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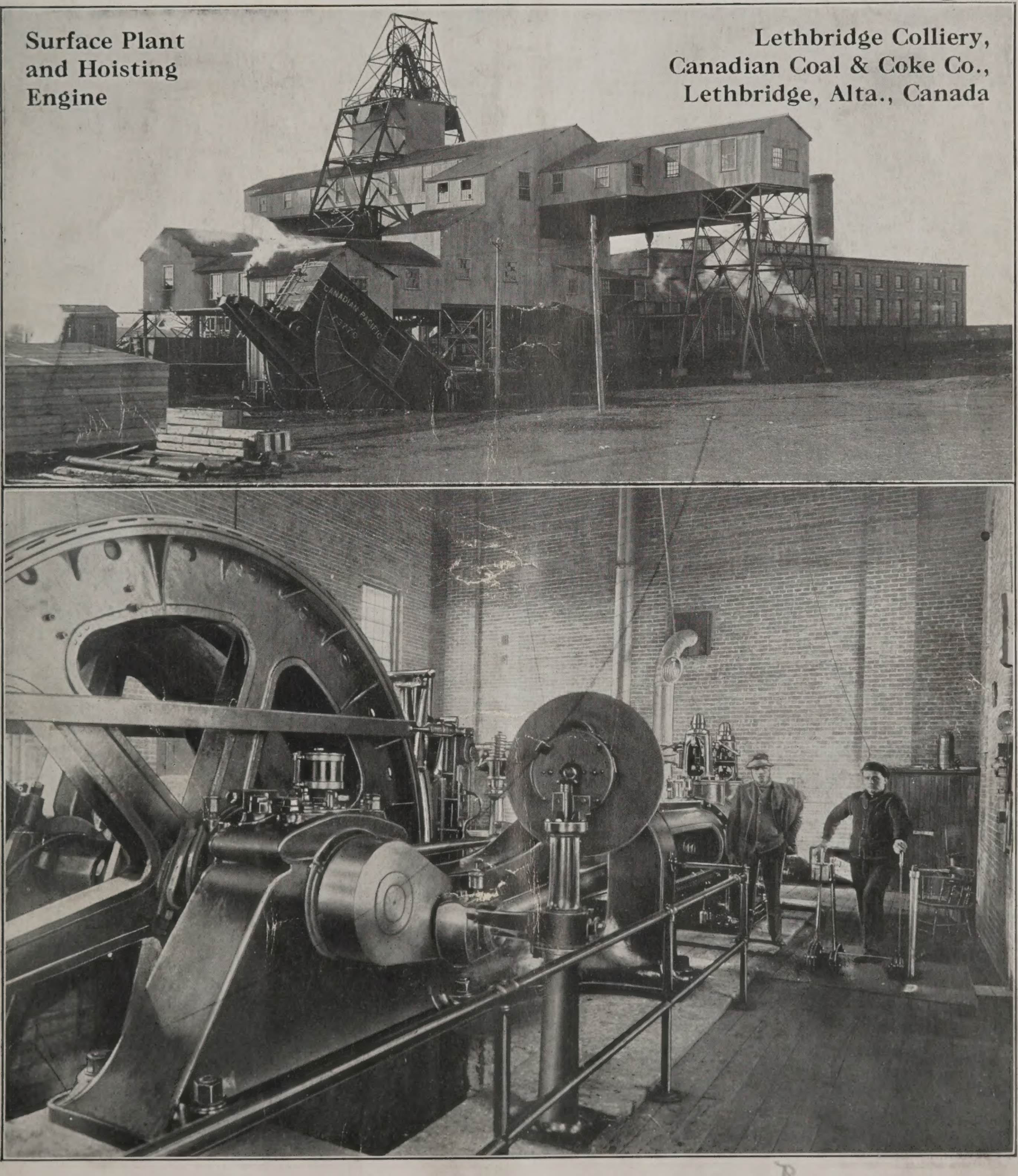
COAL AGE

Volume 7, No. 1
Issued Every Saturday
Hill Publishing Company

NEW YORK, JANUARY 2, 1915

Price, Ten Cents
Contents, First Page
Advertising Index Last Page



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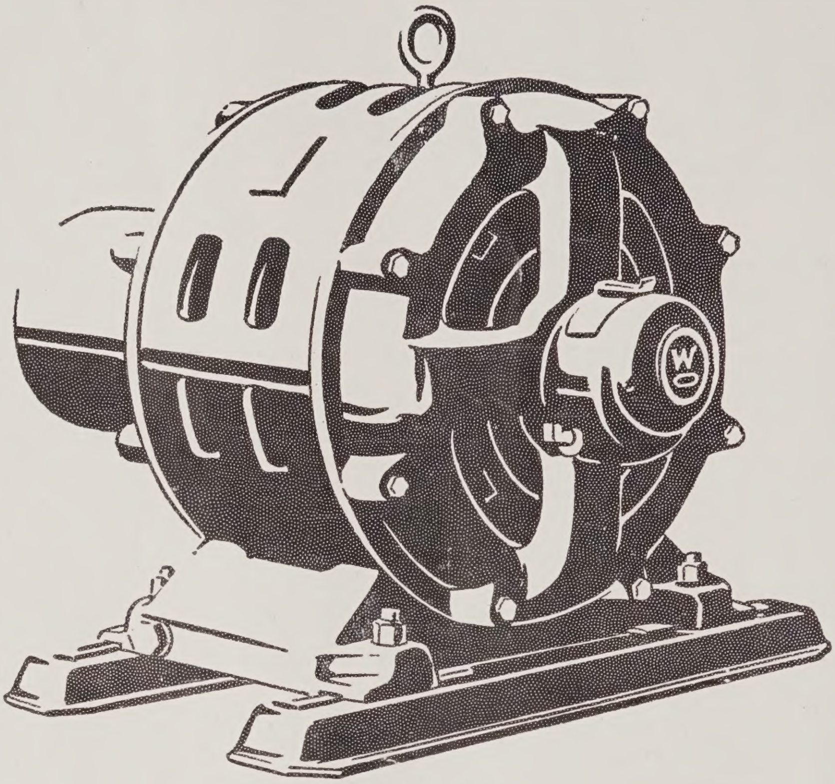

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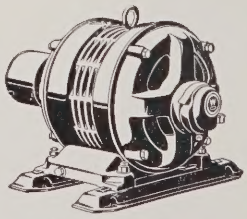

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COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any post-office in the United States or possessions, and Mexico. $4 to Canada.

Published Weekly By **HILL PUBLISHING COMPANY**
Tenth Avenue at 36th Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T MCKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

$5 or its equivalent to any other foreign country. Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England.
Notice to change address should be written to the New York Office in every instance.
Advertising copy should reach New York Office by Thursday of week prior to date of issue.
Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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The Weekly Ad-Talk Page

New Year Vows

By WALT MASON

AT this glad time we make our vows, as many as the law allows. "Here's where we cut out foolish things," we say "and start a-growing wings."

So many pledges do we make, that some of them are sure to break. So many virtues we pursue, we bite off more than we can chew. And three months hence when we look back on broken vows along our track, we feel ashamed, and sadly say, "That sort of pledging doesn't pay."

We're only mortals, after all, our limits close, our orbits small, and we should keep that fact in view, when vows are ripe and years are new. A few sane pledges we can keep, without much strain or loss of sleep, are better far for any man than is the old time wholesale plan.

You fellows, who get out the coal, should make a pledge and keep it whole.

"I'm living on this hustling globe," you say, "where each man tears his robe, to keep up with the other lads, who chase the dollars of our dads. That delegate is sure to lose who doesn't watch his p's and q's; eternal vigilance I need, if I don't wish to go to seed, for in a world where all men strive, the winner, sure, must look alive. My own experience is fine, but it's along a narrow line, and I should know what others do, what policies the rest pursue. I ought to learn from their mistakes, and profit from their dizzy breaks. With others I must get in touch; the yarns they tell will help me much. I'll take the journal of my trade, and through its helpful columns wade, and it will surely put me wise to many things that will surprise. Dodgast me if I ever hedge, on this, my latest New Year pledge!"

This is a vow the mining man who'd follow up a modern plan, and make his methods up to date, will frame at once, and keep it straight. It keeps his finger on the pulse of progress and increased results, and helps him nearer to the goal of cheaper, more and cleaner coal. Just try it out this coming year, and see some worries disappear!

COAL AGE

Vol. 7 NEW YORK, JANUARY 2, 1915 No. 1

Are *You* Thoroughly Posted on Explosives?

If several demonstrators of rival powder companies get busy at a mine simultaneously, every one connected with that mine will be talking gas pressure and velocity and shattering effects and ammonium nitrate and organic nitrate, etc., and, what's more, they will enjoy the discussion.

> *There are many mine foremen and mine superintendents who have a very hazy understanding of explosives. To all such we would like to suggest that they cultivate the acquaintance of a few powder salesmen and demonstrators and if any of them request the privilege of a test for their explosive, by all means become enthusiastic at once.*

We know of several instances where powder demonstrators have made possible a cleaner grade of coal with a lower powder cost to the miner. Because it happens that as a rule miners have to pay the explosives bill, many superintendents take only small interest in that part of the game.

When permissible explosives were first exploited, these same mine officials adopted the new powders and are still using them; however, if you question these men you'll find that they don't even know that many changes have been made in explosives since then, and that each new brand put on the market meets a need that some mine manager, superintendent or engineer has suggested.

If left to themselves, miners always purchase the most powerful explosive that they can obtain. It ought to be evident, therefore, that if a superintendent forbids his miners the use of dynamite and rules simply that they must use a permissible explosive, he is still leaving too much to their discretion.

He may pat himself on the back and say that he has accomplished something from a safety standpoint, but he has not fulfilled his obligations to his employer who has a right to expect the best product that the mine can produce.

And the superintendent is not the only one who can learn from the powder demonstrator. To make the best showing the demonstrator has to determine the most advantageous positions for his holes and also the most economical number required; he does this by drawing on his experiences at other mines where conditions were similar, and also by discussing the matter with the miners who seem to be getting the best results. By the time he finishes his labors, he is quite likely to have hit on a system that will be adopted as standard by all of the men employed in that particular mine.

If several demonstrators for rival companies are working simultaneously, the interest becomes so keen that the post office is liable to be kept busy handling requests for powder information addressed to the Bureau of Mines. It is also at this time that the Bureau's published circulars on explosives are resurrected and passed around very much as the small boy circulates his favorite dime thriller.

Water Sealing the Wet Jed Shafts

By R. G. Johnson*

SYNOPSIS—By a proper method of lining a wet shaft with reinforced concrete and then forcing grout under pressure into the space between the lining and the rock, the influx of water was reduced from approximately 600 gal. per min. to about a pint.

The Jed shafts, near Welch, W. Va., have been completely water-sealed. These shafts were known as being among the wettest in any of the bituminous-coal fields, but by means of a heavily reinforced-concrete lining with a special backing designed to resist the force of cement grout placed under pressure, they were successfully sealed; the flow in the shafts being cut down from something in the neighborhood of 600 gal. of water per min. to possibly a pint.

The methods used and the results obtained in face of the extreme rock and water conditions were new and so full of possibilities for the future that a number of prominent mining engineers made special trips to Jed to see the work, and because of its nature it is believed a description of the procedure followed will be of interest.

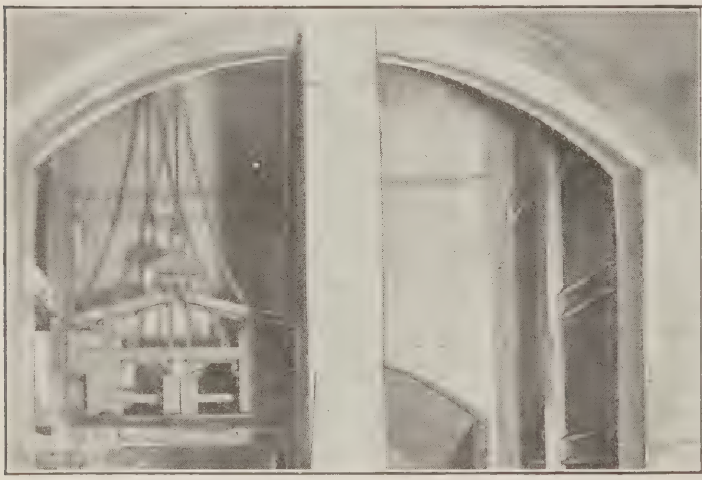

Fig. 1. Foot of Hoist Shaft, Showing Arch and Dry Concrete Lining

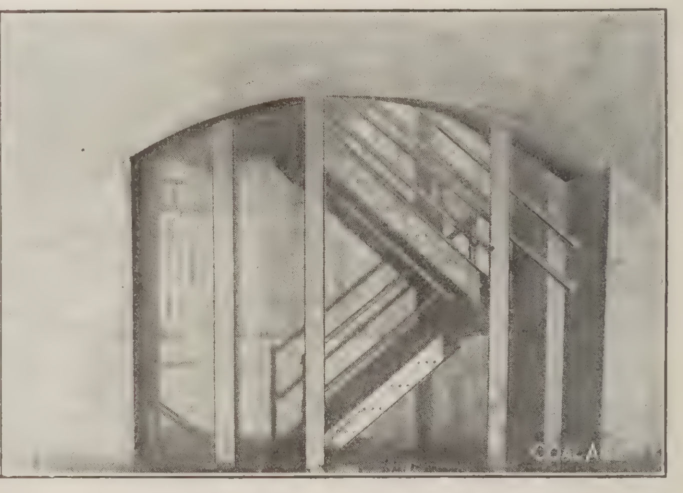

Fig. 2. Bottom of Air Shaft, Showing Foot of Steel Stairway

The mine was formerly the property of the Jed Coal & Coke Co., and is situated about two and a half miles south of Welch, W. Va., on Tug River. In June, 1913, the property was bought from the receivers of the above named company by the New River & Pocahontas Consolidated Coal Co., the West Virginia corporation of the Berwind interests. Shortly before the purchase, however, the question of handling the water in the shafts was discussed by the management of the coal company H. M. Bertolet, who is at the head of the operations of the coal company, knowing the success of rock grouting in some of the recent mine shafts, called in the Dravo Contracting Co., of Pittsburgh, to investigate the water and rock conditions in the shafts, with a view to sealing the shafts, if practicable.

With G. S. Borden, chief engineer of the coal company, the writer took cross-sections in the rock at 5-ft. intervals up the hoist shaft, noting rock structure and plotting water flows. A plan was prepared showing the clear inside dimensions of the shaft arranged to take care of the new mine cars which the coal company proposed to use after its remodeling of the mine workings. The position of the new plan was projected on the old shaft layout, and a heavily reinforced concrete lining backed with corrugated sheet iron and canvas was designed, so as to form drainage channels leading to flanged grout pipes, which extended to the inner face of the concrete lining, to lead the water through the lining into the shaft.

Before giving the details of the design, it is absolutely necessary to know something of the history of the conditions which were encountered in the actual sinking of the shafts.

Sinking Original Shafts

The shaft sinking was started in the hoist and air shafts in October, 1905, and almost immediately water in large quantities was encountered in both. The volume of water constantly increased as the sinking progressed. For the first 120 ft., which was in white sandstone, the rock was much broken, so that the water instead of coming from the ribs of the shafts continued to come from the bottom, making it impossible to construct rings for the handling of the water. These conditions of rock and water were found in both shafts. However, from the fact that the deeper shaft soon drained the shallower, it was evident that the two were connected through the crevices.

In the hoist shaft, at a depth of 120 ft., the largest feeder was struck. This was in the shape of a sheet of water about 2 ft. wide and 2 in. thick, and practically represented the accumulation of what the shaft had been making down to this point. It was also evident that an impervious stratum had been encountered in the sinking, for with progress below that point in the hoist shaft the water continued to come from the rib.

When this shaft was 140 ft. deep, or 20 ft. below the largest feeder, it was decided to discontinue sinking and install a pumping plant which would take care of the water until the air shaft was completed, it being found that the impervious stratum drained to the hoist shaft. This was done, the air shaft known as No. 2 was sunk to the bottom, a large sump was excavated, a heading driven in the coal to a point directly underneath No. 1 shaft, and the permanent pumping plant installed at the bottom of No. 2. A bore hole was then driven from the bottom of No. 1 to the heading, draining the water to the main pumps.

---

*Engineer, the Dravo Contracting Co., Pittsburgh, Penn.

But on Dec. 8, 1906, just as the sinking of the hoist shaft was about to be started again, the failure of the valves on a 1500-gal. direct-acting pump which the coal company had installed in the permanent pump room, and the failure of the company to have repair parts on the ground, caused the flooding of both shafts. The pump was at that time running constantly up to its capacity, and an additional 1000-gal. Jeanesville and a No. 12 Cameron pump were being installed in the pump room.

Pumping from the contractor's sinking plant was commenced in the flooded air shaft with two No. 10 Cameron's. These being unable to handle the water, three Emerson pumps, two 4-in. and one 5-in., were expressed in and placed in the hoist shaft. They were unsatisfactory, due chiefly to the high lift and to the wet steam, so another No. 12 Cameron pump was put in and the Emerson pumps removed. It was found necessary, however, to add more pumps before dependable progress could be made, and the final water-handling outfit required to lower the water so that the big Jeanesville in the pump chamber in the mine could be recovered consisted of two No. 12 Cameron's, three No. 10's and a Wineman pump, about the size of a No. 10 Cameron.

The lost Jeanesville was finally reached on the 24th day of January and on the 30th the water was lowered so that new valves could be put in. The sump was promptly drained and the additional Jeanesville, as well as the No. 12 Cameron, were at once put in running order, the plug shot out of the bore hole in the hoist shaft, and sinking resumed. Throughout a 60-ft. section or from a point 15 ft. above to 45 ft. below the largest feeder of water the shaft was timbered with sets and lagging, and a ring placed at a depth of 175 ft. from the top. In the balance of the shafts, buntons to support the guides were hitched into the ribs. This later, however, proved a very unsatisfactory construction. The entire operation of pumping the drowned shafts took six weeks, from 1500 to 2500 gal. of water per min. being handled continuously; there was also the constant changing and lowering of the pumps. The hoist shaft was bottomed on June 4, 1907.

THE DESIGN OF A LINING

From this brief history, the extreme conditions which had to be taken into consideration in the design of a lining are probably clear. It was deemed advisable to plan not only for the hydrostatic head equal to the depth of the new shaft to the ring below the first impervious stratum, which was practically 170 ft., but to reinforce for the pressure of the grout which would be necessary to drive back the water which itself would be under the pressure due to this head when prevented by the lining from entering the shafts. In the actual grouting this was not found to have been absolutely necessary, although the extra cost of reinforcement was good insurance.

Below the ring the lining was designed to withstand only the pressure which it was figured would accumulate and possibly bank up, as it were, between two or three other impervious strata. It was necessary, therefore, to design and construct the lining heaviest at the ring in the hoist shaft and to reduce the amount of reinforcement gradually, as the lining was constructed up from this point. Below the ring, local conditions as they were uncovered in the actual operation of lining were to govern the placing of the reinforcement.

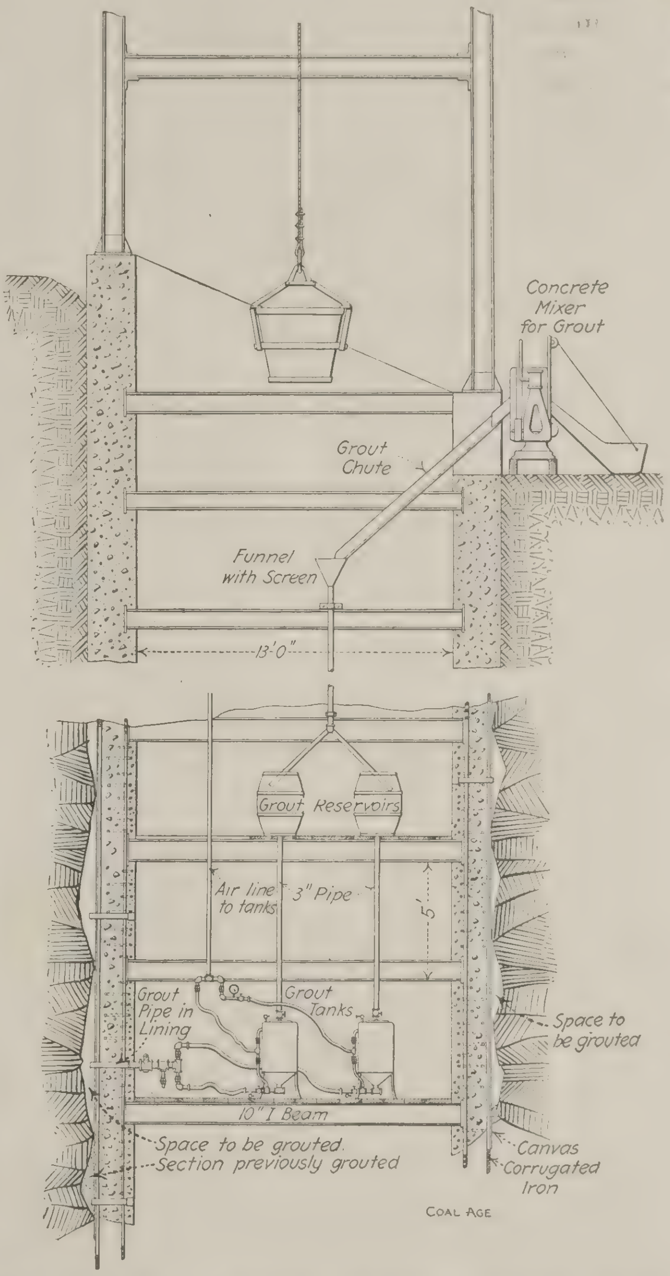

FIG. 3. VERTICAL SECTION OF SHAFT, SHOWING GROUTING APPARATUS

The design of a reinforced lining for a shaft is fortunately governed by natural conditions which determine the placing of the steel. Although the shaft sinker attempts to drill and load the shot holes so as to have the rock break to a certain line, the rib is usually so shattered that it presents a very irregular surface. In lining, therefore, the concrete will be of different thicknesses at different points.

Since the lining between buntons takes the form of a panel system, much like a paneled floor in a reinforced-concrete building, it follows that the greater the thickness of lining, the less reinforcement per foot is required. It was necessary, therefore, in designing a lining to provide for certain quantities of reinforcing steel for certain thicknesses of concrete at different depths in the shaft down to the 170-ft. point, to which it was figured the hydrostatic head would act. The accompanying drawings show the method of reinforcement and the manner in which the stresses in the panels were carried to the buntons which acted as columns.

It may be noted that a different system of reinforcement was considered before the final design was decided on. This contemplated drilling holes in the rock rib and inserting wedge bolts with loops on the outside end. These bolts were to be placed 2 ft. apart, vertically and horizontally, around the rock walls of the shaft. It was then planned to pass reinforcement through the loop holes at the end of these wedge bolts.

The concrete lining in this way would be fastened to the rock ribs and the pressure of the grout would find, of course, much shorter beams to act against. Buntons could have been made much smaller and considerably less reinforcement used, for the span of the panels would have been much smaller. But the scheme presented certain disadvantages which it was decided heavily overweighed the cheapness of the construction.

As above noted, the rock rib was so broken in structure that it was felt that an absolute certainty of the strength of the construction could not be depended upon. Again, the corrugated iron and canvas backing to the lining was deemed an essential feature and, as later proved, was a very necessary one. This could not have been placed around the wedge bolts to completely shed the water with any certainty. Again it was felt that directly underneath the bolts there might be possibly a small channel which would lead the water from the rock rib to the line of reinforcement which would be about 2 in. from the inner or shaft face of the concrete. In this case, it would have been impossible to prevent the lining from leaking. The cheaper scheme was, therefore, discarded on account of its uncertainty.

The biggest feature of the lining as finally constructed was the iron and canvas backing. The canvas was placed, as noted in Fig. 4, so that the grout would be forced into the weave of the cloth and so form an impervious mat behind the actual concrete. The sheet iron formed a stiff drainage channel to conduct the water from the rock behind the lining.

After the minimum thickness of concrete lining had been decided, the necessary enlargements of the shafts were determined, costs estimated, and contracts for the work were closed with the Dravo Contracting Co., of Pittsburgh.

ACTUAL CONSTRUCTION

The hoist shaft was turned over to the contractors about the first of August, 1913. The shaft bottom was found to be in such shape, however, that concrete arching for a distance of 20 ft. on each side of the hoist shaft was deemed advisable, and the work of the excavation therefor and the cleaning out, widening of entries and the taking down of roof necessary for this arching were commenced. Due to certain other bottom work which the coal company wanted the contractors to do, the actual lining of the shafts was not started until Oct. 18.

The routine of the work of lining was as follows: Guides and hitch buntons were removed for a distance of, say 15 or 20 ft. The shaft section was then enlarged, the drilling being done with Sullivan DB-19 hammer drills and Ingersoll jackhamers. After the rib was shot and trimmed, the muck was removed from the scaffold and a set of concrete forms placed. These forms were made in sections to cover five vertical feet of shaft. They were dapped at bunton points to permit the placing of the steel H-beam buntons.

After the forms were braced to line and level, the corrugated iron and canvas backing was hung, directing the course of the water from the rib at the section of concrete to be placed to the drainage channels behind the section of lining last poured, which water would then flow out through grout pipes which connected the drainage channels to the concrete forms. The reinforcement was then put in place, according to the plans applying to the depth and according to the thickness of the lining at that point. After cleaning the top surface of the section of concrete previously placed, removing the keys in the old concrete and covering the surface with cement grout, the pouring of the concrete was started.

After the section was poured, scaffolding in the center was piled to the sides and the men went to the lowest section of forms which had been left in place and dismantled and brought it to the surface, where it was repaired and coated with an oily preparation to prevent the concrete sticking when it was next to be used. The cycle of work to prepare for the concreting of the next form was then resumed.

The work was interrupted at several times by certain operations of the coal company, which were necessary to its interests. These various interruptions caused a total delay of probably a month and a half in the completion of the hoist shaft. It required on an average two days to perform all the operations incident to the placing of a 5-ft. section of lining. Toward the top of the shaft, 25 vertical ft. of concrete were placed per week, while from the ring up through the wettest section, a 5-ft. form of concrete often required three days. The construction of temporary water rings and the placing of a box at the main feeder which acted as a funnel and connected to a pipe in the shaft leading to a motor-driven centrifugal pump at the bottom required especial care and considerable time.

The concrete was thoroughly spaded to remove all air bubbles and their consequent voids. The importance of well worked concrete was so impressed on the shift bosses, and the actual placing of the material so watched by the superintendent personally that at no joint in either shaft did the concrete leak, even in the wettest sections. To the actual thoroughness with which the men did their work is attributed the biggest measure of the success of the proposition.

The water was of such fine quality for drinking purposes that it was suggested that it might be possible to save some of it by running a 6-in. pipe in the concrete lining vertically from the box at the large feeder to the top of the shaft, it being the intention to place a deep-well pump therein. The pipe was placed but, as it developed later, the grouting forced the water supply so far from the bottom of the pipe that none entered it, and the scheme had to be abandoned. After the lining was completed and the guides placed in the hoist shaft, the grout pipes that were making water were piped to the sump, the pipe being laid close to the concrete lining so that the cages could be operated.

Since the rock was so broken that the crevices in the strata connected the two shafts, it was decided to line the air shaft completely before attempting to grout the hoist shaft. The work here required no unusual methods or schemes that were not employed in the hoist shaft.

Grouting Operations

On the completion of the air shaft, preparations were made for the grouting of the hoist shaft. This latter with its grout pipes connected and leading to the sump had been in use by the coal company for four months for reconstruction work in the mine. A small motor-driven fan had been rigged up in one of the entries at the bottom and provided air for a limited operation of the mine while the contractors were working in the air shaft.

The lining was figured to stand the pressure for a 100-ft. hydrostatic head, that is, the plug cocks on the grout pipes for the 100-ft. section of lining could be completely shut while the grouting operation was proceeding at the bottom. However, to make assurance doubly sure the lining was grouted in much shorter sections.

The grout tanks which were arranged in connection with the mixer as shown in Fig. 3 were placed at the hole to be grouted. They were connected in a battery of two and were filled from barrels placed on a scaffolding just above, which barrels in turn were filled by pipe from the grout mixer at the top of the shaft. This was a new departure in shaft grouting and the arrangement was responsible for a speed of at least three times that attained by the old method. Speed was one of the most important requirements, since the coal company had only a limited supply of fuel for the boilers and had this been exhausted it would have been necessary to ship in coal from other mines or to interrupt the work of grouting in order to mine it. The arrangement of pipes, tanks and grout machines, worked admirably in every case.

The first operation in the grouting was to put a pressure gage on the hole to be treated. This would indicate the approximate pressure required to force grout into the hole. The tanks were then connected to the hole and grout forced in under the figured pressure, especial care being taken to see that this did not run over the limiting pressure for which the lining was designed.

Grout mixed to the consistency of a thick cream was forced into the hole until it commenced to run out of the hole directly above the one being treated. However, if the hole showing the grout was only 5 or 10 ft. above the one being grouted, the plug cock on the upper hole would be closed and the process continued until grout appeared in the hole next higher in the shaft. Grouting would then be discontinued, the machines raised to a higher level and connected to the hole last showing the grout. The operation was then continued in this manner until the entire shaft had been treated.

It was necessary on several occasions to come back to old holes and to regrout leaks around the pipes, doubtless caused by shrinkage in the cement. Such leaks required double the pressure that the initial grouting took, but the lining was amply strong to stand loads of this kind, for the force of the regrouting was, of course, expended over only a small area behind the lining. In the case of the original grouting, the pressure would be exerted over a large area, since the drainage channels always made a big void between the lining and the rock. The grouting in the hoist shaft required practically 1350 bbl. of cement and was completed in about 12 days.

On Sept. 14 the grouting in the air shaft was started. No unusual difficulties were encountered in this shaft, although a higher pressure was required. It was the intention of Mr. Bertolet to save a portion of the water from the air shaft for town purposes. Accordingly, the shaft was grouted up to the point of greatest water influx and the grout tanks moved to a much higher position in the shaft. The strata, however, were so broken up that although the lining at the upper point had been bonded to the rock rib, the grout came down through the rock and appeared with the water which it was intended to pipe to the town supply tank. The effort to save this supply was then abandoned and the shaft completely grouted. The entire operation of grouting the air shaft required only four days, in which time 1129 bbl. of cement were forced into the rock crevices behind the lining.

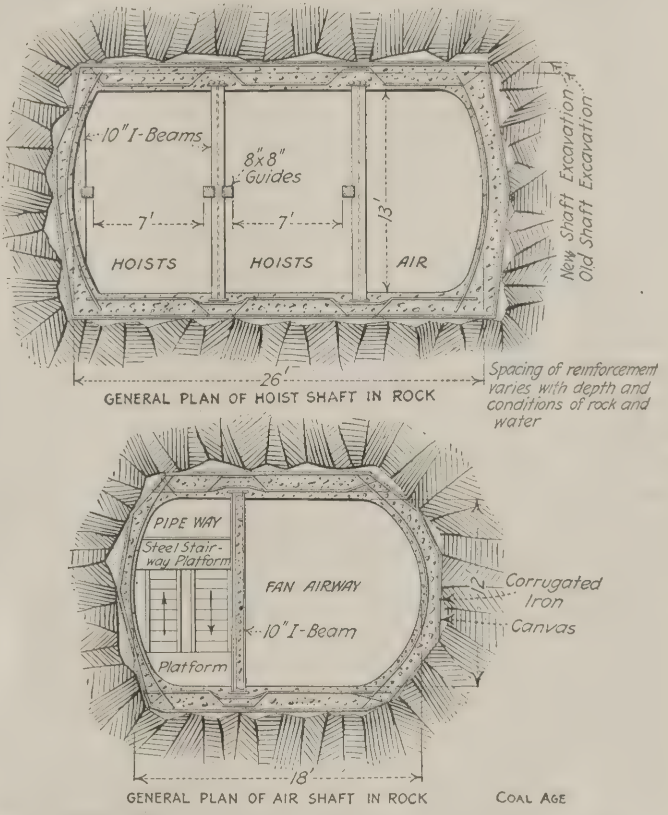

Fig. 4. Cross-Section of Air and Hoist Shafts, Showing Method of Reinforcing

A pressure of 50 lb. per sq.in. is low for ordinary grouting operations in rock, or even if applied through the linings in a circular tunnel or shaft, but when it is realized that the pressure on the back of this lining amounted to 3½ tons per sq.ft. on a flat-sided shaft, it must be readily seen that the extreme care used in placing the lining and in watching the pressure of the grout tanks was more than justified.

It was even figured that the concrete on the lower side of the reinforcement, considering a section of lining as a beam, should be allowed to crack in order that the reinforcement might take its full load. However, there were no cracks perceptible when the lining was completed. This was unquestionably due to the fact that the shaft was grouted in shorter sections than was contemplated when the design was made. It was known and realized from the start that these extra precautions had to be taken. While the picked crew which was brought from shaft regions of western Pennsylvania at the very start of the job were the ones who saw the work through to completion, it was, nevertheless, apparent that the placing of reinforcement in such a place and under such conditions could not conform accurately to the positions noted on the drawings.

Some mining engineers are dubious regarding the question of grouting in shafts, believing that the water which is so shut off will come eventually into the mine. Local rock conditions must, of course, govern this. If there are impervious strata 50 ft. or more above the coal, the chances are that water grouted from the shafts above this point will not enter the mine. In this section, or near Welch, W. Va., there is a fairly solid stratum above the coal, but the upper rocks are much more broken in structure than in other sections of West Virginia. There have been high falls of roof in the Jed mine, now called by the present owners "Havaco Mine"; yet the water which was grouted off from the shafts has not come through into the workings.

The Pumping Now Required

Two 500-gal. centrifugal pumps were required to handle the combined shaft and mine water just before the grouting started. Now, one 500-gal. pump, running only a part of the time, readily ejects the entire flow which, of course, now comes only from the mine itself.

The wisdom of such an expensive piece of construction for the sole purpose of shutting off 600 gal. of water per min. might possibly be questioned, but pumping costs and the saving of the delays and incidental inconveniences due to handling coal in a wet shaft bottom are the best answers to such arguments. The saving in actual horsepower formerly required for pumping will alone pay 10 per cent. on the cost of the actual lining and grouting. Of course, there are other distinct advantages in having an absolutely dry shaft other than the saving of actual boiler horsepower in pumping. The forming of ice on the guides in the winter time under original conditions was a constant source of danger, delay and expense, and unquestionably the amount lost because of such delays would pay the interest on the cost of the incidental construction which the coal company added to the shafts. These took the form of an extra-heavy steel stairway, a concrete partition wall in the air shaft, and concrete arching at the shaft bottom.

The scheme above described was designed by and its execution carried out under the supervision of the writer, with Maurice H. Rupert as superintendent in active charge of the work on the ground.

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If a current of electricity flows through any conductor, a certain definite portion of the electrical energy supplied will be required to overcome resistance and transmit the current between any two points along the path. This energy of transmission, as it is called, is never lost, but is converted into heat. Heat will be developed whenever any electric current flows through any conductor or part thereof, the amount being directly proportional to the resistance of the conductor and to the square of the current.

Repairing Pipe Leaks

I have found the following repairs successful, says James E. Nobel, in *Power*. A 4-in. cast-iron pipe broke apart under a building foundation. To enable us to turn the water on again as soon as possible, I used the clamp *A*, 6 in. wide and ¼ in. thick (Figs. 1 and 2), with sheet-rubber packing wrapped around the pipe, and two pieces of sheet copper *D* and D_1 6 in. wide, where the edges of the clamp came together. This job was done seven years ago and is still giving satisfaction.

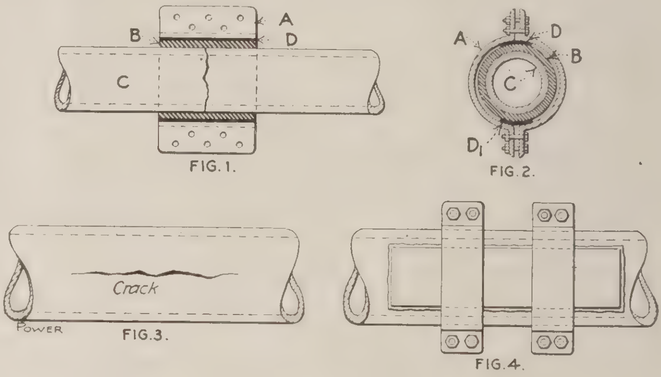


FIG. 1. FIG. 2. FIG. 3. FIG. 4.

Methods of Clamping Broken Pipes

Another 6-in. cast-iron water pipe had a 15-in. crack, Fig. 3. A piece of ¼-in. iron 4 in. wide formed to the shape of the pipe, with sheet rubber placed under it, was clamped over the break, Fig. 4. This has also proved successful.

A 3-in. steam pipe leaked at the flanges, because the threaded ends were badly corroded. A copper sleeve and a 5-in. pipe 8 in. long were slipped over the opening after the flanges were removed, Fig. 5. The space between the outside of the 3-in. pipe and the inside of the 5-in. pipe was then filled with Smooth-On, iron and elastic cement mixed. Heat from a blow torch was then applied for half an hour, and in two hours steam was turned on.

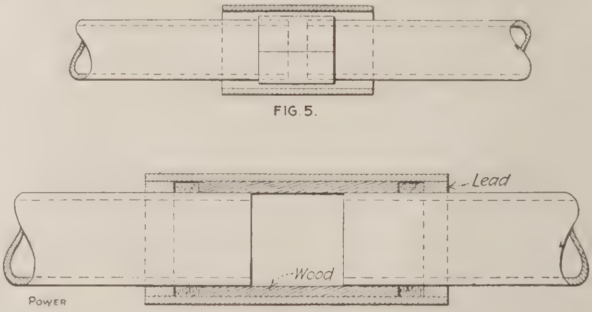


FIG. 5. FIG. 6.

Joining Pipe Ends with Sleeves

In extending a cast-iron water main it was found that what should have been the connecting length was a foot short and there was no more pipe of the same size on hand. Instead of sending to the city for a pipe and sleeve, one of the men went into the workshop and in a few minutes turned out a wooden sleeve 16 in. long to fit over the pipe. Next a 20-in. piece of larger pipe was cut and placed over the pipe ends and the wooden sleeve, Fig. 6. The joint was then run with lead in the usual way.

A Successful Automatic Gate

By H. M. Kanarr*

SYNOPSIS—A device is driven by the hoisting engine, which opens the shaft gate at the ground landing when the cage is stopped there. It also prevents over-winding, shutting off steam and applying the brakes when a predetermined point in the headframe is passed.

An automatic gate, designed to protect the ground landing of a hoisting shaft, which has been invented and patented by I. J. Harvey, a division superintendent for the Rochester & Pittsburgh Coal & Iron Co., is being tried out at the Sykes shaft of the Jefferson & Clearfield Coal & Iron Co., at Sykesville, Penn. Thus far the device has proven entirely satisfactory.

This particular device is operated by compressed air, although it might be steam driven were the air not available. The controlling mechanism, which is mounted on a small frame adjacent to the hoisting engine, is driven from the main drum shaft through a sprocket wheel and chain. The speed of the engine and the depth of the shaft determine the relative gear ratios of the two sprocket wheels.

The engine, in hoisting, rotates a rod about 1¼ in. in diameter and 3 ft. long, on which is cut a special screw thread with a pitch of about one-half inch, the rod thus making two revolutions per inch of travel of the screw thread. This screw operates a slide which is mounted on a small rod just below and parallel to it.

At one point in its travel, this slide comes in contact with and depresses a lever for opening the valve which admits the compressed air into a cylinder standing vertically against the front wall of the engine house. This cylinder is approximately 8 ft. long, and is made from a 6-in. pipe. A piston or plunger operates within it, which is connected with the gate at the shaft by means of a wire rope passing over suitable sheaves. The gate slides up and down on two 2-in. pipe guides, the vertical travel of the piston in the engine house being just sufficient to raise the gate the distance required for car clearance.

When the cage does not stop at the lower landing, the slide passes over the operating lever so quickly that only a small amount of air is admitted to the cylinder, an amount insufficient to cause any piston movement. When a stop at this landing is made, however, the lever is held open by the slide, and the air in the cylinder holds the gate suspended until the cage is moved, when the slide releases the lever to its normal position, which, in turn, releases the piston and the gate descends. A short helical spring on the piston rod cushions whatever shock may be caused by this action.

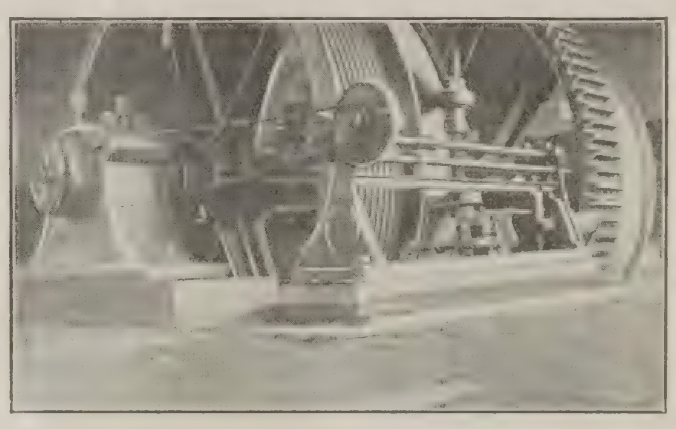
Over-Winding Is Prevented

In addition to operating the gate as above described, this device is arranged so as to prevent the cage passing a predetermined point. It thus forestalls over-winding. A small lever adjustable with a threaded nut is placed at the end of the frame on which the operating slide travels, and when the cage passes a predetermined position in the head frame, the slide comes in contact with a small lever tripping it, and thus putting the entire air pressure against a piston attached to the throttle, closing it immediately and through another piston applying the brakes to the hoisting drums. In order to move the engine again, it is necessary to shut off this emergency pressure, which may be done by suitable valves, after which the safety trigger may be again set and the engine operated as usual.

It has been found by actual test that it is impossible for the hoisting engineer to hold the throttle open against the air pressure, or to open it until the pressure has been released, while the braking effect is sufficient to stop the engine almost instantly.

The Gate Requires No Attention

The gate is entirely automatic in its operation, requiring no attention from the engineer other than to see that the mechanism is in working order and the proper adjustments made. All of the driving mechanism is in a warm room and is not affected therefore by freezing temperatures. The only part exposed is the gate, and its operation on the slides may be assured during cold weather by admitting a small amount of steam to the 2-in. pipe guides, thus keeping them absolutely free from snow and ice. The engineer can always see at a glance the position of the gate by noting the location of the piston at the front of the building.



Mechanism Controlling the Gate

The accompanying photograph shows all of the operating mechanism, except the cylinder and piston, which raises and lowers the gate. It will be noticed that in this particular case the device is arranged for a single-compartment shaft. In a double-compartment shaft, two screws and slides would be required. These might be mounted on the same frame and driven by the same sprocket. Two cylinders and pistons would, however, be necessary.

Gates similar to the above have been installed at the Stanley shaft of the Rochester & Pittsburgh Coal & Iron Co., at Helvetia, Penn., and at a double-compartment shaft of the same company at Lucerne mine near Homer City, Penn.

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*Chief engineer, Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Penn.

The Value of Anthracite Steam Coals

By Reginald Trautschold*

SYNOPSIS—A study of some economic considerations in the use of the anthracite steam coals. The actual heat values fluctuate according to delivered prices and hence vary in different sections of the country. Grate bars should also be designed with a view to further increases in the cost of coal.

With rice coal at two dollars the ton, buckwheat a dollar more, pea still another extra dollar and nut probably two dollars more than pea—each one an excellent steam fuel—the selection of the most economic anthracite to burn in any plant is a question surrounded by varying difficulties. The cheap smaller coals are harder to burn economically, lower in heating value and contain considerably more ash and refuse than do the more expensive grades. There are disadvantages or drawbacks on one side of the equation and dollars on the other. The steadily increasing cost of anthracite coals is also continually upsetting the balance of the equation, so that the economical coal of yesterday may not be the cheapest today. To complicate the problem still further, the economic balance is not the same in all localities.

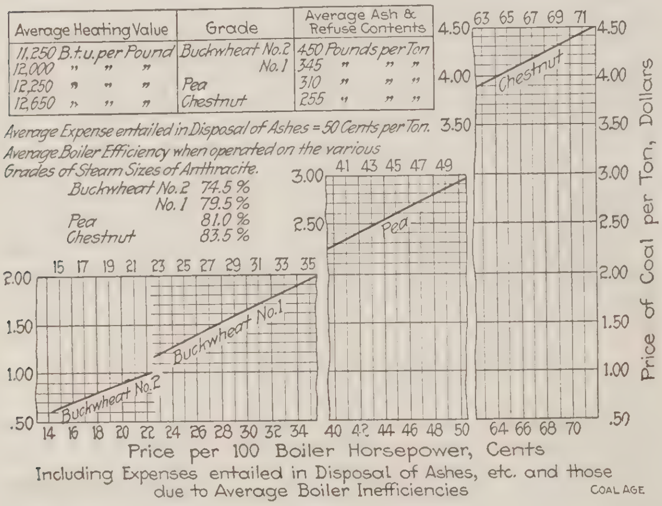

Chart I, Showing Costs per 100 Boiler Horsepower

Irregularities in Values

At the mines, the relative value of the various sizes of anthracite has not varied as much as at points requiring long rail hauls, etc. However, culm and barley have acquired a certain value since the not very remote days when they were practically worthless, or worse, while the larger coals have increased in cost fairly proportionally, the price being regulated by cost of production and by the demand. Within range of wagon or automobile delivery from the mines, the economic value of the anthracites varies inversely with the size. That is, the smaller the coal, the greater the heating value obtained for a given outlay.

The relative economy does not, however, necessarily vary with the price of the coal nor its heating value, at least it does not vary directly. While the heating value increases with the size of coal—considering only the washery sizes and the smaller prepared sizes—it must also be remembered that the ash content and other refuse decrease in proportion as these coals advance in size. These dilutants not only necessitate an expenditure for their removal, but have a tendency to reduce the boiler efficiency of the plant. The greater the proportion of ash, the more that has to be expended for its disposal and also the lower the thermal efficiency of the boiler, even though the different sizes of coal burned do contain the same heating value. The ash and refuse contents of any fuel tend always to reduce the transfer of heat to the boiler. The effect of these noncombustibles is not so marked, on account of their relatively small proportion, as the benefits derived from increased heating value, but they must nevertheless be considered if economic efficiency is to be realized in the choice of fuel.

The Steam Sizes and the Basis of Comparison

Any grade of anthracite, even culm, can be burned so that it has a certain heating value, more or less constant for standard sizes of coal, and correspondingly an economic value, which latter is governed by its heating value, ash and refuse contents. Culm and barley do not lend themselves to efficient use, however, without briquetting or pulverizing, operations which add materially to the cost of the fuel. Though anthracite briquettes do prove economical when the proper binder is employed and the combustion of coal dust has been successfully and profitably undertaken, neither of these two methods of utilizing low grades of anthracite comes under the scope of this discussion.

Rice, or buckwheat No. 2, can be successfully and economically burned on grates especially designed for such fuel, buckwheat No. 1 is rapidly becoming a standard size for power purposes, pea is, of course, the recognized standard steam coal among the anthracites and chestnut is an excellent, though costly, steam fuel. These four standard grades of hard coal may then be considered as embracing all the anthracite steam fuels and their relative economic value for power purposes will be taken up, both at the mines and at a market comparatively distant from the source of supply.

A convenient base for comparing the value of coals as steam producers is the quantity required to develop the necessary heat for 100 boiler hp. with a boiler efficiency of 100 per cent. A boiler horsepower is equivalent to 33,317 B.t.u. per hr., the heat required to convert 34.5 lb. of water into steam from and at 212° F., or practically equivalent to an evaporation of 30 lb. of water from 100° F. into steam at 70 lb. gage pressure. If all grades of coal could be burned with equal efficiency—that is, if the boiler efficiency were the same for all grades of fuel—

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the economic value of the various grades would vary according to their heating value. But there is frequently considerable difference.

For instance, the average heating value of buckwheat No. 1 is about 6⅔ per cent. greater than No. 2, while the ash and refuse contents of the former average something like 21 per cent. less. Therefore, the average efficiency of a boiler with grates designed for the use of buckwheat No. 1 would be nearly 7 per cent. greater than a similar boiler fired on rice, the same care and efficiency being employed in burning the two grades of fuel and the respective grates equally well proportioned. At the mines or in localities where coal can be purchased at similar rates, this variation in boiler efficiency and the additional expense entailed in disposing of the greater quantity of ashes and refuse from the poorer grade of coal mean that though buckwheat No. 1 costs nearly 100 per cent. more than rice, its net cost per 100 boiler hp. averages but about 75 per cent. more. Other grades of steam sizes of anthracite are affected in a similar way.

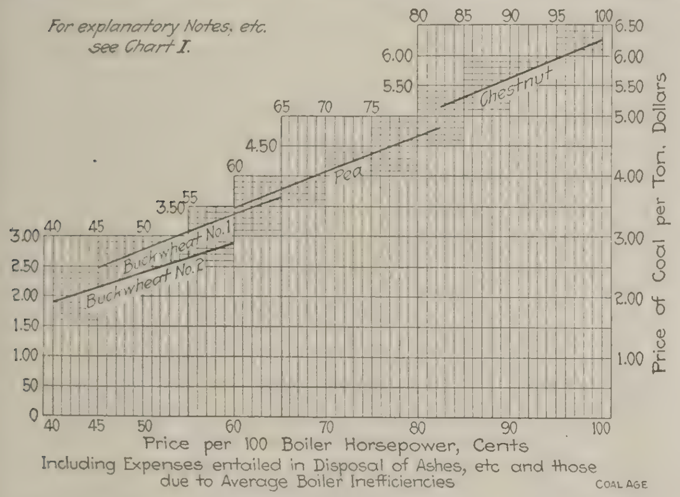


Chart II, Showing Costs per 100 Boiler Horsepower at New York

Value per Boiler Horsepower on Mine Prices

Based on mine prices, Chart I graphically depicts the net cost of the various grades of anthracite per 100 boiler hp. with coal commanding different prices per ton, due allowance being made for expenses entailed by the presence of ash and other refuse and the losses due to thermal inefficiencies of the average boiler when fired on the various grades of coal. The chart shows that there is a fairly uniform relation existing between the prices of coal at the mines and its cost per power-generating unit, and that the better the coal, the less economical it is for steam-producing purposes, its cost per ton increasing about 50 per cent. more rapidly than its steam-generating power; the chart also indicates the limiting prices that can be economically paid for various grades.

As as example, should rice command a price of $1 per ton and if at the same time buckwheat could be purchased for $1.15 per ton, the higher-grade coal would be the more economical, although containing but 6⅔ per cent. more heat units per pound. Such conditions could not arise at the present rate at which coal is sold, but such rates are not impossible if the progress in efficient burning of rice continues as rapidly as it has during the past few years. The price of buckwheat is regulated almost entirely by demand and not the cost of preparation, which is little or no more than rice costs. If the numerous power houses now fired on buckwheat should modify their grates so as to burn rice instead, a step that at present would effect considerable saving, the price of the poorer grade of coal would go up rapidly and the decreased demand for buckwheat would result in its becoming cheaper so that their respective costs per ton might fall to a difference of 15 per cent. instead of nearly 100 per cent. as at present.

At a distance from the mines the relative value of the small sizes of anthracite may differ considerably from the mine prices; freight and delivery charges have to be added and these are not governed by the heating value of the coals but are based upon weight. Freight rates do vary according to the grade of coal, it is true, being less for the poorer qualities; but delivery charges do not, so that the average price of coal delivered at the power house at a distance from the source of supply bears little relation, so far as the true economic value of the coal is concerned, to the prices current at the mines. Take the New York market, for instance—the average price of buckwheat, delivered, is about 40 per cent. greater than rice, while the average difference at the mines is nearly 2½ times as great. This naturally has considerable effect upon the relative value of the various grades, often reducing the difference to a considerable extent.

Variations According to Freight Burdens

Regarding the freight and delivery costs as fixed charges, just as if the price at the mines had been increased by an equivalent amount, a chart may be plotted to embrace the range of prices through which the various grades of coal may pass and the cost of the coals per 100 boiler hp. for any locality where the market prices fall within its range can be shown. Such a graphic illustration is given in Chart II, covering the range of prices that may be expected in New York; similar charts are equally applicable to any other locality where prices are the same. In such sections of the country the gap between the minimum possible price for pea and the maximum for rice is well overlapped by the average prices of buckwheat and not simply connected by the minimum and maximum prices as at the mines.

Three grades of coal are thus brought within a possible equal value for steam purposes—rice at about $2.87, buckwheat at $3.35 and pea at approximately $3.48 per ton, all being equally economical. At the present time (October, 1914) pea commands more than this figure and rice is obtainable at a better price. Buckwheat has already, or may before long, be counted upon to touch this figure, $3.35 per ton delivered, and the time cannot be far distant when many plants, now operating with pea, will find it to their decided advantage to burn buckwheat and others that now burn buckwheat to fall back on rice. With buckwheat at $3 per ton, it would be economical to remodel a plant so as to operate on rice, provided the latter costs less than $2.65 per ton; and similarly with pea at $3.75 per ton it would pay to use buckwheat at $3.60 per ton.

The foregoing comparisons apply only to localities where the average prices are about the same as in New York. Where anthracite is more expensive, the range of economical coals is greater and the gain derived from abandoning the use of a certain grade for one of poorer quality is not so marked. The nearer the source of supply the greater the economy of using a low-grade product.

The charts presented herewith are based on coals of average heating value, reasonable ash and refuse contents, burned under boilers of ordinary efficiency, and the fuel costs per 100 boiler hp. represents values that can be counted upon with efficient operation. They may be bettered, of course, but if they are not fully realized, the coal used is below specifications or else the boiler efficiency is not what it ought to be. Should better efficiencies or higher heating values than those on which the charts are based be obtained, very close fuel costs per 100 boiler hp. may be arrived at by interpolation of the chart readings, such calculated values being accurate enough for all practical purposes.

Effects of a Slight General Increase in the Cost of Coal

Two general rules may be laid down as to the economic value of anthracite for steam generation in the power house: First, the lower the price of anthracite, the poorer the grade of coal (smaller size) that can be advantageously used, and *vice versa*. Second, in selecting grates for new plants or in the remodeling of old ones, it may be advisable to install grates for the grade of coal poorer than the most economical grade at the time of installation, if the economic values of the two coals do not vary greatly. This allows for an increase in the price of all grades of anthracite, which must be expected, and an increase has less effect on the fuel cost per boiler horsepower when cheap coals are employed than with a more expensive, though more efficient, grade.

In a locality where buckwheat commands a price of $2.80 per ton at the time of installation of grates, and rice a price of $2.40, it would be good policy to install grates for burning rice, although for the time being buckwheat would prove the more economical coal. A 10 per cent. increase in the price of the two grades, which would not be at all improbable, would reverse their relative economies. With rice and buckwheat commanding $2.80 and $2.40 per ton, the fuel costs per 100 boiler hp. would be 49.6c. and 50.1c., respectively; but with buckwheat at $3.08 and rice at $2.64, the fuel costs would be 55.2 and 54.9c. per 100 boiler horsepower, respectively, and should there be still further increases, the balance would favor rice even more.

In sections of the country where the difference in cost of buckwheat and rice is still 40c. per ton, and the price of buckwheat $3 per ton, it requires only about a 2½ per cent. increase in the prices of the coals to throw the economic balance in favor of rice.

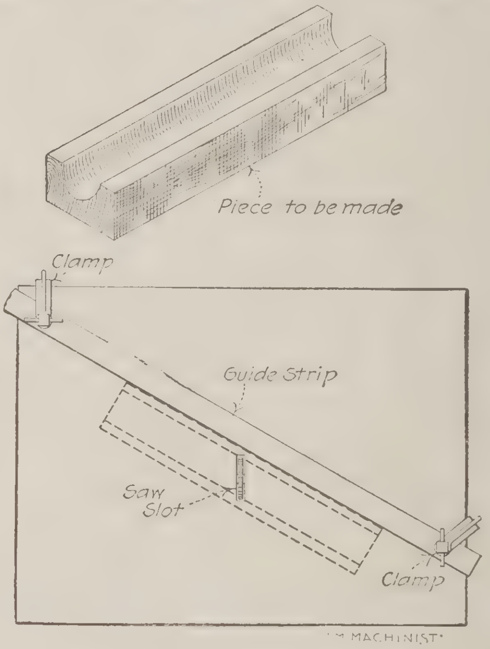
Kentucky Makes Large Gain in Mine Output

The principal mineral product of Kentucky is coal, the value of which constitutes about three-fourths of the value of the state's total mineral output. In 1913, according to the U. S. Geological Survey, the total value of the mineral production of Kentucky was about $27,000,000, of which the coal mines contributed $20,516,749. This is an increase of about $4,500,000 in value of total mineral products over the figures for 1912.

The second industry in importance, clay-working, contributed $2,914,276 in 1913, an increase of $470,536 over 1912. The quarrying industry is third in importance in the state, its products in 1913 being valued at $1,150,205, against $1,282,148 in 1912.

Sawing Elliptical Troughs

A short time ago, says Johnson Barre in *American Machinist* for Nov. 5, our wood-working department made use of the following "stunt" which, while it may be old, was certainly new to me, and may bear passing on. A number of wooden pieces had to be made about 3 ft. long by 8 in. wide and 5 in. thick, troughed out about as shown in the illustration. The curvature of the trough had to approximate fairly closely a given diameter. This curve was laid out in pencil on one end of each piece, previously dressed to the required outside dimensions. The rough stock was then removed, leaving enough to finish smoothly. A flat strip of wood, having a straight edge, was clamped across the table of a circular saw, as shown, and a test piece run along this strip for a short distance to obtain the angle necessary to set the strip so that the saw might cut to the correct curve. This angle was readily obtained after a few trials, and the troughs were then easily and rapidly finished. This method is applicable only where the curve is part of an ellipse with the long axis vertical.



Sawing Elliptical Troughs

Where such is the case, it is rapid and accurate, as the saw can be raised after the correct angle is determined, to cut right up to the desired curve, and the trough furthermore is uniform in curvature from one end to the other.

Automatic Mine Doors in Alabama

The Republic Iron & Steel Co. is installing automatic mine doors in its Warner and Sayreton mines, in Alabama. These self-acting doors do away with trappers, and thus reduce general operating expenses. The doors are manufactured by the American Mine Door Co., of Canton, Ohio. which concern charges coal companies a rental price of $6 per month for mule doors and $7 for mechanical-haulage doors.

A New Entry-Driving Machine

By A. H. Gibson*

SYNOPSIS—This machine is virtually a powerful air-driven coal puncher with an elevator and conveyor for loading cars attached. It has been in use for about six years, undergoing development meanwhile, and is now for the first time being put on the market.

One feature of coal mining which is admittedly dangerous and undesirable is the use of explosives. The only reason for their employment and the risk entailed when they find their way into ignorant or careless hands, is economy. If, however, their use could be entirely eliminated without decrease of output or increase of cost, and without introducing other and perhaps more grave dangers, the safety of coal production would be considerably enhanced, while the occupation of coal mining would become more attractive to the coming generation.

At the present time this improvement in means and methods is applicable to the driving of entries. It is alleged that the Ingersoll-Rand "Heading Machine," "Entry Cutter" or "Cutter and Loader," as it is variously called, accomplishes this result. The machine in question is not new, having been in existence for some six years and having cut many miles of entry. It has now, however, arrived at the status where its endurance, performance and possibilities are known quantities which can be thoroughly proven on a commercial scale.

The principle and operation of this machine may be clearly understood from reference to the accompanying drawings, Figs. 1 to 4. Fig. 1 represents the device ready for undercutting. The machine itself consists of a powerful compressed-air coal puncher mounted upon a carriage and under the control of the operator. A lever elevates or depresses the puncher pick. Another lever moves it from rib to rib by means of a small air engine, while a third lever moves the whole puncher together with its truck bodily toward or away from the face, the conveyor remaining stationary within certain limits or accompanying the forward or backward motion of the puncher as desired.

The puncher itself makes about 160 strokes per minute, and is controlled in the same manner as the ordinary hand-operated machine going from rib to rib and making a cut extending the entire width of the entry.

The conveyor is driven by a separate engine suitably controlled by a stop valve, and the mine car is filled evenly by moving the same about three times during the loading process by means of the brake on the car, provided the latter is on a sufficient grade, that is, on the dip the car is stopped at the proper place to fill the end nearest the machine first, after which the brake is released, allowing the car to move down hill until the loading is complete.

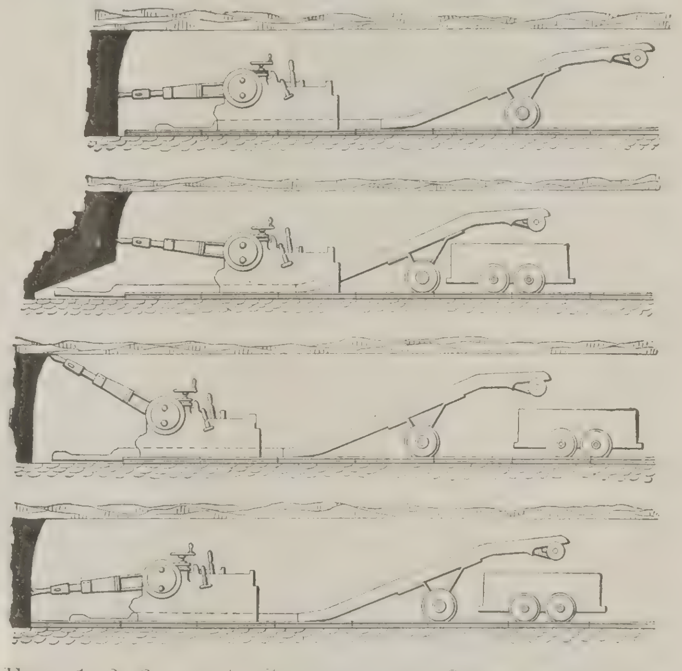
Fig. 2 shows the machine and entry after the undercut is finished, and the conveyor moved into the kerf. This illustration also shows an unfilled car in place and in readiness for the process of knocking down the coal, the car being shown as it would be placed when working on the rise. Making the undercut is the longest part of the operation, requiring from 25 to 40 min., according to the hardness of the coal.

Fig. 3 shows the knocking-down process completed. This ordinarily takes place faster than cars can be supplied. The next operation is to pull the conveyor back about 7 ft., lay a section of track, and move the conveyor forward to position.

Fig. 4 is the same as Fig. 1, except that the entry has advanced about 5 ft. and five to six cars of coal have been loaded out.

The Average Advance Is 10 Ft.

Two set-ups during the shift constitute a 10-ft. advance of the entry. It is estimated that under suitable operating conditions, such as high coal of the quality found in the Pittsburgh seam, that the machine should average 250-ft. advance per month of 25 working days, working day shift only, night shift being reserved for the laying of tracks, piping, etc. Under actual working conditions, the advance made and the repairs show such a speed to be perfectly possible.


Figs. 1, 2, 3 and 4. Showing the Operation of the Machine

Two of these machines which have been in operation at the Annabelle Mine, of the Four States Coal & Coke Co., at Worthington, W. Va., have been in operation since June 1, 1913. These have been operated two shifts of nine hours each per day, and entries cut averaging 10½ to 11 ft. wide and 6½ to 7 ft. high. Where conditions have been suitable and cars have been served to the machine without delay, as much as 20-ft. advance has been made in a single shift. This condition does not, however, hold true all the time, as the machines are considerably delayed by lack of cars, but the average operation over a period of two or three months showed a progress of somewhat over 10 ft. per shift on the average.

The question naturally arises, how does this machine compare with present costs of entry driving? According to conditions, comparisons will vary somewhat, but taking into consideration the first cost of the machines, which work in pairs, the total actual daily expense figures out favorably to the machine, everything being considered. This estimate, however, does not take into account the increased rate of entry driving, the reduced risk of gas or dust explosion, due to the absence of explosives, the fact that a straighter entry is secured, that the roof is better since there is no blasting to shake it loose, also that the ventilation is better due to the straight sides and roof facilitating the movement of the air current.

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*Engineer, Phillipsburg, N. J.

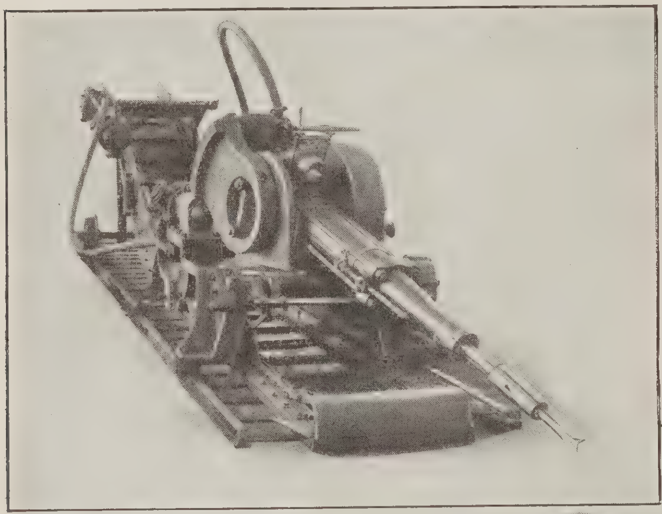


Fig. 5. Front View of Heading Machine

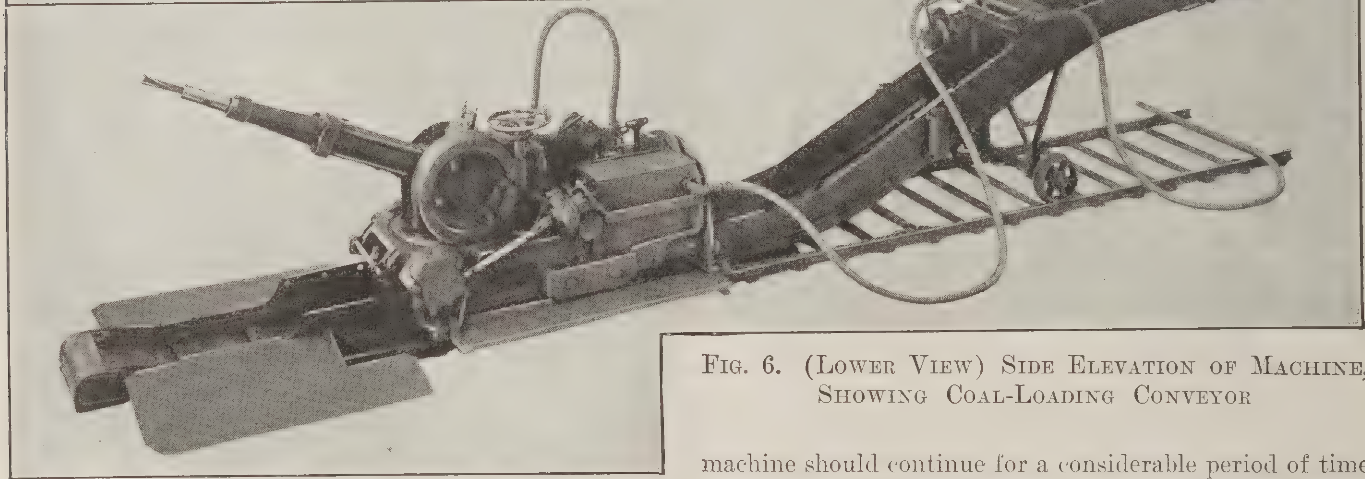


Fig. 6. (Lower View) Side Elevation of Machine, Showing Coal-Loading Conveyor

A reduced risk of explosion is secured by the absence of electric arcs or sparks, and the much ridiculed but nevertheless real menace of live wires strung along the entry, which are, even under the best circumstances, a more or less imminent peril to both men and animals. The advantage of this machine is still more apparent where the roof is bad and requires timbering.

With this, as with other pneumatic mining machines, where gas collects in the entry over night, a small quantity of air may be allowed to escape from the pipings nightly, with the result that in the morning there is no gas and the air at the face is clean and fresh.

The Spacing of Breakthroughs May Be Greater

Owing to the ventilating effect of the exhaust air from this machine and the fact that this exhaust takes place while work is being done, the distance between breakthroughs prescribed by law could be doubled without serious danger. This fact reduces this expensive deadwork about half, and allows the entries to proceed more rapidly.

The use of this machine renders possible the working of coal mines by the retreating system, which, should it become general, would effect a considerable saving of human life due to the reduction of accidents from falls of roof. Its use also secures greater uniformity and reliability in daily output than is at present common.

This machine has the disadvantage that when working on the rise a water supply is necessary, which has to be piped to the machine in the same manner as the air line twice each week. The water jet and a beam of light from a safety electric headlight follow the movements of the coal pick, both spray nozzle and headlight being mounted upon the plunger frame and moving with it. Where the entry is on the dip, the coal is usually wet and requires no water spraying.

As has been stated above, this machine has been in operation for about six years. It is, however, only now being placed upon the market. In the operation of the earlier machines, failures and breakages were frequent, and it was found expedient to redesign practically everything on the whole device, after which it was necessary, considering the previous experience, that the redesigned machine should continue for a considerable period of time in operation, to prove beyond doubt that it would stand up to continuous work cutting and loading coal. The success or failure of any mechanical coal cutter depends largely, if not entirely, upon its reliability of operation.

The present machine with its embodied improvements and simple working parts has gone through a severe development, resulting in a steel-inclosed, grease-packed construction, the wear upon which is bound to be extremely small. In the course of driving the several miles of entry in the various mines which this machine has cut, nothing has stopped its advance. Horsebacks have been cut through, large lumps of sulphur have been removed, the entry has been driven under treacherous roof, curves have been cut, and headings as wide as 13 ft. have been made. The machine has also been used in cutting breakthroughs, slate has been cut down and loaded. No accidents have occurred, although the work has been done in gaseous mines with gas issuing from the face most of the time. It is believed, therefore, that compared with the usual method of entry driving, namely undercutting and shooting down, the employment of this machine renders the work at once faster and safer.

U. S. Mines Bureau Trains West Virginia Miners

Mine-Rescue Car No. 8 is now traveling through the Pocahontas (W. Va.) field, along the lines of the Norfolk & Western Ry., engaged in a training tour which will embrace all the mining centers of this great coal field. Ten-day stops have already been made at Elkhorn, Eckman, Vivian, Welch and Gary, and over 100 men have received complete training in mine rescue and first-aid-to-the-injured since Nov. 10, when the training trip commenced.

General Manager Edward O'Toole, of the United States Coal & Coke Co., at Gary, is coöperating in every way with the Bureau's representatives in their present safety-first campaign at this camp, and over 50 men have received a complete course of training at Gary, where a fine mine-rescue station is already established with an up-to-date mine-rescue and first-aid equipment, in charge of Chief Chemist Vitus Klier.

Car No. 8 is now in charge of Mining Engineer D. J. Parker, from Alabama, who has just relieved Engineer H. D. Mason, Jr., who has been called to Pittsburgh as assistant to J. W. Paul, chief of the mine-rescue division.

The present intention is to extend this West Virginia training tour until July 1, taking in all the important coal fields of the state. Chief Mine Inspector Earl Henry is furthering the work of the car, as are his district inspectors, Messrs. Blenkinsopp and Lambert.

The complete itinerary for Car No. 8 along the Norfolk & Western Ry. field is as follows:

ITINERARY OF CAR NO. 8 THROUGH WEST VIRGINIA

Town	County	Dates of Training
Gary, W. Va.	McDowell	Dec. 20 to Jan. 3, 1915
Davy, W. Va.	McDowell	Jan. 4 to 10
Marytown, W. Va.	McDowell	Jan. 11 to 19
Premier, W. Va.	McDowell	Jan. 20 to 29
Coalwood, W. Va.	McDowell	Jan. 30 to Feb. 9
Berwind, W. Va.	McDowell	Feb. 10 to 18
Panther, W. Va.	McDowell	Feb. 19 to 28
Glenalum, W. Va.	Mingo	Mar. 1 to 9
Thacker, W. Va.	Mingo	Mar. 10 to 19
Matewan, W. Va.	Mingo	Mar. 20 to 29
Williamson, W. Va.	Mingo	Mar. 30 to Apr. 9
Chattaroy, W. Va.	Mingo	Apr. 10 to 19

"Buck Up"

Written Expressly for COAL AGE

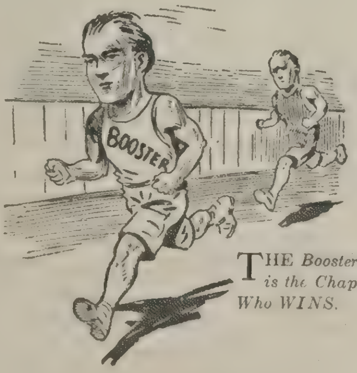
By BERTON BRALEY

THIS is an old familiar phrase,
Yet one that people will forget,
Although they hear it all their days,
"—The Grumbler never got there yet!"
To groan and sigh and moan and fret
Will cure no business ills or sins,
You've got to keep your nerve, you bet,
The Booster is the chap who wins.

IF mining troubles dog your ways,
– If markets are the worst you've met,
It does no good a howl to raise
The Grumbler never got there yet!
There's no use pining with regret,
That's not the way success begins,
In spite of dullness, worry, debt,
The Booster is the chap who wins.

WHEN foolish tears bedim your gaze
Until your handkerchief is wet,
You'll fail to see the chance that pays—
The Grumbler never got there yet!
However troubles may beset,
The wise man faces them—and grins,
And conquers fate by toil and sweat,
The Booster is the chap who wins.

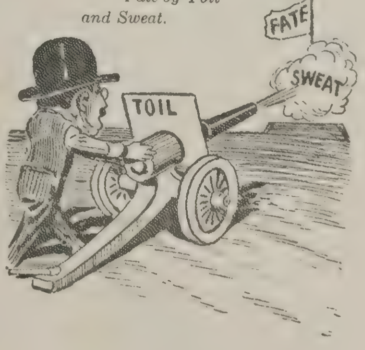
* * *



THE *Booster is the Chap Who* WINS.

HERE IS THE MORAL, *boiled down, net;*
The Grumbler never got there yet!
And while this earthly globule spins,
The Booster is the chap who wins!

HE *Conquers Fate by Toil and Sweat.*



The New Home of Coal Age

The accompanying pictures show the new Hill Building, at the corner of 36th Street and 10th Avenue, New York City, which is the new home of Coal Age and its four sister engineering journals. This building has been erected by the Hill Publishing Co., owning these publications, and was especially designed for their purposes. The ground area is 100x175 ft. There are 12 stories, each one 14 ft. in the clear, an unusually great height. The 12th story, where are the offices, is of double height, having a gallery along two sides. About 3900 tons of steel were used in this building, the steel framing being heavier than in any other building of its height in New York City. The permissible floor load is 300 lb. per sq.ft. The side walls are largely of glass, being approximately 70 per cent. of the total wall surface; otherwise the exterior of the building is covered with white tiling. The steel columns of the framework are protected by cement poured in from the top, 31,000 bbl. of cement being used.

The ventilation of the building is artificial. In the basement there are three blowers capable of delivering 47,000 cu. ft. of air per min. each. These draw the air through three air-washing machines, which remove the dust and give the proper degree of moisture to the air before it is forced through the building. On the roof there are two exhaust fans, each with a capacity of 67,000 cu.ft. of air per min. There are a number of small auxiliary fans. In summer the air can be cooled, and in winter it is heated somewhat before being forced to the floors, but the main heating of the building is done by means of a hot-water circulating system.

The supply of drinking water for the building is drawn from the city mains through large filters. It is cooled in a refrigerating plant having a capacity equivalent to three to five tons of ice per 24 hours. The filtered and cooled water is distributed to sanitary fountains.

The New Home of Coal Age

The power plant comprises three 250-kw. direct-current generators. The coal for the steam boilers is delivered to hopper bins, whence it is taken mechanically to the automatic stokers that fire the boilers. The ashes also are removed mechanically. Mechanical conveyances are to be found throughout the building for other purposes wherever necessary. Thus, between the offices and the composing room, which is on the eleventh floor, there is a pneumatic-carrier system. From the bindery, on the 10th floor, the mail bags going to the post office are dispatched to the truck on the ground floor via a spiral chute. This chute might also serve as an auxiliary fire escape in case of emergency, although the need for it is hardly conceivable.

Probably no other building was ever so thoroughly safeguarded against fire. The building itself is chiefly of steel and cement. The furniture and fittings are of steel. The building is equipped with a sprinkling system throughout. There are two main stairways at opposite corners of the building. Each of these is isolated in an independent shaft, communication with the several floors being through doors that are closed when not actually in use. Besides these provisions there is an adequate fire-alarm system.

The lighting of the editorial rooms and general offices is done by the indirect system. The floors are covered with interlocking rubber tiling, which is both noiseless and durable. A noiseless typewriter is also used. With these aids toward the abolition of noise, the sounds in this large office, which is occupied by 225 persons, are scarcely more than those of a reading room in a public library.

The composing room and electrotyping departments are on the 11th floor. The printing and binding departments are on the 10th floor. All of these departments are equipped with the most uptodate machinery and methods, and are supposed to exemplify the last word in printing-house-construction equipment. There are seven linotype composing machines and three monotypes. The pressroom contains nine presses for the regular runs on the several papers. The regular weekly editions of Coal Age, *Engineering News, American Machinist, Power* and *The Engineering and Mining Journal* amount to 100,000 copies and the output of printed paper weighs 41 tons. The handling of this from the time the white paper is received in rolls to the time when the printed papers, wrapped, addressed and sorted into mail bags, are taken by automobile truck to the general post-office is as thoroughly mechanical as can be.

The floors of the Hill Building that are not occupied by the company are rented to concerns in similar or allied lines of work. Thus the floor immediately under the pressroom is occupied by the engraver who does the work for the Hill Publishing Co. The supply of paper is obtained from the ground floor. With its power plant in the basement and a restaurant for employees on the roof, this printing building is about as thoroughly equipped as anything of the kind can be. The design and construction throughout reflect the mature experience of John A. Hill, the president of the company.

General View of Office, Showing Steel Furniture, Mezzanine Floor and Indirect Lighting

Pressroom and Bindery Floor, Showing Web, Two-Color and Rotary Presses

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Dr. G. Hickling, in a paper before the Manchester Literary and Philosophical Society, has shown that vegetable structures are preserved in coal in two forms: (1) In a carbonized condition, found pure in "mother of coal," quite opaque even when much less than one micron thick; (2) impregnated with the transparent material. Spores are the most readily distinguishable objects preserved in this matter, their walls being greatly swollen by impregnation.

The Labor Situation

SYNOPSIS—The federal troops are to be removed from Colorado by degrees. The eastern Ohio miners show less disposition than was anticipated to settle with the operators. They stand somewhat firmly for the Union scale. In Illinois there has been much destitution.

A conference was held by President Wilson, Governor Ammons, of Colorado, Governor-elect Carlson and Senator Shafroth on Dec. 23. After the conference, Secretary of War Garrison stated that a plan had been agreed upon for the withdrawal of troops. This was to be done slowly and the observed effect of partial evacuations would determine the rapidity with which the troops would be withdrawn.

Disturbing Pacificators to Be Kept out of Colorado

Governor Ammons advised the President not to send Seth Low, C. W. Mills and Patrick Gilday into the state just at present and declared that the investigation of the Federal Industrial Relations Committee had delayed a settlement of the strike for two weeks. He thought that the troops could be removed in 10 days after withdrawal commenced.

Col. James Lockett, in charge of the U. S. troops in the southern Colorado strike district, announced, on Dec. 23, that after Jan. 1 he would not impose any restrictions on the sale or shipment of liquor in that district.

Colorado Fuel & Iron Co.'s Beneficences

The Colorado Fuel & Iron Co. held as usual its annual Christmas entertainment, distributing candy and toys among the families of its employees. The families of those who till recently have been on strike and have now been re-engaged received presents as if no cessation of work had occurred. Unfortunately many of the families in the tent colonies cannot be given houses as there are not enough to shelter everyone.

The Colorado Fuel & Iron Co. put its new pension fund into operation Dec. 26, Frederick Darraugh, of Pueblo, Colo., receiving a pension of $125 a month which is half his present salary. He has been in the employ of the company for 33 years and is now 61 years of age. He used to be a timekeeper and has risen to the position of assistant auditor of the steel plant at Pueblo. In 33 years he has never asked for a leave of absence or taken a vacation.

No Settlement in Eastern Ohio

The proposition of the Pursglove-Maher Coal Co. to open its mines in Belmont County paying a mining rate of 58c. per ton for lump and 22c. per ton for small sizes received little attention from its men. The notices were posted the week before last and the company announced itself willing to start the mines as soon as the men accepted the proposition. Another offer of $2.84 per day for cutters and loaders was also made. Some assert, however, that the men in eastern Ohio are getting more and more discontented over the methods employed by the organization officials in handling the strike and a large majority would go to work if permitted to do so.

The action of the operators in offering the split scale as mentioned above or a payment of 44.61c. per ton on the mine-run basis, which is the Pittsburg scale, shows conclusively that they do not want to make war on the miners' union or on any one. They are sincere in saying that they cannot pay 47c. per ton for machine-mined run-of-mine coal under present conditions and that they will not open their mines on that basis. The operators engaged in eastern Ohio adhere as strongly to their position as at any time in the past and they have no intention of surrendering to their men.

Eviction of Striking Mine Workers

The Pursglove-Maher Coal Co. sent the following telegram to the officers of the United Mine Workers of America on Monday, Dec. 28.

> The Pursglove-Maher Coal Co. expects rent for ten months for all its houses occupied by former employees and members of your organization or possession of its property from your men by Jan. 15, 1915. See by the papers that your funds are in such shape that you can take care of the miners indefinitely. Answer quick as upon your reply will depend our action with the civil authorities. We must have definite answer by Thursday noon. Will be at Hotel Frederick, Huntington, W. Va., Tuesday and Wednesday.

The message was signed by Joseph Pursglove, president, and T. K. Maher, secretary and treasurer. No answer was received on Monday.

Notices were prepared for service at Steubenville, O., Dec. 29, demanding that 25,000 striking mine workers in Jefferson County pay the 10 months' rent they owe the coal companies under penalty of eviction. The families reside in Warren, Mount Pleasant, Smithfield and Springfield townships and constitute a large part of those involved in the wage disagreement. The United Mine Workers of America will endeavor, it is said, to contest the eviction writs in the court. It is naturally rumored that the intention is to bring strike breakers into Ohio.

More Strike Benefits and Free Clothing

In the meantime the United Mine Workers of America through its executive boards which met at Indianapolis last week endorsed the strike in eastern Ohio and made arrangements for paying larger strike benefits. Where the money was to come from was not announced.

Senator Atlee Pomerene of Ohio has introduced in the national congress a bill to permit of the giving of 2000 discarded uniforms of the Ohio National Guard to the striking miners. When Governor Cox discussed that matter with the war department some time ago he was informed that army regulations prevented the giving of the uniforms to any one.

Poverty in Illinois Mining Settlements

Christmas this year has seen more poverty in the mining settlements of Illinois than in many years past. In Belleville, Ill., three hundred families, mostly of miners, were in need of assistance at Christmas time. In the mining section east and northeast of St. Louis, there was much poverty this year, and especially at Witt, Ill., where the Peabody mines have been idle for several months. Governor Dunne sent a Christmas present of $5 each to twenty of the most needy families there, and much assistance was rendered to others at Witt and in the mining towns adjoining.

Conditions were extremely bad at all the mining towns to the south of St. Louis, with the exception of Royalton, Zeigler and Christopher. Farther north in the Danville District, 340 coal miners, who have been idle for many months, received an order for $7.50 worth of groceries and other provisions for Christmas. The citizens of Harrisburg almost compelled the O'Gara Coal Co. to put some of its mines in operation, so as to give all its miners an equal opportunity to make a livelihood.

Frank Farrington Elected Head of Illinois Miners

Frank Farrington, of Streator, Ill., has been elected president of the Illinois or 12th district of the United Mine Workers of America. He received 22,134 votes while his opponent, Adolph Germer, of Mt. Olive, obtained 21,135, so Farrington has a majority of 999 votes. Steve Sullivan, of Springfield, received 14,136 votes. Thus it was a three-cornered fight but Farrington's greater popularity can be judged from the fact that he carried seven of his men into office including vice-president Frank Hefferly, of Collinsville. However, Duncan McDonald, the supporter of Adolph Germer, was reëlected secretary-treasurer by 26,856 votes, his nearest competitor out of the four, C. A. Sullivan, of Herrin, receiving 10,383 votes.

Frank Farrington is probably a more reasonable man than Adolph Germer. Duncan McDonald has always been regarded as an unreconcilable. It is true Frank Farrington ordered the strike in Vancouver Island from Seattle, Wash., Apr. 30, 1913. He does not appear to have had much more to do with it, and John P. White, the president of the main organization was probably as much to blame for that abortive struggle as Farrington. (See "Coal Age," Vol. 5 pp. 253, 280, 577 and 879.) Farrington was formerly on the National Executive Board for the State of Illinois.

Duncan McDonald will be remembered for his violent attacks on the president of the American Federation of Labor, Samuel P. Gompers. John Zimmerman, of Springfield, was elected to the National Executive Board.

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Next Week, We Publish Our Annual Statistical Number

The Jan. 9 issue of Coal Age will be devoted entirely to a review of the coal industry in America during 1914. The chief mine inspectors of all coal-producing states will tell us of the progress made by coal companies in their territory. Trade conditions in all important consuming centers and shipping ports will be reported by our special field correspondents. There will be a chronology of events as well as articles covering the industry's progress along engineering lines.

Don't Miss This Issue—You'll Need It For Future Reference.

Power Department

The Use of Coal

SPECIAL CORRESPONDENCE

SYNOPSIS—Any commodity is valuable in exactly so far as it fulfills a need. In order to create and foster a market for his product the coal producer should study with care the requirements of his customers.

It is usually conceded that the interests of the mine operator are supposed to cease when he has "delivered the goods" and collected payment therefor. It might be well to remember, however, that coal, like any other commodity, only possesses a value in proportion to the efficiency or effectiveness with which it meets the needs of the purchaser.

For example, a cutler might offer one of his customers a bowie knife of exceptional quality and workmanship. If that customer at the time, however, was requiring a razor, the vender's advances would probably be treated with marked disrespect. Hence, in order to successfully market the product of a mine, it is not only necessary to produce a good article, but to have an idea of what use the purchaser intends to make of the goods after he has bought them.

The advantage of this is two-fold: In the first place, much preliminary talk in attempting to sell unsuitable goods is avoided. Secondly, the vender can often point out to the purchaser methods of treatment of the goods which will enormously improve their value to him, and therefore stimulate future sales.

It is to the advantage of the coal producer therefore to study the methods employed in the use of fuels in order to be able to offer to any prospective customer the proper sizes, quality and mixture of fuel for any specific purpose, and to be in a position to point out any errors in arguments advanced by a doubtful buyer or one who is dissatisfied with what he has purchased.

In order to illustrate this position, we may take one field only in which coal is extensively used, namely, the production of steam. It is hardly too bold an assertion to say that the man who wants to sell coal should know something about the furnace in which that coal is to be burned. For example, there are furnaces in which the boiler tubes or plates are considerably removed from the grate. These are more particularly adapted to long-flaming coal which requires considerable space and time for the perfect combustion of the gases and lighter volatile elements before they impinge upon the heat-absorbing surfaces of the boiler.

DIFFERENT COALS REQUIRE DIFFERENT FURNACE PROPORTIONS

On the other hand, anthracite coals, or those containing only a low percentage of volatile matter, burn with an intense local heat, and therefore the furnaces best adapted for their use have grates comparatively close to the water-carrying boiler elements.

This is but one example of the many factors which may go to make up a customer's complaint. If a vender does not know the class of boilers and quality of coal which the purchaser is trying to combine, he may become generally puzzled at the complaints received, regarding undue repairs or low steam production per pound for coal, after his fuel has been given a tryout. If, on the other hand, he does know the probable cause of the difficulty, he may be able by a timely remark to convince a customer that at comparatively small expense an alteration may save him considerable money in fuel.

In some plants it is essential for the proper burning of the coal that the latter shall reach the furnace in a comparatively unbroken condition, and must be free from any excess of dust or slack. Other plants on the contrary are fitted with mechanical stokers for the express purpose of burning fine coal. The buyer will, of course, mention his requirements, but it is much to the advantage of the seller if he possesses a clear conception of the type of plant for which his fuel is destined.

Often the condition of the coal as it arrives at its destination depends largely upon the way in which it has been handled in transit, and where there are any particular requirements as regards freedom from dust, and two modes of shipment are possible, it may be worth while considering alternate methods to ascertain whether carriage by rail or water is likely to give the best results.

COMPLAINTS AS TO WEIGHT

Then again complaints are sometimes received as regards the weight delivered. Under such circumstances it is not ordinarily necessary either to call the colliery scales into question or to describe the complainant as a perverter of the Christian virtues. The real difficulty in such a case often lies in the weather. A variation in climatic conditions at the beginning and end of a railway journey often makes considerable difference in the amount of water contained in the coal, and therefore in the weight thereof. It may be taken as practically certain that a customer of any considerable size keeps a record of gross and net weight delivered to his power plants and it is just as well therefore that the coal owner on sending out his product should not only take its weight, but should keep some sort of record on the condition in which the coal leaves the mine.

At the present time, much attention is being paid to the calorific value of coal purchased for industrial or steam-raising purposes, and it is only fair that discrimination should be made in values on this account. In many of the larger power houses and in some of the small ones as well, samples are taken periodically of the coal as received, and these samples, after being suitably crushed and prepared, are subjected to a test for heating content and ash.

These tests, if systematically carried out, should give the average figure not only for ash and clinker, which are purely waste products, but also for the water content, the volatile constituent, which determines whether or not the coal is free burning, and the fixed carbon which yields a steady and comparatively slow combustion. With data on these points, the owner of the power plant can, to a certain extent, determine the value of a coal from the point of view of steam raising.

Cheap Fuels May Be Expensive

It has been repeatedly demonstrated that many cheap fuels, which, however, carry a large ash- and clinker-forming content, and are consequently low in calorific value, are disadvantageous and more expensive than a higher-priced coal possessed of greater heating power. If consumers are analyzing coal, it is to the elementary interest of the coal operator that he should also take samples both of the run-of-mine and of the various grades produced, obtaining therefrom accurate figures upon the above qualities, upon which he may base his arguments when selling.

The proposition that it is necessary for a mine owner to know the plant that is consuming his product is capable of still further proof, when any particular customer is actually or is about to become a large buyer. It then pays the coal producer to visit the plant concerned, and with the permission of the owner, see for himself the conditions under which his fuel is to be used.

The best coal in the world cannot give its full heat value if it is not being properly fired. Although most large power makers are today fully aware of the value of carbon-dioxide recorders in connection with their flue gases, there are still some who think such apparatus to be a scientific fad. The good performance of any fuel depends first on complete combustion and second that large quantities of excess air be not admitted to the furnace, as otherwise the heated gases become mixed with this cold air, their temperature being thereby lowered and their efficiency as a heating medium destroyed.

The carbon-dioxide recorder is an excellent check on the proper burning of the fuel, since it registers at every instant the proportion of carbon dioxide (CO_2) contained in a given volume of flue gases. This with a recording draft gage and a thermometer gives an excellent idea of the way in which the plant is being operated. It is not too much to assert that a loss may often be converted into a gain through properly burning the fuel purchased.

It is the duty of the coal producer in cases of this kind to make suggestions to the power-plant manager which will safeguard the proper use of the commodity which the former is supplying. The same general argument applies to the proper testing of feed water, for poor results from a steam generator often attributed to the fuel may readily be traced to the condition of the boiler plate or tubes due to the admission of improper materials along with the feed water. Temporary and permanent hardness are the natural enemies of efficient heat utilization.

The Record of Input and Output

In some power plants, a check is kept upon the working of the installation by measuring the coal input and comparing the same with the power output. This is a particularly easy matter when the output is electrical. Now the number of pounds of coal consumed per kilowatt-hour generated (although a good test of the overall efficiency of the power plant) may sometimes be used as an adverse argument regarding the quality of the coal supplied. It is therefore advisable that the producer of the latter who is vitally interested in the proper sale and use of his commodity should knew something of the possible losses that may occur in a power house between the furnace and the wattmeter.

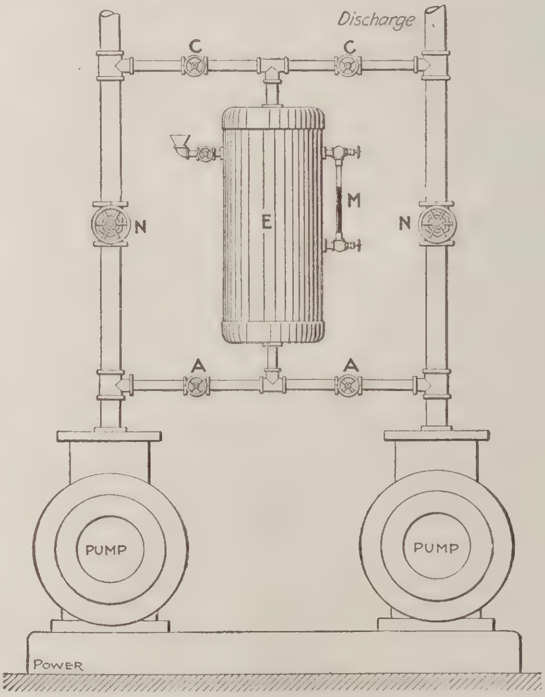
For example, much power may be wasted in leaky steam traps, in excessive condensation, in holding boilers as standbys when it would be perfectly safe to shut them down, and in running engines at uneconomical loads. Of course, a good power-plant manager is able to distinguish between losses incurred in this manner and defects in fuel supply, but it is open to question whether every power installation is conducted on highly scientific lines.

Consequently, when complaints are received concerning bad results from fuel, it might pay the owner of a mine to visit the power plant consuming his product with an eye open for bad operation, and to do this intelligently he should have at least a fairly comprehensive knowledge of the practical working of a steam power plant.

There are many other points which might be raised in support of the belief that it is not merely sufficient for a coal producer to sell fuel and then wash his hands of the results. A good salesman should be a good buyer if his position in the transaction were reversed. To be a good buyer one should know not only what he wants but what he is actually purchasing. And in the coal trade in order to be a good buyer, one must understand steam engineering.

Boiler-Compound Feeder

The illustration represents a good form of boiler-compound feeder, says R. C. McGahey in *Power,* where *E* is the body and *M* the glass gage, the merit being that the compound does not pass through the pump. The feeder can be readily regulated or cut out by valves *N*, *C* and *A* while the pumps are in operation.



Compound Feeder Connected to Two Pumps

Editorials

Success

In a week or two we will announce the date of issue of a special "Success" number of COAL AGE. There isn't anything so close to the heart of the average individual as success, and the coal industry has an abundance of great men, great machines and great systems.

We will cover it all, dealing only with what has made good, whether it be a man, a method, a motor or a mining machine. We want to tell how success was won here, there and everywhere. A mine was a failure, it is now a successful operation; how was the change wrought? That's the story we want to tell in its every phase.

Therefore, we want our readers to help us make this proposed issue of COAL AGE the most interesting and valuable number we have so far gotten out. Tell us the story of men, mines and machines that have stood the test of everyday hard knocks. If you can't prepare a story for us yourself, then make a suggestion to us concerning what you have in mind, and we'll follow the tip and get the facts ourselves.

If you have a good story of an actual case, but don't care to sign the article, remember you don't have to. Think this over right now, and the chances are you can pen a description of something or somebody, that will not only interest other coal men, but benefit them as well.

Of course! we pay for the article you prepare for us.

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What Will the New Year Bring Us?

We have all made our new resolves, rolled up our sleeves and started the work of 1915. The war may last all year, or it may end very soon. However, millions of people in this country have stopped speculating on this great uncertainty and have buckled down to free themselves as far as possible from the influences of the European trouble.

The outcome of our affairs in 1915 depends largely on ourselves. If the war continues no one need expect a boom in our own land, but by eliminating all waste of money, material and time, we can enter on an era of satisfactory, independent progress.

This does not mean we should hoard our money; on the other hand, the time is here when we must show confidence in ourselves and our nation by going ahead with long delayed plans. True! we must be careful—only harm could result from pulling the throttle wide open—but caution does not imply inaction. We have all had time to get our bearings and survey the road ahead, so a steady, certain advance in all lines of industry is now in order.

COAL AGE sees a brighter outlook for 1915, and we are therefore going to back our opinion by carrying out to fulfillment numerous extensions in our work. The coal industry has hit bottom, and all worth-while signs point to an increase in general mining activity. Labor troubles will be largely eliminated from this year's calendar, and the result will be a better feeling in the industry.

Therefore, let us all throw away our blue glasses, and above all else let us be sanely optimistic. No good can come from shouting untruths concerning business prosperity. People who follow this plan deceive no one, not even themselves. Likewise we must eliminate the other extreme, which is responsible for a flood of senseless pessimism. To many people, the face of futurity leers black and disagreeable. Hope to them is forbidden fruit. Imagination is of use only to portray calamities that never happen.

Add to your New Year's Resolutions the following: I will exercise hope and preach optimism every day during the year. I will not forget that I am a part of the greatest nation on earth, and that I live in a land of untold wealth and possibilities. I will not give ear to calamity howlers either in my office, my home or on the street. I will keep a cheerful countenance even should clouds gather overhead and I will impress on all I meet that clouds of whatever hue and density never stand still—there is always a wind to blow them away. Lastly, I promise to remember that I work in an industry that produces the second necessity of life—the first is food—and nothing can stop the demand or replace the product I send to the markets of the world.

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At Home and Abroad

Between the optimistic and pessimistic American, your average citizen is "eternally fussed up." The American eagle in the imagination of our national evaluators is as often bedraggled like the sparrow after a fight as he is spread or displayed like the triumphant bird of heraldry.

For our part, we confess that most of the claims for arrogance or for regret equally fail to appeal to us. As for the claims of alien supremacy, we feel we could doubtless duplicate those vaunted conditions if we would accept them when duplicated. But somehow our American way, with its disadvantages, seems very good to us and we are ill disposed to be disturbed in our pursuit of it.

Samuel Dean has been showing us some German and French mining plants and we will readily grant that there is nothing like them in America. They are truly magnificent and show the genius of their engineers. Yet we cannot avoid the suspicion that there is no directorate in America but would discharge the officials in charge of these foreign enterprises if the men in them produced as little as they do in Germany—one ton per man underground. The miners in the United States produce from three to seven times as much per man for each working day and the result is that the cost of coal is much lower.

Moreover, the miners of the United States make better wages, at least twice as much as the German miners. Why then should we be ashamed? We have greater efficiency per man, cheaper coal and better paid working men. All we lack is "stylish works" and a greater safety.

Now there are parts of America where conditions in the matter of safety are excellent, and it is by no means clear that all unsafe conditions are chargeable to excessive neglect of either employers or men. Let us not be misunderstood—we do not say that there is no neglect, for it is certain that there is, but we declare that it may not exceed the negligence manifested abroad.

The difference in the death rate in various parts of this country as a result of falls of rock and explosions of gas and dust clearly exhibits the fact that these accidents are in a class by themselves. Some operatives are much endangered by them; others are not likely to have them to face. Consequently, we will compare the other accidents underground in the United States with those in the Dortmund district of Germany, an area where about one-half as many men are putting in their time underground as can be found mining coal in the United States.

In 1911, the death rate from accidents underground other than "falls of ground" and explosions of gas and dust was 1.437 per thousand of those employed below the surface. The rate in the United States was only 1.28 for the same class of accidents in that year.

In 1912, in the United States, assuming the same ratio of employees to underground workers (1.202) as in 1911, we find that 1.11 persons were killed per thousand employed underground in the accidents selected, whereas in the Dortmund district 1.541 per thousand lost their lives in that specific manner. It will be granted readily we think that the roof-fall and explosions question is severe or unimportant according to locality and that the other accidents which we have here compared are more truly controllable, and it is in these accidents which have no necessary relation to locality that the American record is creditable.

But still those magnificent buildings fill the eye. Surely a people who can construct such magnificent mines, must be mining efficiently. Order, design and modernity are apparent on every hand, and we are prone always to connect together fine plants and efficiency. However, the two may have no connection whatever with each other. The magnificent structures may be only the outcome of munificent prices. Let us examine this carefully.

It would not be fair to compare German prices with American because it may be, at once, conceded that wages are unequal and the difficulties of mining are not on a parity. But it is permissible to compare German prices at one period with those at another and see whether the American market has advanced as liberally as the German. Since 1886 the average price of coal in Germany has risen 103 per cent. at the mines. In that same time it has fallen in the United States 4 per cent. We quote these figures on the authority of the British Board of Trade.

If we allowed our coal men to combine and to increase prices 103 per cent. when producers in other countries lowered their prices 4 per cent., the very foundations of our democracy would be shaken. It may be right to combine for fair prices, but we shall have to think twice before we consent to such a measure of syndicatism as has made such marvelous developments possible in Germany.

If we had such profits we also could build almshouses and bath houses and provide for pensioners. We also could build lamp houses like palaces and make our mine portals like triumphal arches. The American workingman, however, believes profits are criminal, the American consumer is raging horribly about coal combines and both are getting the benefit of a situation which is by no means profitable to the coal operator. And down in the hearts of the coal producers is a belief that while profits in his industry should be larger than they are, there is a limit which should be set for the good of the public, and he is sure that a 103-per cent. increase per ton in the present price would be many times that limit and should not be permitted in any democracy.

For if, instead of the $1.05, which was the average price of coal at the Pennsylvania bituminous mines in 1913, $2.13 was paid, just think how our mine roads could burgeon out with rose bushes and could be curbed with concrete. Then, indeed, we could model the superintendent's house after the home of a feudal baron—and the rest of the country could pay the bill.

But it is not our way. Such desirable conditions—and they are desirable—can only come here when the proletariat, which has been given liberal wages and cheap living, learns to put back into industry and permanent improvement what it now too largely expends in the grog shop, in frequent changes of apparel and in general waste.

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Some Comments on the Panama R. R. Contract

The contract for supplying coal to the Panama R.R. has been awarded finally to Wm. C. Atwater & Co. (Vol. 6, pp. 814, 854, 892, 933, 1048). The coal is to be supplied from the Thelma and Nora mines of the Virginia Pocahontas Coal Co., at Coalwood, McDowell County, W. Va., and from the mine No. 1 of the Lake Superior Coal Co., near Huger, McDowell County, W. Va. It is generally understood that these mines are all working the upper Pocahontas beds, and if this be the case, it will be the first time that no coal from the No. 3 original Pocahontas bed has been supplied on this contract.

The bid of Atwater & Co., as originally reported, was for 350,000 tons, at $2.70, f.o.b. Hampton Roads, the proposal calling for 500,000 tons. We are informed that all of the bids were turned over to the U. S. Bureau of Mines for report on the various mines and to figure the cost of one million B.t.u., according to their standard formula, so as to reduce all bids to a common basis, combining the ash, heat value and price per ton. It is also stated that the Bureau of Mines sent their inspectors to the Atwater company's mines to obtain further data and samples before the contract was finally awarded.

There were several bidders from Pennsylvania, but they were all unsuccessful, although it is said that there was only one mill difference in the cost of a million B.t.u. as between the Atwater coal and Colver, Penn., coal.

The Government does not yet seem to appreciate the importance of the ash-fusing temperature of coals, although fuel experts are generally agreed that this and the ash percentage are the most important determinations on coals of similar nature.

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Who Gets the Promotion?

COAL AGE last week, on page 1030, published a problem cartoon entitled, "Who Gets the Promotion?" We anticipated that the question would be a popular one, but we did not expect it would attract such wide attention. From the many answers received so far, it is quite certain this will be the most popular discussion we have ever printed. If you haven't already sent in your answer, do so today.

Sociological Department

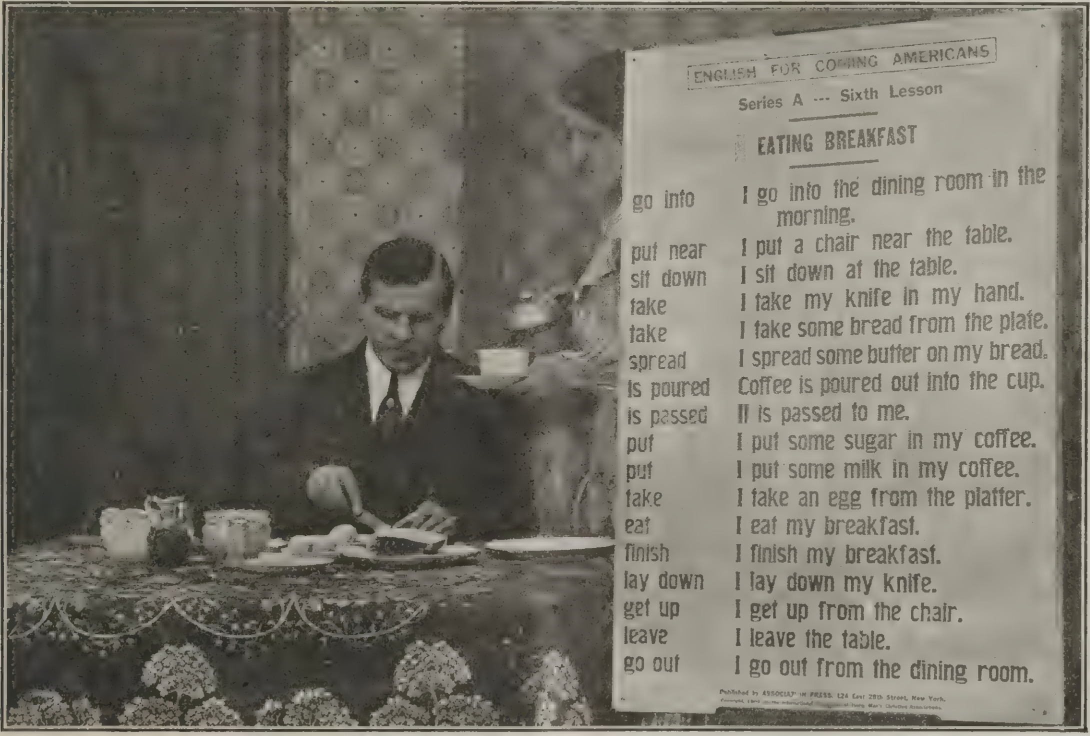
Teaching English to Foreign-Speaking Men

By Peter Roberts*

SYNOPSIS—The writer has elaborated a most successful system of teaching foreigners English without the employment of their native language in the process.

There are 15,000,000 foreign-born people in the United States, which is about 15 per cent. of the population. The proportion of male to female in this group is 129 to 100, so there are 8,450,000 foreign-born males in the country and of these more than 97 per cent. are employed in gainful industries. Of the males of both native birth and native parentage 75.5 per cent. are so employed. All the men of foreign birth are not foreign-speaking.

Of the 15,000,000, about one-third have their birthplace in English-speaking countries, while half of the remainder are more or less conversant with the English language. Thus, the problem of teaching English to non-English-speaking wage-earners is not as serious as some men would have us believe. The number of persons of foreign birth in the United States today not able to make themselves understood in English is not more than 5,000,000. This is about five per cent. of the total population.



	ENGLISH FOR COMING AMERICANS
	Series A --- Sixth Lesson
	EATING BREAKFAST
go into	I go into the dining room in the morning.
put near	I put a chair near the table.
sit down	I sit down at the table.
take	I take my knife in my hand.
take	I take some bread from the plate.
spread	I spread some butter on my bread.
is poured	Coffee is poured out into the cup.
is passed	It is passed to me.
put	I put some sugar in my coffee.
put	I put some milk in my coffee.
take	I take an egg from the platter.
eat	I eat my breakfast.
finish	I finish my breakfast.
lay down	I lay down my knife.
get up	I get up from the chair.
leave	I leave the table.
go out	I go out from the dining room.

Published by ASSOCIATION PRESS, 124 East 28th Street, New York.

The Roberts Method of Instruction by the Practical Illustration, the Spoken Statement, and the Printed Description

Over 70 Per Cent of the Coal Miners Are Foreign-Born

The foreign-born are neither equally distributed among the states of the union nor are they found in equal numbers in the industries of the country. In agriculture, of the 10,500,000 male wage-earners only 9.1 per cent. are foreign-born; in coal mining, 750,000 men and boys are employed, and 70 per cent. of them are of alien origin. If 50 per cent. of the 525,000 foreign-born in the coal-mining industry are not conversant with the English language, it means diminished efficiency, increased accidents, want of harmony, and irritating misunderstandings between the coöperating agencies. The question then is, How can these men be taught English? I will explain the system used by us in doing this work.

Basic Principles

This is based on three fundamental principles which should be observed by all anxious to learn or teach a language:

First: The *ear* is the organ of language. Speech is sound modified to convey thought, and the organ designed to catch sound is the ear. The eye and the hand may supplement, but if any man wants a working knowledge of any language he must use the ear in attaining it.

Second: The lessons given should deal with experiences perfectly familiar to the pupils. The simplest and most interesting actions of daily life should be clothed anew in the garment of the language to be acquired. You cannot discuss coal mining with a man who never saw a coal mine in operation, nor can you teach a man a language if you attempt to give him lessons dealing with objects and actions wholly out of the realm of his experience.

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*Secretary, Industrial Department, Young Men's Christian Association, 124 East 28th St., New York City.

NOTE—Article read before the West Virginia Coal Mining Institute, at Huntington, W. Va., Dec. 10, 1914.

Third: Each lesson should conform with fundamental principles laid down by psychologists as aids to memory, the law of association of ideas, the law of contrast, the law of sequence in time, etc. By the aid of these, the memory is greatly relieved, and the pupil can better concentrate his attention on correct pronunciation and enunciation.

These three principles are used in the Roberts System of teaching English to foreign-speaking men.

A Class in English in a Foundry at West End, Toronto, Canada, during the Noon Recess

Let us illustrate these principles. The first lesson we give a class of foreigners is about getting up in the morning. The lesson is as follows:

PREPARATORY COURSE

Getting Up in the Morning

awake	I awake from sleep
open	I open my eyes
look	I look for my watch
find	I find my watch
see	I see what time it is
is	It is 6 o'clock
must get up	I must get up
throw back	I throw back the bed clothes
get out	I get out of bed
put on	I put on my pants
put on	I put on my stockings and shoes
wash	I wash myself
comb	I comb my hair
put on	I put on my collar and necktie
put on	I put on my vest and coat
open	I open the door of my bedroom
go down	I go down stairs

These sentences observe the sequence in time in the action of getting up in the morning. Each man goes through this stage every day. The word open suggests shut; find, lost; throw, catch; put on, pull off; open, close; etc. The teacher who does his work right will teach this lesson and build around it a vocabulary following the suggestions which come to him by the laws specified.

Teaching the Lesson

How is the lesson taught? The teacher has five steps to follow in teaching each lesson:

First: Oral instruction. Nothing is put before the eye or in the hand of the pupil. He is told to listen carefully to the words pronounced by the teacher, and repeat them after him. The teacher says, "I awake from sleep," suiting the action to the words, and the class says the sentence. This is followed in order by the other sentences as the class makes progress. The teacher talks slowly and distinctly, and is never weary of repeating. After about twenty or thirty minutes the class can rehearse the whole of the lesson from memory, at the suggestion given by the teacher with an appropriate gesture illustrating each sentence.

Second: A chart on which the lesson is printed is now hung up, and the class sees the lesson in print for the first time. The teacher then leads the pupils in reading, going over the lesson three or four times, leaping from sentence to sentence, to test the capacity of the pupils to read.

Third: Sheets of paper are next given the pupils, on which the lesson is printed in both book and script type. Each scholar is provided with pencil and paper, and is told to write out the lesson, the teacher during the exercise passing from pupil to pupil to see how he does the work. Then after ten or fifteen minutes, he collects the papers, corrects them and calls the attention of the pupils to their defects.

Fourth: Review of the lesson. The teacher takes a

A Class Composed of Men of Many Nations

sheet of paper and covers the chart. He asks for the first sentence and suggests it by a gesture. The pupils say: "I awake from sleep." The teacher uncovers the sentence and says: "Good, and then what?" "I open my eyes." "Splendid, and then what?" etc. The pupils by this review get, not only the lesson, but also sentences such as "good," "right," "splendid," "that's it," "try again," etc., which in a short while they will be able to use in their conversation.

Fifth: Grammar practice. Grammar is not taught in the abstract; but grammatical forms are practiced in connection with each lesson, so that the pupils talk grammatically and are trained to do so from the beginning. This is done not only by each exercise, but also by reading and writing. The pupils who show an eagerness to learn our language, if they have a good teacher, will, in an incredibly short time, begin to converse in common, everyday English in their work and in their buying.

The Equipment

A word ought to be said about the tools used in this work. Three courses have been prepared for the men:

First: The Preparatory Course, which comprises thirty lessons; ten on domestic life, ten on work life, bearing directly upon the work in which the man is engaged, and ten on social life, helping this man so that he may go to the store or shop, postoffice or railroad station, and transact his business in the English language.

Second: The First Reader is the second course, in which lessons are given on the history of our country, on outlines of geography, dealing especially with the United States, and on the forms of our government, so as to prepare the foreigner who is anxious to become a member of our family to pass the examination prescribed by the federal government for naturalization.

Third: The Second Reader is a more advanced book, having readings in history, industries and civics for advanced pupils.

Teaching All Nationalities without Knowing the Tongue of Any

Accompanying each lesson are grammar suggestions, so that the teacher, in each session, may drill the men in certain forms which are essential to correct talking or writing.

For men employed in the coal-mining industry, we have prepared the following lessons:

INDUSTRIAL SERIES—BITUMINOUS MINE WORKERS

I. Going to Work

stands	The miner stands at the foot of the shaft
asks	The miner asks the foreman: "Give me a light"
takes	He takes his lamp and lights it
trims	He trims the wick
burns	The wick burns brightly
puts	The miner puts the lamp in his cap
walks	He walks along the entry
lights	The lamp lights the way
walks	The miner walks until he comes to his room
enters	He enters the room
looks	He looks around the room
left	All things are as he left them last night
takes	The miner takes off his coat and vest
hangs	He hangs up his coat and vest
puts	and puts away his dinner pail
goes	The miner goes to his box for oil
fills	He fills his lamp with oil
takes	He takes his tools out of the box
carries	He carries his tools to the face
lays	He lays down the tools
examines	The miner examines the face
begins	He begins the day's work

INDUSTRIAL SERIES—ANTHRACITE MINE WORKERS

VII. Firing the Shot

puts	The miner puts the powder in the hole
shoves	He shoves the powder back carefully with the drill
puts	He puts in the tamping and tamps it carefully
takes	He takes the needle, tipped with copper, so that it will not strike fire
puts	He puts the needle in the hole
completes	He completes the tamping of the hole
withdraws	He carefully withdraws the needle
examines	He carefully examines the squib
sends	He sends his laborer to warn the men in the next chamber
go	The men in the next chamber go to a place of safety
goes	The laborer goes down the road and shouts "Fire! Fire!"
shouts	The miner shouts "Fire! Fire!"
lights	The miner lights his squib with his touch paper
runs	The miner runs to the next crosscut
continues	The miner continues to shout "Fire! Fire!"
goes	The blast goes off

RESULTS

The men who will learn these lessons will acquire a knowledge of English which will help the foreman and fireboss to talk to them intelligently concerning their work and duties. It will also enable them to communicate with their fellow workmen, so that they may feel that common bond of union which should pervade all industrial units. It enables the foreman or superintendent also to talk face to face with the foreigner, and avoid misunderstandings and trouble, which otherwise might disturb relations and demoralize an industrial plant.

Thousands of men, taught in classes using this system, are today able to talk, read and write in English. A year's faithful work done by any group of men, led by a good teacher using this system, will enable them to have a talking knowledge of our language, which will be a good basis for further instruction in any line the foreigner may choose. These classes for foreign-speaking men have been laboratories where men are tested, and the born leader or the mechanical genius has been discovered and set on the path that will give the industry and society far more than he ever could give if kept at the pick and shovel. The foreigners bring with them brain, as well as brawn, and the interest of each industry is conserved by giving the foreign-speaking worker in it the opportunity to come to his own in the industrial life of America.

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Jermyn & Co.'s Relief Fund

A unique relief fund is maintained by Jermyn & Co. at its collieries in Rendham, Penn. The source of revenue is the sale of the empty powder kegs for 8c. apiece. This sale nets the fund from $125 to $150 a month, and out of this sum it pays $1 a day to any of the men who are injured or ill.

Formerly the twelve hundred Jermyn & Co. employees took their empty powder kegs to the nearest saloon and exchanged them for drink, but now it would be impossible for an employee to take one off the property. The mine workers appreciate and take an interest in this unique relief fund and guard its interests jealously.

If a man is killed, every employee is called upon for a dollar, the company contributes $400, and the wife or nearest relative of the deceased is presented with a check for $1000. To the credit of the company be it said that there has been only one fatality in the course of the last two years, during which it has produced one million tons of coal. This record was made despite the fact that most of the coal was produced by the dangerous work of robbing pillars.

INSURANCE AGAINST ACCIDENTS AND MINE CAVES

In addition to the above provisions for its injured employees, the company pays from its insurance fund varying sums, dependent upon the seriousness of the injury, to all victims of accidents who break an arm or a leg, or suffer some other major injury. It also repairs free of charge all houses affected by mine caves.

There is an excellent reason for the low accident record of the company in the many safety devices in use at the Jermyn & Co. collieries. Directions, with an arrow pointing the way to safety, are posted in Italian, Russian, Polish, Slovenian, Spanish, Hungarian and Greek in the mines. All the machinery in the breakers is inclosed. Automatic blocks at the heads of the shafts hold back all but the car to be loaded on the cage, and are not released until the gates have been closed and the cage started. The trips of cars at the slopes are held on a sidetrack, and not switched onto the track leading down into the slope until the way is clear.

VILLAGE IMPROVEMENT AND SANITARY BATH HOUSES

Trim green lawns, flower beds and whitewashed fence posts and foundations all contribute to the attractive appearance of the collieries, and there is a hospital above ground as well as those required by law at the foot of the shafts, and a trained first-aid corps ready for instant service.

Another attraction is a wash-house with two hundred lockers, enough individual shower baths with hot and cold water to accommodate everyone without delay, concrete floors, sanitary drainage and ventilators. It is in charge of an old miner of thirty years' service, who, for $50 a month, scalds, washes and boils 500 towels a day, so that every man has fresh towels. Wire mats are provided in front of the lockers, and all diseased men are rigorously excluded. It is said that miners' wives urge their husbands to work for Jermyn & Co. At any rate, only 10 per cent. of the entire number of its employees are unmarried.

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New Rescue Station at Herrin, Ill.

The mine-rescue car attached to the Benton station of the Illinois Mine-Rescue Station Commission has been ordered to Herrin, for the purpose of establishing a permanent substation at that city. Walter Scott, of Harrisburg, and Walter Nichols, of Benton, are to be in charge.

There are three mine-rescue stations under the control of the Commission. These are located at La Salle, Springfield and Benton respectively. Up to this time, a car has been attached to each station, so that the course of training and instruction might be taken by men who were unable to come to any of the three centers. The cars have been on the road for over three years, and that from Benton is the first to be given a permanent location. It is probable that the other two cars will be similarly located after the most suitable cities have been determined.

A committee representing the operators, miners and the city officials of Herrin met with the Mine-Rescue Commission at its last meeting, and presented the request of Herrin for the establishment of a substation. This committee consisted of James S. Reed, state mine inspector, William Burton, board member of the United Mine Workers of America, Mayor C. E. Anderson, of Herrin, Milo McGowan, J. F. Goalby and Evan D. John.

The car has been placed on the Chicago & Carterville spur, and has a telephone so that it may be called at any time. The city council of Herrin has placed two rooms in its new city hall at the disposal of Messrs. Scott and Nichols, and a large room on East Cherry St. has been fitted up for training work.

The next legislature will be asked to appropriate sufficient funds to establish a station at Herrin similar to those already erected at Benton, Springfield and La Salle.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 14—I believe a practical discussion of mining laws and a careful consideration of mine regulations, by practical miners, operators of long experience in coal mining and mine inspectors, as suggested in Coal Age, will be productive of good results. By this means, many valuable suggestions will be made, in reference to amending existing statutes or enacting new laws that will greatly simplify and facilitate the enforcement of these laws, in the operation of mines.

The safety of life and security of property do not depend so much, however, on legal enactments as on the observance and strict enforcement of wise and practical mine regulations. Many existing laws are not enforced or obeyed because of some objectionable features contained in them, which impose unnecessary burdens on either the miner or the operator. Although such laws may have seemed at first desirable; in their practical application they are not calculated to attain the end or purpose sought. Thoughtful and practical miners, superintendents and foremen are in a better position to understand what is required in the way of legislation, in order to safeguard the work of mining coal, than are the law makers themselves.

The mining law of Tennessee provides for certificates of two classes, Class A and Class B. The law also divides all coal mines into four classes; namely, Class A, including all gaseous mines; Class B, dusty mines; Class C, mines neither gaseous nor dusty, employing as many as 20 men; and Class D, the same as Class C, but employing less than 20 men. Class-A certificates are required of all foremen in charge of mines of the first two classes, while Class-B certificates enable the holder to act as foreman in mines of the two remaining classes.

My experience leads me to suggest that there should be three classes of certificates, A, B and C; and that a holder of Class-C certificate, making him eligible to foremanship in mines belonging to Classes C and D, should also be permitted to act as assistant foreman in mines of Class B. In like manner, a holder of a Class-B certificate, making him eligible for foremanship in mines of Class B, should be permitted to act as assistant foreman in mines of Class A; but in order to act as foreman in these mines he must first secure a Class-A certificate.

In respect to classification of mines and certificates, the present law of Tennessee works a hardship on the operator of a dry mine, generating no gas and employing but a few men. To operate this mine in compliance with the law, he must employ a foreman holding a Class-A certificate, while one holding a Class-B certificate would be just as competent to take charge.

In respect to examination for certificates of competency, the examining board in Tennessee is authorized by law to make any rules and regulations pertaining to the examination of candidates that they deem proper. It has been the custom with the present examining board to give one examination for *all* candidates, with the understanding that a candidate whose paper received a mark above 75 per cent. and who had had the necessary experience in gaseous mines, would be entitled to a Class-A certificate; while a candidate whose paper received a mark not below 60 per cent. would be entitled to a Class-B certificate. But any candidate whose mark fell below 60 per cent. would fail to pass the examination. It seems quite clear that better results would be obtained if the questions propounded were suited to the class of certificate the candidate desired to obtain, instead of expecting all candidates to answer the same questions.

The advantage of having three grades of certificates for mine foremen would be that the demand for Class-A certificates would thereby be reduced, while the standard of efficiency in the examination would be raised. Since it is merely the presence of explosive gas in a mine that makes it necessary to rate that mine as belonging to Class A, it is important that the foreman in charge of such a mine should pass a rigid test for a gas-boss certificate, to obtain which he must have a thorough knowledge of the dangers of mine gases. This knowledge would not be required of a foreman to take charge of mines belonging to Classes C and D.

My attention has been drawn to the question raised by Mine Foreman William Crooks, Edgewater, Ala. In his letter No. 5, Coal Age, Nov. 21, p. 839, Mr. Crooks asks how many mine inspectors dare to enforce those laws that are offensive to the large coal companies who were instrumental in securing their appointment. He states that the inspector who is appointed under such conditions cannot be expected to oppose the wishes of those responsible for his appointment. He speaks disparagingly of a candidate having a "good pull," or a "good stand in." Is it not true that most men holding positions of trust and honor have secured these positions through influence? It does not necessarily follow that this fact will cause him to neglect his official duty in the interest of those who have supported him. Mr. Crooks does not suggest a better method for the selection of mine inspectors. I fully believe that the appointment of mine inspectors by the governor is the best method that can be adopted, in the interest of safety for the miner.

In regard to the enforcement of existing laws, I would say that it is well nigh impossible to make a law so broad as to apply with equal justice to all the mines in the state. Owing to the constantly changing conditions in mines, it is necessary for the mine inspector and the mine foreman in charge, frequently, to use their best judgment. I will say that in Tennessee the chief mine inspector's ruling or judgment is law in many instances.

In closing, I want to emphasize the importance of the point already suggested that the examination of the mine should be made by the gas bosses *within three hours of the time for the men to commence work* and that evidence of their examination should be left at the face of each working place. This is the law in Tennessee and it needs little to be added in this respect. The Tennessee law also states that there shall be employed one or more gas bosses, as conditions, extent of workings and other circumstances may require. This provision of the mining law of a state, together with honest and competent inspection, will go far toward reducing mine accidents.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

Letter No. 15—For the past 13 years, the mines in Iowa have been operated under what is known as the "shot examiners' law." This law requires that, in all mines where coal is blasted from the solid, competent persons shall be employed to examine all holes before they are charged. The law authorizes the examiner to prohibit the charging and firing of any shot that in his judgment would be unsafe. It requires the state mine inspector of the district to certify to the mine operators in his district such persons who have proved to him their competency to act as shot examiners.

Notwithstanding the opposition that was met in the passage of this law, I believe I am correct in stating that the good results brought about since, by its operation, have caused a unanimity of opinion on the subject; and the need of employing shotfirers, acting under the same authority as shot examiners, is now no longer in dispute. I believe that this conclusion has been reached in the mind of every considerate mining man. Under the present system, the examination and firing of shots by different persons naturally give rise to a conflict of interest; and it is this condition that suggests the wisdom of enacting a law that will compel all operators of coal mines to employ shotfirers as well as shot examiners, and to have all shots fired by them after other employees have left the mine.

In my recent report, contained in the 17th biennial report of the state mine inspectors of Iowa, for the two years ending June 30, 1914, pp. 61-65, I have recommended the enactment of a law by which all shots should be examined and fired by one and the same party, who should be subject only to state regulation in the performance of his duties. It is a foregone conclusion that as long as the practice of "shooting off the solid" is permitted in the mines of Iowa, the old-time system of every miner firing his own shots will be forever banished.

The dual authority under which the mine examiners and shotfirers have, for a long time, acted, has been a bitter bone of contention between the operators and miners of this state; and it is earnestly hoped that the enactment of a new law making it compulsory for all shots to be examined and fired by a competent person authorized by the mine inspector and employed by the coal company will forever put an end to the present controversy.

R. T. RHYS,
State Mine Inspector, Dist. No. 2.

Ottumwa, Iowa.

Letter No. 16—The interesting discussion now being conducted in COAL AGE calls to mind an incident in my own experience as mine inspector in Iowa, a few years ago. At that time, I was notified by the inspector of Missouri that the workings of a certain mine in his district had been extended across the state line into Iowa. He stated that, according to the decision of the attorney-general of Missouri, his jurisdiction terminated at the state boundary line. For this reason, he requested me to look after that portion of the mine that was located in Iowa.

It naturally occurred to me that if the Missouri mine inspector had no jurisdiction over that portion of the mine in Iowa, I would have no jurisdiction over that portion located in Missouri. Under these circumstances, it appeared that the proper inspection of the mine and enforcement of the mining laws of either state would be somewhat difficult. I, therefore, placed the matter before the attorney-general of Iowa, whose decision, as I had supposed, gave me no jurisdiction beyond the state line.

Looking further into the matter to find, if possible, a precedent that would serve as a guide in such cases, I found that a similar opinion had been rendered by the attorney-general of Ohio, in regard to a mine in *that* state which had been extended across the boundary into West Virginia. The coal mined from this property in West Virginia was hoisted in Ohio, where all the surface equipment, air shafts and ventilating machinery were located. The mine generated gas.

Upon the application of the Ohio mine inspector, the attorney-general of that state decided that the mine inspectors, in either state, respectively, had no jurisdiction beyond the state line. It is well known that the safety of the entire mine often depends on the conditions that exist in a single portion or district of the mine; and the lack of jurisdiction over the whole mine makes it practically impossible for either of the mine inspectors concerned in the inspection of an interstate mine to guarantee the operation of the mine in full compliance with the laws of his state.

Recognizing this fact, the attorney-general of Ohio suggested that the Ohio inspector should arrange with the mine inspector of West Virginia to examine the mine at the same time, each confining his inspection to that portion of the mine within his own jurisdiction. After making the examination, the two inspectors could then compare notes and, if possible, reach a satisfactory conclusion in regard to what each considered necessary for the safe operation of the mine. In doing this, however, it might happen that either or both of the inspectors would be compelled to disregard some of the requirements of the mining laws of their respective states.

Considered from the standpoint of the safety of human life and the security of property, and remembering that explosions, fires, squeezes and sudden inrushes of water or gas do not respect state lines, in an interstate mine, there is every reason why the inspection of such a mine should be untrammeled and in no way embarrassed or hindered by differences in the requirements of the respective state laws.

Allowing that the decision of the attorneys-general, in these cases, is in conformity with the general laws of state jurisdiction, it has been suggested that the problem of the inspection of interstate mines could be solved by placing such mines under Federal supervision. Another suggestion is that either state inspector should be given full jurisdiction over the entire mine by interstate agreement.

So far as I know, the mining law of every coal-producing state gives the mine inspector the power to call out the men from any portion of the mine that, in his judgment, presents unsafe conditions. Under this provision of the mining law, the refusal of the operator of an interstate mine to voluntarily concede to the request and instructions of the mine inspector of a border state.

having jurisdiction over a portion of the extended workings of said mine, would be sufficient reason to warrant said mine inspector's withdrawing the men from that portion of the mine. In the event of his order being disobeyed, he could apply to the courts of his state for an injunction forbidding the working of that portion of the mine in his jurisdiction.

In my own case, to which I have referred, I notified the operator before going to the mine that I expected him to give me jurisdiction over the entire mine to the extent that would enable me to protect the men working in Iowa, as required by the mining laws of that state. This was granted, and requests for several improvements of the surface equipment located in Missouri were fully complied with and results were satisfactory to all.

JOHN VERNER.

Chariton, Iowa.

Letter No. 17—There is no question but that the mining laws of Kansas can be improved, in many respects; but it goes without saying that there would be fewer accidents occurring in the mines if the present mining laws were enforced and obeyed.

The law in respect to the undermining and shearing or cutting of coal before firing a shot is very specific. The law makes it a misdemeanor for a miner to drill a hole or fire a shot, at the face of any room or entry, until the coal intended to be broken down by the shot has been undermined to a depth of at least 2 ft. and sheared or sidecut the full thickness of the seam, to a depth equal to that of the hole. The law also provides that the width of the shot at the back of the hole shall not be greater than the width between the mouth of the hole and the sidecut. The law provides a fine for anyone guilty of such misdemeanor.

This law was intended to reduce the number of blown-out shots that occur as a result of "shooting the coal off the solid" without undermining or cutting. I regret to say that the law is almost entirely disregarded. Some unscrupulous miners still continue to drill their holes on the solid and overcharge them, in spite of this warning. In my opinion, the only way to do away with this dangerous practice is to employ competent shotfirers, and instruct them to tamp all shots in entries or roomnecks and other narrow work themselves; and not to fire any shots that, in their judgment, are liable to cause an accident.

Another dangerous practice, much followed in Kansas mines, is the use of dynamite for shooting coal. This practice also is contrary to the mining law of the state, which prohibits the use of dynamite or other detonating explosives for blasting coal in the mines of the state. The law provides, however, that dynamite or other detonating explosives may be used under such rules and regulations as may be agreed upon between the employers and the employees. This provision practically annuls the law and, in my opinion, should be eliminated from the statute.

By such a provision, the responsibility for an accident due to the use of dynamite in blasting coal rests on the mine foreman and the mine committee. It is often a difficult matter for the foreman and the committee to come to any agreement as to the amount of dynamite that can be used with safety, in a particular place. However, as the miner is not compelled to purchase his dynamite at the mine, he often secures an extra supply unknown to the foreman and the committee. The result is that an excessive amount of dynamite is frequently used.

It is a very common practice here to mix dynamite and black powder, in the same hole. It cannot be denied that, in general, this is a dangerous practice, although some experienced miners frequently use a small piece of dynamite, at the bottom of the hole, to break the coal more readily at that point. I may say that the use of dynamite, in Kansas mines, dates back but a few years, when it was introduced by some unskilled miners; but the practice has grown to considerable proportions and should be abolished.

The state law of Kansas can be improved, in respect to the selection of mine inspectors. Candidates for this office should be made to pass a very rigid examination before a properly authorized and constituted mining board. Such an examining board should be composed of representatives of the operators and miners, who should coöperate in preparing an examination that would determine both the theoretical and practical knowledge and the ability of each candidate. Whether the mine inspector is appointed by the governor or elected by the miners, he should be chosen from persons who have passed a successful examination and been certified by the examining board, as required by law.

In my opinion, the law should also provide for the examination and certification of mine foremen, firebosses and hoisting engineers. Inasmuch as these positions are the most responsible ones in the operation of a coal mine, the persons filling them should possess sufficient technical education and practical knowledge and experience as to fit them for the proper discharge of their duties.

C. J. VANRIETTE, Mine Foreman,
Central Coal & Coke Co.

Scammon, Kan.

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The Foreigner in Mining

Letter No. 11—Referring to Mr. Parfitt's second letter, COAL AGE, Nov. 21, p. 841, in which he explains his deductions as based on "an ethical analysis of the characteristic traits of the foreign element," I want to say that, even on such a basis, his conclusions are erroneous and his statements far too sweeping. I feel this would voice the sentiment of a large majority of mine officials, whose experience with this class of labor, like my own, has extended over many years.

I understand an *analysis* to mean an unraveling process by which one discovers the original elements or the cause of known facts. But Mr. Parfitt's reasoning is *a priori*, or from cause to effect. He shows that the early training and environment of the foreigner have developed a character for deception, immorality, ignorance, etc. In addition to these characteristics, in a second letter, he adds the element of untruthfulness when he states, "Obviously their answer was contrary to their practical belief."

The ability to render a just verdict on a question as large as the one under discussion requires much close study. Years of observation are necessary before one can appreciate the foreigner and understand him sufficiently to give an opinion that is untainted with prejudice. Without this knowledge, any criticism of his mental processes bids fair to be as unjust as it is superficial.

In reference to their holidays, which they celebrate with evident loyalty, the act only shows their love for the land of their fathers. The recurrence of these holidays is as dear to them as that of the Fourth of July or other holidays are to Americans. In our judgment of the foreigner, we must not forget that, in spite of these sporadic celebrations, the production of coal in this country, which has come to be so dependent on foreign labor is the wonder and admiration of the world.

Every intelligent person who is interested in our country's industrial supremacy knows that a loss of even 50 per cent. of the foreign labor employed in the mills and mines of the country would be an irremediable loss. Taking it as granted that foreign labor constitutes so valuable an asset in our industries, it should be our aim and constant endeavor, by precept and example, to cultivate a fraternal feeling for the foreigner, rather than to create a sentiment inimical to him.

Recognizing our dependence on foreign labor I am glad to say that it is, at present, by no means the intricate problem it was 25 or 30 years ago. At that time, few of these foreigners spoke English; and no English-speaking miner would accept of a foreigner as his "butty." When the foreigner went into the mine, he was compelled to work by himself, often at the risk of his life. It was this fact that retarded the work of assimilating foreign labor and utilizing it for the mining of coal. The process has been slow; but time and their own earnest endeavors, assisted by those foremen who have taken a personal interest in them, are rapidly bringing the question of their availability to a successful issue. Now, there are thousands of foreign miners working in our mines who can mine coal as well as the old-time miners whom they have replaced.

A wise foreman places a new arrival in charge of an experienced compatriot, who gives him the necessary instructions, until he is able to mine coal by himself. Interpreters are found in almost every mine, who explain orders to those who do not understand.

In Mr. Parfitt's previous letter, he regarded the education of the foreigner as a "herculean task," and finally declared it to be "impracticable"; but, in his second letter, he recants and says "He is still capable of mental education." The fact that so many of these foreigners are now returning home to take part in the war is, to my mind, evidence that they desire the same freedom for their homeland that they have enjoyed here in America. Their return, at this time, to assist their homeland in one of the bloodiest wars of history, deserting their present opportunities for advancement and gain, in exchange for peril and probable death, strengthens my opinion and admiration of them, and forces me to the conclusion that they are excellent material with which to make good American citizens.

Charlton Dixon.

Pittsburgh, Penn.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

THE CIRCLE

The **circle** is a plane figure bounded by a curved line, called its **circumference,** every **point** of which is equally distant from a point within which is its **center.**

A straight line drawn from the center to any point in the circumference of a circle is its **radius.**

A straight line joining any two points in the circumference and passing through the center of the circle is its **diameter.** If such line does not pass through the center, however, it is a **chord.**

A straight line touching the circumference of a circle in a single point only, however far it may be produced in either direction, is **tangent** to the circle at that point. A tangent to a circle is always perpendicular to the radius drawn to the point of tangency.

THE ELLIPSE

The ellipse is a plane figure bounded by a curved line such that the sum of the distances of any point of the curve from two fixed points within called the **foci** is constant. This sum is equal to the length of the **major axis,** which is the straight line passing through the foci and terminated by the curve. The bounding curve is the **perimeter** or **circumference** of the ellipse.

The point on the major axis midway between the foci is the **center** of the ellipse. Any straight line passing through the center and terminated by the circumference is a **diameter.** The diameter at right angles to the major axis is the **minor axis** of the ellipse.

The points in which a diameter meets the circumference are **vertices,** the ends of the major axis being the **principal vertices** of the ellipse.

NOTE—The terms "circle" and "ellipse," as used, often refer to the bounding line or circumference of the figure instead of to the figure itself.

MENSURATION

Mensuration is that branch of applied geometry that treats of the calculation of the lengths of lines, the areas of surfaces and the volumes of solids. The following formulas are of the most general application:

The Triangle—Denote the three angles by A, B, C; and the sides lying opposite to them by a, b, c, respectively.

$$A + B + C = 180°$$

$$a : b :: \sin A : \sin B$$

$$\frac{a}{b} = \frac{\sin A}{\sin B}$$

The proportionality of any two sides of a triangle to the sines of their opposite angles; or, in other words, the equality of the ratios of any two sides of a triangle and that of the sines of their opposite angles is one of the most useful principles in the solution of triangles, and the one most frequently used in the practice of surveying.

The Coal Age Pocket Book

The solution of a triangle is always possible when three parts are given or known, provided one of these is a side. It is possible to form but one triangle with three given lines or sides; but, with three given angles, an infinite number of triangles can be formed. Hence the necessity of knowing at least one side.

The solution of triangles presents four cases requiring separate treatment for each case; namely,

1. Given two angles and any one side.
2. Given two sides and an angle opposite one of them.
3. Given two sides and the included angle.
4. Given any two parts of a right triangle.

Cases 1 and 2—The first two of the above cases are solved by applying the formulas just given depending on the ratio of any side to the sine of the opposite angle, as shown by the following examples:

Example—Given, in a triangle, A = 40 deg., B = 30 deg. and b = 100 ft.; to find the other parts of the triangle.

Solution—The third angle is C = 180 — (40 + 30) = 110°. The remaining sides are

$$a = \frac{\sin A}{\sin B} \times b = \frac{\sin 40°}{\sin 30°} \times 100 = \frac{0.6428 \times 100}{0.5} = 128.56\ ft.$$

$$c = \frac{\sin C}{\sin B} \times b = \frac{\sin 110°}{\sin 30°} \times 100 = \frac{0.9397 \times 100}{0.5} = 187.94\ ft.$$

Example—Given, in a triangle, B = 45 deg.; b = 400 ft. and c = 250 ft.; to find A, C and a.

Solution—The remaining angles are first found; thus,

$$\sin C = \frac{c}{b} \times \sin B = \frac{250}{400} \times \sin 45° = \frac{5 \times 0.7071}{8} = 0.44194;$$

and $C = 26° 14'$, *nearly*

Then, $A = 180 - (45° + 26° 14') = 108° 46'$

The unknown side can now be found; thus,

$$a = \frac{\sin A}{\sin B} \times b = \frac{\sin 108° 46'}{\sin 45°} \times 400 = \frac{0.94684 \times 400}{0.70711} = 535.61\ ft.$$

This principle, which is called the **law of sines,** can always be applied when two angles and any side are given; but when two sides and only one angle are given it cannot be applied; unless the given angle lies opposite one of the given sides, or the triangle is a right triangle.

Case 3—When two sides and the included angle are given, there are two methods of solution, as follows:

1. The half difference and half sum of the other two angles are first found by the formulas

Half difference, $\tan \frac{1}{2} (A - B) = \frac{a - b}{a + b} \tan \frac{1}{2} (A + B)$

Half sum, $\frac{1}{2} (A + B) = \frac{1}{2} (180° - C)$

Having found the half sum and the half difference, add these together to obtain the greater angle; and subtract the half difference from the half sum to obtain the lesser angle.

Inquiries of General Interest

Humidifying Mine Air

We have to contend with a serious proposition, in our mines, in respect to keeping the mine moist to prevent the drying out of the dust and avoid the dangers resulting therefrom. I would like to get the views of the readers of Coal Age as to the proper method to pursue to accomplish the necessary humidification of the mine air. The facts, in our case, are as follows:

The mine is ventilated by a blowdown fan and the exhaust steam from the fan engine is discharged into the downcast shaft. Experiments have shown, however, that the dampness or degree of humidity imparted to the air current by the exhaust steam is practically lost at a distance of 600 ft. from the bottom of the downcast shaft.

Inasmuch as the live workings are located at a distance of 4000 ft. inby from this point, it will appear that we are deriving no benefit from the steam exhausted into the downcast shaft. The plan has not accomplished the purpose intended and the results are not what were anticipated.

I want to ask, What is the best method of accomplishing the necessary humidification of the air current passing through the live workings of this mine? Can this be accomplished by passing the air current through a film of water at the point of distribution of the air; and will sufficient moisture be absorbed, by that means, to keep the dust below the point of ignition?

Another plan that has been suggested and considered is to install a line of pipe in the main-intake air course, with plugs at every 200 ft., to which could be attached a hose 100 ft. long. The pressure on the pipe line would be about 104 lb. per sq.in. Will this method furnish sufficient moisture to dampen the dust and render the mine safe, in this respect?

MINER.

Caldwell, Ohio.

In considering a proposition of this nature, it must be remembered that the capacity of air for carrying moisture will depend on the temperature of the air. The average temperature of a mine is generally above that of the outside atmosphere. This is always true in the winter season, which is the most important period in the production of coal. Therefore, although the air current entering the mine may be fully saturated with moisture, owing to the discharge of the exhaust steam of the fan engine into the downcast shaft, this saturated intake current, on assuming the higher temperature of the mine, soon becomes comparatively dry, because the weight of moisture that saturated it at the lower temperature of the outside air is insufficient for saturation at the higher temperature of the mine.

For the sake of illustration, let us first estimate roughly the weight of moisture in the exhaust steam. For this purpose, assume that a current of 100,000 cu.ft. per min. is passing into the mine, under a water gage of 2 in. Then, taking the general efficiency of the circulation as 60 per cent., the indicated horsepower of the engine necessary to supply this circulation is

$$H = \frac{100,000 \times 2 \times 5.2}{0.60 \times 33,000} = \textit{say } 50 \textit{ hp.}$$

Now, assuming a water consumption of 30 lb. per hp. per hr., for a feed-water temperature of 100 deg. F. and a gage pressure of 70 lb., the weight of steam exhausted into the shaft is, on this basis, 50 × 30 = 1500 lb. per hour.

Assume, further, for the sake of calculation, that the outside temperature is 40 deg. F. and the relative humidity of the outside air 50 per cent. Then, since the vapor pressure, at this temperature, is 0.1216 lb. per sq.in., the weight of water vapor necessary to saturate an intake current of 100,000 cu.ft. per min., is

$$W = \frac{0.6235 \times 0.50 \times 0.1216 \times 100,000 \times 60}{0.37\ (460 + 40)}$$
$$= \textit{say } 1230 \textit{ lb. per hr.}$$

From this it is seen that the weight of steam assumed to be discharged into the downcast shaft is more than sufficient to saturate this air current, under the assumed conditions. Indeed, it would saturate this intake current, even assuming an outside humidity of 40 per cent. at the given temperature.

Now, assuming the temperature of the live workings to be, say 70 deg. F., we may ask, How much moisture will be absorbed from the mine workings by this air current, which was saturated in the downcast shaft, at a temperature of 40 deg. F., but reaches a temperature of 70 deg. F., in its passage through the mine? The vapor pressure at the mine temperature (70 deg. F.) is 0.3602 lb. per sq.in.; and, remembering that the volume of air in circulation varies with its absolute temperature, the quantity of water or moisture absorbed from the live workings by a current of 100,000 cu.ft. per min. is found as follows:

$$W = \frac{0.6235 \times 0.3602 \times 100,000 \times 60}{0.37\ (460 + 40)\ 8\frac{1}{3}} = 874 \textit{ gal. per hr.}$$

This quantity of water represents a weight of 7285 lb., or 3.64 tons, which will be absorbed from the live workings each hour by an air current of 100,000 cu.ft. per min., under the assumed conditions. The result shows the enormous drying power of such an air current. It also shows, with more or less accuracy, the volume of water that would have to be sprayed into the current, through a pipe line, in order to maintain a uniformly continuous condition of the mine with respect to moisture, assuming no drainage from the overlying strata and the full saturation of the return air current.

One of the best methods that has been suggested for the practical humidification of the mine air throughout the mine is a pipe-line system with fine sprays of air arranged at regular intervals along the pipe line. If such a system is installed on an intelligent basis, in accordance with the existing conditions in the mine, good results may be expected.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—Under what conditions may afterdamp become explosive?

Ans.—It frequently happens, under the varying conditions in mines, that the afterdamp of the mine explosion contains much unburned methane (marsh gas); and, frequently, much carbon monoxide is present. The addition of fresh air to afterdamp containing these gases will render the mixture highly explosive.

Ques.—What conditions, other than the volume of air passing through the fan or furnace, should a mine foreman consider in order to determine whether the mine is properly ventilated?

Ans.—Assuming that the volume of air passing into the mine is sufficient to meet the requirements of the mine law, it is important to ascertain its relative humidity. The intake air current should be brought, as nearly as possible, to a state of saturation, in order to prevent the absorption of moisture from the dust accumulated in the entries and workings of the mine, which always takes place when passing a comparatively dry air current through the mine. It is also necessary to see that the entire quantity of air, as far as practicable, is conducted forward and made to sweep the working face; and to so distribute the air that the velocity of the current, at the working face, will be sufficient to carry away the gases that would otherwise accumulate and yet not be so great as to make the use of safety lamps dangerous.

Ques.—In what parts of a mine are accumulations of dust more dangerous than in others, and why?

Ans.—Accumulations of dust on the intake airways are more dangerous than on the return, because the dust is then carried into the mine by the air current. Also, accumulations of dust in proximity to the face of the coal are always dangerous, in case blasting is done in the mines. All such accumulations of dust should be carefully removed, and the roof, floor and sides of the place thoroughly sprinkled before blasting is done; otherwise, the dry dust may be blown into the air by the force of a blast and ignited by its flame, causing a local explosion of dust that may, under favorable conditions, be propagated throughout the mine.

Ques.—State how the several mine gases may be detected; in what proportions in the air they are fatal to life; and in what proportions they will extinguish light.

Ans.—This question cannot be answered with absolute accuracy, owing to the difference in the effect of mine gases on persons of different temperament and on lamps burning different oils. Moreover, the results are varied considerably by the presence of other gases or dust. However, methane or marsh gas (CH_4), which is detected in mines by its effect on the flame of a safety lamp, may be regarded as being fatal to life when it much exceeds 50 per cent. of the air breathed. At this point, the oxygen of the air will be reduced to about 10 per cent. of the mixture, which is generally considered as fatal to life. The percentage of methane required to extinguish the flame of a candle, in otherwise pure air, is about 16.7 per cent.

Carbon monoxide present in mine air may be detected by what is known as the "blood test," in which two or three drops of blood in an ounce of water is colored a buff-yellow when air containing this gas is passed through the solution. A better test, however, is the effect of this gas on small animals, such as mice or birds, which become prostrated in, perhaps, one-twentieth of the time necessary to produce a similar effect on human life. The effect of this gas is cumulative when breathed into the lungs, and a mixture of otherwise pure air containing 0.5 per cent. of carbon monoxide will generally produce fatal effects when breathed. The gas is not extinctive of flame.

Carbon dioxide, when present in mine air, is best detected by its effect, which is to dim or extinguish the flame of a lamp. When breathed in sufficient quantities, a considerable length of time, the gas produces dizziness, headache and nausea. Assuming carbon dioxide to be added to otherwise pure air, a candle flame is first extinguished by it when this gas forms 13.4 per cent. of the mixture. The mixture, however, does not necessarily become fatal to life until the gas reaches 18 per cent.

Hydrogen sulphide (H_2S) is generally detected in mines by its smell, which resembles that of rotten eggs. Otherwise pure air containing only 1 per cent. of hydrogen sulphide is generally fatal to life when breathed but a short time. This gas contains no oxygen and it is probable that when from 16 to 18 per cent. of it is present in otherwise pure air, the mixture would extinguish the flame of a candle.

Ques.—State the conditions under which the presence of the various mine gases may be expected.

Ans.—Methane may be expected in the live workings of mines generating this gas, particularly in the rise workings of the mines and in proximity to faults. Carbon monoxide may be expected where gob fires are in progress or slow combustion is taking place where the ventilation of the mine is deficient. Carbon dioxide may be expected in all cases where the mine is improperly ventilated, especially in dip workings. Hydrogen sulphide is seldom found in appreciable quantities in coal mines.

Ques.—State the volume of each of the principal gases composing atmospheric air.

Ans.—Atmospheric air is composed of two principal gases, which are mixed in the proportion of one volume of oxygen to four volumes of nitrogen, practically.

Ques.—In the event of a severe explosion in a mine, what would be your first consideration and duty as mine foreman in charge of the underground operations?

Ans.—The rescue of any possible survivors entombed in the mine. To accomplish this, it would be the mine foreman's duty to organize and equip, in the shortest possible time, a volunteer rescue corps of experienced miners; and having made any necessary repairs to the ventilating equipment, to lead the work of rescue in the mine.

Coal and Coke News

Harrisburg, Penn.

Returns of anthracite tonnage with the value and per capita amount due were completed by the Auditor General, on Dec. 26.

The figures are for the first 6 months of the Rony Act, or from July to December, inclusive, 1913. The report shows for that period that 34,528,794 tons were prepared for market and sold representing a value of $92,144,050.50.

This law imposes an ad valorem tax of 2½ per cent. on coal prepared for market (not including coal run through washeries). Half of this tax goes to the state and half to the county where the coal is mined. The money received by the county is to be distributed under the law to each municipality therein, the proportion received by each city, borough or township being based on the population reported in the 1910 census.

The pro rata share of the money provided for the municipalities is due each and every political division of the bailiwick whether coal is mined within its borders or not. In fact, some municipalities that haven't a pound of coal will receive under this coal tax law more revenue than their present duplicates return. This is one of the features attacked by the operators in the suit now pending.

The tax money is now held in trust by the various coal operators pending the adjudication of the question of constitutionality of the act, Jan. 4 having been set for argument in the Dauphin County courts.

It is contended by the operators that the tax is a special one and cannot under the Constitution be levied: that the tax is assessed after the coal has been shipped out of the state this method being illegal as well as the payment of the money to municipalities in which no coal is mined.

Miners to Formulate Legislation

For the first time in the history of the organisation a meeting of the executive boards of five districts of United Mine Workers in Pennsylvania will be held in Harrisburg in January for the consideration of legislation interesting the miners and which is to come before the 1915 legislature. It is planned to have the miners concentrate their energies on having their legislation put through this meeting of the state's law makers.

Already the anthracite district boards in Districts 1, 7 and 9 have held several meetings and outlined the bills they will fight for.

The plan now is to have the two bituminous districts Nos. 2 at Altoona and 5 at Pittsburgh join their influences with the anthracite miners. It is expected that the efforts of the state mine workers will center on the workmen's compensation, employee's liability and child labor. The meeting will probably be called about the 21st of January.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Members of the Tri-District Board of the United Mine Workers of America in session here recently started a movement for the elimination of wooden cages in shafts, and the substitution of all-steel ones. Officials of the board who investigated the recent Tripp accident, believe that similar catastrophes of this kind might be averted by the use of all-steel cages.

At a recent meeting of the Anthracite Conciliation Board, nine petty cases were referred to Umpire Gray, of Philadelphia, and three others acted upon, one of which was decided in favor of the employees, and two sustaining the company.

Scranton—Scranton will receive about $200,000 through the operation of the Roney tonnage tax on coal for 1913, provided, of course, that this measure is held to be legal. It is probable that the 1914 report of coal mining will show somewhat of an increase over that of 1913, with a corresponding increase in the amount of the tax.

Shenandoah—Four miners were badly burned in a gas explosion which occurred at the Stanton colliery on the evening of Dec. 24. Two are thought to be fatally injured while the others may lose their sight. The explosion occurred at quitting time just as the miners were leaving the workings.

Selinsgrove—Northumberland County Commissioners and officials of Coal township have joined in filing an answer to the petition of the Philadelphia & Reading Coal & Iron Co., the Mineral Railroad & Mining Co., and the Lehigh Coal Co., which recently petitioned for an injunction. These firms seek to prevent the enforcement of the collection of coal taxes for 1913, amounting to $73,001.27, which it is claimed is excessive.

Shamokin—After having been idle for some time because the officials of the Pennsylvania R.R. increased the fare of the miners riding to and from work, the 900 employees of the Hickory Ridge and Hickory Swamp collieries recently returned to work. The men received assurances from the railroad officials that the company is willing to lower the rate of fare to the original figure, but before this change can be made it is necessary to receive the approval of the Public Service Commission.

Pottsville—Four collieries were recently closed down for about three weeks for needed repairs and improvements. This throws approximately 1600 men and boys out of employment.

Tamaqua—Being unable to check the fire now burning in part of No. 9 mine, the Lehigh Coal & Navigation Co. has decided to sink a temporary shaft, and in order to prevent a further spread of the flames to flood the workings where the fire exists.

Lansford—The Lehigh Coal & Navigation Co.'s No. 6 boiler house was burned to the ground on Dec. 25. From 3000 to 4000 men and boys are out of employment as the boilers furnished steam for No. 6 Breaker and a half dozen underground operations.

Bituminous

Connellsville—Twelve hundred coke ovens in the Connellsville region that have been banked for some time were relighted Dec. 26. Three hundred and fifty merchant ovens are shortly to be added to the active list, with the prospect that still more will be fired early in January. The weekly production of coke remains, however, around 200,000 tons, but this will probably increase as conditions in the steel industry are improving, and coke operators are consequently hopeful of a better future market.

Point Marion—An explosion in the cellar of the storeroom of the Fancy Hill Coal Co., located between here and Cheat Haven, burned the office building and store to the ground. The loss was approximately $10,000. Employees promptly formed a bucket brigade, but an inadequate supply of water prevented the firefighters from making progress against the flames. Work of reconstruction will be begun immediately.

Latrobe—The United States Steel Corporation has determined that there will be no general reduction of wages by the corporation or none at the first of the year at least. Such decreases in the general wage scale have been considered and have seemed at times imminent, but according to the statement of the officials, the existing scale will be continued for the present at least, and hopes are entertained that improvement in business will be realized shortly.

Brownsville—It is stated that information received from reliable sources indicates that the officials of the Century Coal & Coke Co. are planning to resume operations at their plant near Brownsville at 85 per cent. capacity on or about Jan. 1, or as soon thereafter as is possible.

WEST VIRGINIA

Fairmont—The general store of the New Central Coal & Coke Co., at Baxter, was totally destroyed by fire on the morning of Dec. 21, entailing a loss of about $25,000. John Jackson, manager of the store, and his family were rescued from the third floor of the building with difficulty, being compelled to descend ropes made of blankets, comforts, etc. The water plugs near the building were frozen up, which handicapped the fire department to a considerable extent. The origin of the fire is unknown.

Gary—Mine Rescue Car No. 8 is now at Gary and has started in on a successful training campaign at that point. Every possible coöperation to the car's crew has been given, and 55 men are taking a complete course of training in mine-rescue and first-aid work. This large number will necessitate an extension of the car's stop at this point, and the car will probably remain here until Jan. 4, after which it will proceed to Davy.

Kingwood—It is freely intimated around this vicinity that the Elkins mines as well as those located elsewhere along the Morgantown & Kingwood R.R., will resume operations shortly after Jan. 1. These mines have been closed or working only half time for several months, and when in operation give employment to several hundred men, all of whom are anxious to see the mines start up again.

ALABAMA

Birmingham—The Alabama Coal Operators' Association has been advised that the Interstate Commerce Commission has suspended the advance rate on coal from Alabama mines to Memphis, New Orleans and other points in the Mississippi valley, which the railroads had petitioned to have put on Jan. 1. The advance asked for was from 15 to 30 cents per ton over present prices. A date for a hearing before the Commission will be fixed early in the year. Pending the investigation the old rate will remain in force. The railroads that joined in the petition were the Illinois Central, the Louisville & Nashville, the Mobile & Ohio and the Frisco. The operators and shippers are encouraged and believe they will win the fight on the merits of their case when a hearing is given.

KENTUCKY

Harlan—This city, according to the Commercial Club, is making a more rapid growth than any other community in Kentucky and is guaranteeing an interest of 6 per cent. on an investment of $25,000 for a water works to any person who will install such a plant. The coal resources of the county explain the city's growth. There are 12 mines already producing while 8 others are to be opened in the immediate future.

St. Charles—The Carbondale Coal Co., with mines two miles north of here, has suspended operations. The reason for this suspension has not been given but report connects it with the "Possum Hunters" activities of several weeks ago when four white men were shot at this camp and all the negroes driven away.

Earlington—The St. Bernard Mining Co. reports for the week ending Dec. 19 the best week in its history in this district, shipments having totaled 887 cars of coal and 36 cars of coke.

Barbourville—There has been a large increase recently in the number of electrically operated mines in the Knox County field. Several of the operators took advantage of the dull period of the last few weeks to install electrical equipment, in preparation for greatly increasing their outputs.

OHIO

Columbus—J. M. Roan, chief deputy and safety commissioner of mines of Ohio, has recently issued Bulletin No. 12 calling attention to three fatal and one serious accident in Ohio mines during the past month. In each case remarks are made showing how the accident in question could have been prevented. The accident was the fault of the miner in every case.

INDIANA

Boonville—The Sunlight Coal Co. has ready for use a fourth large stripping machine, and expects when this is working properly to be able to load more than 50 cars of coal per day. The dipper holds about 1½ tons of coal, and cars can be loaded on an average of one every 15 minutes. Three other machines are now in use, two of which are used to strip the coal, while the other loads it.

ILLINOIS

Pana—Fire has broken out again at the Taylor Springs mine west of here, and the operation is in a serious condition. A mine fire started 18 months ago, and it was supposed that it had been confined to a section that had been bricked and cemented in.

Belleville—On account of the large number of mines of this section that have been idle on account of no market for their coal, the mayor and other business men of the city held a meeting to complain to the Interstate Commerce Commission, asking it to fix rates on coal from Belleville to interstate points, so that the local mines can operate.

Princeton—A judgment for $18,500 was recently awarded in the Superior Court of Cook County in favor of Fred De Filippe, of Spring Valley, who lost his leg about four years ago in the No. 1 mine of the Spring Valley Coal Co. The coal company has, however, taken an appeal to the Supreme Court.

Harrisburg—Through the petition of citizens, the Commercial Club and miners' organization, the O'Gara Coal Co. recently agreed to start Mine No. 4. Mines Nos. 3 and 4 have been idle for many months, and the employees at these operations who were thrown out of work have been reduced in some cases to actual suffering. All idle men who were formerly employed will be given preference in the work.

COLORADO

Denver—The gradual withdrawal of Federal troops from the Colorado coal fields, where they have been on strike duty since April last, will begin shortly. The troops stationed in Routt County will be the first to go. These will be followed by those in Boulder, Weld and Freemont Counties. It is intimated that some time may elapse before all the Federal forces now in Las Animas and Huerfano Counties in southern Colorado will be withdrawn.

FOREIGN NEWS

Pictou, Nova Scotia—Thomas Blackwood, deputy inspector of mines, and James Brown, mine superintendent of the Acadia Coal Co., were killed in an explosion in Allen's Shaft No. 1 recently. Alexander Sutherland, manager of the mine, and Neil McLane, a foreman, were also in the mine at the time of the explosion, and nearly lost their lives.

PERSONALS

W. C. Bonham has been appointed trustee for the American Coöperative Coal Co., who recently filed a petition in bankruptcy at Birmingham, Ala.

George G. Crawford, president of the Tennessee Coal & Iron Co., has returned to Birmingham from New York after attending a meeting of presidents of subsidiary organizations of the Steel Corporation. He says indications point to a general revival of business.

Neil Robinson, consulting engineer, of Charleston, W. Va., and receiver for the LaFollette Coal, Iron & Ry. Co., has been confined to his home in Charleston for the past three weeks with valvular heart trouble. He is improving, but will not be at LaFollette for a few days.

The vacancy created by the resignation of Fred W. Minton as sales agent of the Philadelphia & Reading Coal & Iron Co. at Detroit has been filled by the appointment of William A. Reed, who has represented the same company for several years in Ohio. The changes take place on the first of January.

James B. Neal, president and general manager of the Buck Run Coal Co., recently had suit brought against him by one of the hoisting engineers of the colliery, the charge being that the hoisting engineers were forced to work more than eight hours per day, which is the working time provided by law.

S. C. Van Norman has resigned his position as sales agent of the Pittsburgh-Westmoreland Coal Co. at Buffalo. He has been with the company in this territory for four years. No successor has been appointed, but the office will be conducted for the present by B. F. Mills, who is with the company at Cleveland.

OBITUARY

Col. Eugene Zimmerman, of Cincinnati, O., former president of the Cincinnati, Hamilton & Dayton R.R. Co., and widely known as a financier, railroad magnate and capitalist, died suddenly in Cincinnati on Dec. 20, at a club where he was staying. Death was due to a hemorrhage brought on by undue exertion during an illness. Col. Zimmerman was born in Vicksburg, Miss., in 1845, and was a veteran of the Civil War, serving in the Union navy and reaching the rank of commander. After the war he engaged in railroad construction, and was subsequently interested in many large deals involving railroad properties in the Middle West.

CONSTRUCTION NEWS

Blackey, Ky.—It is announced here that the Rockhouse Realty Co. will make a big coal development on Rockhouse Creek above here, expending thousands of dollars in the work.

Glasport, Penn.—It is stated that extensive improvements costing upward of $100,000, and involving the employment of more than 100 men, are to be made by the Allegheny Byproduct Coke Co., the work to be started about Jan. 15.

Jenkins, Ky.—The Penny Coal Co., starting a new development on the Sandy Valley & Elkhorn R.R., below here, will increase its capital stock the first of the year and will also increase the output. As a result there will be a big increase in the working force.

Baker, Ky.—White L. Moss, M. J. Moss and others, after leasing the K. S. Potter coal land tract near here, will organize the Yount's Fork Coal Co. for early development. The new operation will be on the Yount's Fork Branch of the Lexington & Eastern R.R. White L. Moss will be manager.

Benscreek, Penn.—A structural feat will be attempted by the Hughes Coal Co. during January when an effort will be made to build a steel tipple, one of the largest in this part of the state, in 30 days. The reason for this rush is because the miners, about 200 in number, will be made idle while the work is going on.

Edwardsville, Ill.—The Mt. Olive & Staunton Coal Co. will shortly install one of the largest coal washers in southern Illinois. This plant will cost approximately $70,000, and will have a capacity of 1000 tons per day. It will handle coal from mines as far north as Mt. Olive, making grades ranging from slack to egg sizes.

Whitesburg, Ky.—The Mineral Development Co. general offices, Philadelphia, Penn., is preparing for initial developments above here in Letcher County, to start Jan. 1, although plans are not quite complete. J. L. McCormick, Whitesburg, Ky., will be manager of the new operations. It is said a good sized industrial and mining town is planned.

Holt, Ala.—The second barge which will be used in the barge line to be inaugurated by the Pratt Consolidated Coal Co. has been completed. The third will be finished soon. Mr. G. B. McCormack, president of the company, states that he is negotiating for the purchase of a tow boat to be ready as soon as the completion of lock 17, which will be in two or three weeks.

Greensburg, Penn.—The Export Coal Co., of which J. S. Pates, of Monongahela City, is the president and general manager, will in the early spring begin the operation of coal land directly south of Trafford and Cavittsville and north of the Southern Turnpike between East McKeesport and Irwin. It is anticipated that about 400 first-class American miners will be employed.

Lonaconing, Md.—The Maryland Coal Co., of New York, will improve its Lonaconing plant, developing the Tyson bed in the Georges Creek region. It is stated that this firm will install electrical and improved equipment for an ultimate capacity of 1000 tons of coal per day, and upon the completion of this work will probably develop about 1000 acres of fireclay property at Mt. Savage, Md.

Whitesburg, Ky. — Louisville & Nashville engineers are rapidly locating a 10-mile branch of the Lexington & Eastern R.R. from Blackey, in the southern end of Letcher County, up Rockhouse Creek into rich coal and timber fields. The Mineral Fuel Co., the Swift Coal & Timber Co., the Rockhouse Realty Co. and others own large boundaries on Rockhouse and it is expected that developments aggregating millions of dollars will be started in the near future.

Columbus, Ohio—With the passage of an act by the National Congress authorizing the building of a bridge across the Ohio River at Sciotoville by the Chesapeake & Ohio Northern R.R. Co., all obstacles in the way of building the line from Portsmouth to Columbus have been removed. The line in question will be 97 miles long and will shorten the route from the Virginias to the lakes by 102 miles. It is the intention to construct the road at once. The Kentucky terminus of the bridge will be at Limeville, 8 miles above South Portsmouth.

NEW INCORPORATIONS

Richmond, Va.—It has been announced that the West Virginia Coal Co. has taken over the Atlantic States Coal & Coke Co. The principal offices will be in this city, while the Western business of the latter company will be handled at the Cincinnati office of the West Virginia firm.

Morgantown, W. Va.—A charter was recently granted to the Wilfong Coal & Coke Co. This firm has an authorized capital of $10,000 and will operate in the Grant District of Monongahela County. The incorporators are John, L. C., and Edward Wilfong, of Fairmount, and W. L. Boughner and Thomas Ray Dille, of Morgantown.

INDUSTRIAL NEWS

Columbus, Ohio—A meeting of the executive board of the Michigan-Ohio-Indiana Coal Association will be held some time in January, the place and date to be announced later. At that time the matter of fixing a place for the 1915 convention of the organization, to be held in June, will come up for discussion.

Jackson, Ohio—Because of the fact that 18 locomotives used by the Detroit, Toledo & Ironton R.R. leased from the New York Central, the Pennsylvania and the Norfolk and Western have been recalled by their owners, the coal traffic on that line is demoralized. This is especially true of the yards at Jackson.

Wheeling, W. Va.—Following the lead of the Lorain Coal & Dock Co. which boarded up the entrance of its mine at Blaine, Ohio, a short time ago, a number of other big operating companies in the eastern Ohio fields are said to be making preparations to close up their workings. A number of these firms have already sent away their livestock.

LaFollette, Tenn.—The coal land lease secured three months ago by C. H. Thompson, of Darbyville, Va., and W. J. von Borries, of Louisville, Ky., from the Haley Coal Co., on First Creek in Perry County Ky., has been surrendered to the lessors on account of the inability of the lessees to finance the proposition as stipulated when the lease was taken.

Harrisburg, Penn.—The auditor's general department recently mailed 150 blanks to anthracite coal producers, corporate, partnership and individual, upon which to make reports on their tonnage for 1914 for the purpose of levying the state tax on anthracite. The question of constitutionality of the law is now in the hands of Dauphin County Court for determination.

Pittsburgh, Penn.—Although the stage of the river was falling somewhat, two million bushels of coal which had accumulated in the local harbor since the suspension of navigation in June were sent south Dec. 23. Five of the largest tow boats of the Monongahela River Consolidated Coal & Coke Co. were assigned to take out this cargo, the river was then clear of ice.

Washington, D. C.—Increases in the freight rates on coal and coke in carload lots from mines in Alabama, Kentucky, Tennessee, Virginia and Illinois, to Memphis, Tennessee, New Orleans, Louisiana and destinations in other states were recently suspended by the Interstate Commerce Commission until Apr. 30 next. The increases average 15c. per ton on coal, and from 10c. to 50c. a ton on coke.

Beaver, Penn.—Two coal boats, part of the tow of the steamer "W. K. Fields" which left Pittsburgh with a fleet for southern waters a few days ago, broke in two above Industry recently and sank. The boats contained 40,000 bushels of coal. They grounded on the Wolf Run bar, and broke in two after being released. They were owned by the Monongahela River Consolidated Coal & Coke Co.

Fayetteville, W. Va.—The New River Co. during the fiscal year ended June 30, 1914, produced nearly one and one-half million tons of coal, the actual figures being as follows: Beckley mine, 92,927 tons; Collins, 114,820; Cranberry, 180,419; Dunn Loop, 192,040; Harvey, 161,153; Mabscott, 95,647; MacDonald, 59,618; Prudence, 136,262; Stuart, 114,933; White Oak Fuel, 347,435, making a total of 1,485,254 tons.

Louisville, Ky.—Ice in the Ohio River has been seriously interfering with shipments of Pittsburgh coal by the Monongahela Consolidated Coal & Coke Co. This ice has been disgorged into the Ohio from the Monongahela River and has been of sufficient thickness to make shipments inadvisable. Large cargoes of coal, however, were sent ahead of the ice and conditions have since improved so that shipping can be resumed.

Winchester, Ky.—Both the Louisville & Nashville and the Baltimore & Ohio railroads are making extensive preparations to handle the 80 million tons of coal which it is reported the Consolidation Coal Corporation has contracted to deliver in the next six months. It is stated that every one of the company's mines will be put in operation and that deliveries, presumably to one of the belligerent European powers, will be begun at once.

Washington, D. C.—Regulations governing the coal mines on Indian land were recently promoted by Secretary Lane with the object of decreasing fatalities among miners. On and after Jan. 1, 1915, such mines will be required to use either permissible explosives or electric firing systems operated from outside the mine. Provision is made for extension of time in compliance with this order, where a hardship would be worked upon the mine owners.

Washington, D. C.—Officials of the Department of Justice were apparently not greatly surprised when they heard of the dismissal of the Lehigh Valley R.R. case by Judge Hough in the District Court. An appeal will be taken from this decision, and an effort made to have the case brought before the Supreme Court during this term. The necessity of preparing a brief of the record of the case, however, may consume a considerable length of time.

Erie, Penn.—The Erie Pump & Engine Works recently consolidated with the Northern Equipment Co., and the name of the combination will be the Erie Pump & Equipment Co. This firm will occupy the property of the Erie Pump & Engine Works, and John H. Dougherty who, for a number of years, has been in the employ of the Jeamsville Iron Works as designer of centrifugal pumps, has been engaged to take charge of the designing of pumps for the company.

Reading, Penn.—It has been learned that since the reduction of freight rates which has been ordered between the mines and Philadelphia, a movement will be inaugurated all along the Reading railway system to secure a similar reduction in rates on hard coal on the ground that the reduction granted to Philadelphia is discriminatory. It is the belief that the matter will be presented to the proper state authorities soon after the first of the year.

Huntington, W. Va.—As a result of the recent cold weather, the coal business on the Chesapeake & Ohio R.R. has increased and traffic is now much congested. Despite this rush, however, the amount of coal loaded so far this month is not as great as that loaded during the same period of last year. Between Hinton and Newport News terminals are congested with coal cars, thousands of which are standing on side tracks rendering it difficult to handle other classes of traffic with dispatch.

Cincinnati, Ohio—The court of appeals for this district has affirmed the judgment rendered some time ago in the amount of $26,650, in favor of the Campbell Creek Coal & Coke Co. against the Cincinnati Gas, Coke & Mining Co., now the Reliance Coal & Coke Co. The suit was brought on a contract made in 1907, by which the defendant agreed to take 225 barge loads of coal from the Campbell Creek company, the suit being brought on an alleged breach of the contract in 1908. The amount asked was $55,643.06.

San Francisco, Calif.—Word has been received from San Antonio, Argentina, by Hind Rolph & Co., to the effect that the four-masted bark "Drummuir," flying the British flag was sunk by the German cruiser "Leipsic" a few days before the latter was destroyed with the German fleet off the Falkland Islands. The "Drummuir" owned by this firm left Swansea some time ago, and would have arrived here in February had she not been intercepted by the German ship. She was loaded with 2780 tons of anthracite coal.

New York, N. Y.—The Gifford-Wood Co. will shortly establish a branch office in the Hudson Terminal Building, 30 Church St., occupying suite of rooms No. 1038. This office will be managed by A. W. Berghoefer, who will have associated with him Joseph A. Boucher, both being engineers of ability. The territory of this office will include Westchester County, N. Y., the whole of New Jersey, the southern part of Connecticut, and the southeastern part of Pennsylvania; also the Southern States east of the Blue Ridge Mountains.

Denver, Colo.—According to the preliminary draft of the annual report of the state coal mine inspector, James Dalrymple, there has been a decrease of 1,183,577 tons in the amount of coal mined in Colorado during 1914 compared with that produced in 1913. It is estimated that a total of 8,085,362 tons were mined during 1914 as against 9,286,939 tons produced in 1913. The strike, European and Mexican wars, and the closing down of large steel mills in Pueblo, together with a general business depression, are some of the causes for this decrease.

Philadelphia, Penn.—In order to conserve the assets of the Colonial Coke Co., which owes Irish Bros. $96,570 for money loaned, the receivers of the latter firm recently brought action in Common Pleas Court No. 1 to appoint a receiver for the former company. In addition to the amount owed Irish Bros., the Colonial company owes to its employees $2358.45, while the Cambria County Coal Co., lessor of the mine held by the Colonial company, have a claim for $11,236. The assets consist of a lease on coal lands in Cambria County, and mining appliances valued at $20,000.

Harrisburg, Penn.—It is stated that recommendations for embracing under the authority of the state Department of Mines, all quarries, iron ore, and other mines, oil and gas wells and other operations will be made to the next legislature in a report which will be drafted under the authority of a legislative resolution passed in 1913. This measure directed the state chief of mines to make an inquiry into the subject, and it is probable that recommendations will be made that these mines and wells be brought within the scope of a special act, and that regulatory legislation be enacted.

Columbus, Ohio—The New York Central Lines have followed the example of the Baltimore & Ohio R.R. Co. in issuing new reweighing rules which are better suited to the interests of coal shippers and retailers. The new rules are about the same as issued by the Baltimore & Ohio and provide for reweighing upon the request of the consignee at the nearest scales to destination, the cost to be $3 in case the shrinkage is less than 1000 lb. In case the shrinkage is more than 1000 lb. the cost of reweighing is to be paid by the railroad company. The cost of reweighing at the point of destination is only $1.

Birmingham, Ala.—After a long delay on account of lack of funds, the 1913 annual report of Chief Mine Inspector Nesbitt has been issued. This report contains a directory of the mines in Alabama, the seams of coal, number and kind of openings, whether drift, slope or shaft, number of employees, mode of ventilation of each opening, production of each mine, number of days worked, price paid per ton for mining, states whether machine or pick mined, and the railroad connections. The number of coke ovens are listed, together with the output of coke, as well as a description of each mine, and much valuable information regarding accidents, etc.

Philadelphia, Penn.—The State Railroad Commission of Pennsylvania issued its formal order Dec. 28, covering the reduction which was made in the rates of freight to Philadelphia. This becomes effective, Jan. 12, and the various railroads have been requested to furnish the commission with revised tariffs. Officers of the various railroads still maintain silence as to their attitude in the premises, but it is not expected that the rates will be actually established, without some protest on their part in the courts. The decision will undoubtedly be fought to the bitter end. It is expected that there will be virtually no change this winter in the prices of coal at retail, and even if the new rates should be upheld, it is doubtful if the consumer would receive the full benefit thereof.

Columbus, Ohio—A peculiar situation has arisen in Columbus over the administration of the Ohio Workmen's compensation law, which affects every coal dealer in the state. It has been the custom among dealers to furnish a man to wheel coal from the sidewalk to the basement or other storage place. These men are paid by the customer and are not in any sense working for the dealer. Recently a man so employed injured a finger and immediately brought complaint against the dealer, who was not a contributor to the board of awards and thus had to assume the risk individually. It required the employment of an attorney and the taking of depositions to convince the state board of awards that the man was employed by the consumer and not by the dealer. Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, advises that all dealers who furnish such a man should impress it upon the workman, as well as the customer, that he is not employed by the dealer.

Montgomery, Ala.—The State Railroad Commission has just reached its decision regarding the proposed rates petitioned for by the railroads out of Birmingham, as follows: The Commission issued orders requiring the railroads to withdraw all special rates not open to the public, except those to pig-iron furnaces and steel plants; denied petitions of Montgomery, Dothan and Alexander City for reductions in coal rates from Birmingham, and adopted Southern Classification No. 40 of the Interstate Commerce Commission which puts intrastate rates in Alabama on a uniform basis with interstate rates. Withdrew its interdiction for a lower rate on coal from Birmingham to Selma; denied petitions of railroads for an increase in rates on coal from mines to Birmingham. In the commodity cases the railroads asked for increases ranging from 10 to 25%, and in granting a 10% increase the Railroad Commission stipulated that it was to meet present conditions only, and would not be effective after June 30, 1915. On rehearing the Selma coal-rate case the Commission decided to reëstablish the original rate of $1 per ton. A rate of 80c. per ton had formerly been established by the Commission, based on the rate to Decatur being 75c. Investigation showed, however, that the Decatur rate was allowed on account of being a highly competitive point with other districts. Permission was granted to the Louisville & Nashville R.R. to withdraw certain building material rates to coal and ore mines and coke ovens. This still leaves the Interstate Commission decision as far as it pertains to shipments to other states, and the operators are anxiously waiting the decision.

Coal Trade Reviews

General Review

Colder weather forces the large anthracite companies to draw on their storage piles. Bituminous trade continues heavy, with sales agents pushing hard to place the current production. Substantial improvement noted in the Middle West.

The long continued cold snaps have created an active situation in the retail anthracite trade, but the wholesale business is still holding back. Supplies are plentiful, though the large companies have been drawing on their stocks. Delays occasioned by freezing coal caused temporary anxiety in some quarters, but on the other hand the dealers reduced their buying over the closing days of the year and there has been no shortage of consequence at any time.

Large stocks, weak prices and excessive surpluses in all directions mark the opening of the new year in the Eastern bituminous trade. The colder weather, which has started coal moving in certain restricted channels, and more or less indefinite reports of a turn for the better in industrial circles after the first of the year, are the only encouraging features in the situation. The surpluses at the main distributing centers are probably a shade less than for some time, and quotations on prompt sales a trifle steadier, but the demand is only spasmodic while only the thinnest pretense is made of maintaining the circulars and sales agents are pushing hard to place the January and February tonnage. On contracts for the new year, the producing interests are holding out determinately for the same prices as last year, and most of the business coming up so far has been closed at these figures, though very slight concessions are occasionally noted.

In the Pittsburgh district, a scarcely perceptible improvement in the demand is noted, due entirely to the additional tonnages required because of the colder weather. As a result the market on free coal is a trifle steadier, and there are encouraging reports of increased working schedules to become effective at many of the mills this month. At the moment, business is confined entirely to routine orders on regular contracts, and spot coal is the only size in which buyers are displaying any interest. The severe cold weather caught the dealers in Ohio with unexpectedly low stocks with a result that there has been a rush of orders, with some of an urgent character. A better sentiment is also noted among the steam consumers, who are now placing orders with every apparent confidence.

In the Southern market current prices continue below the regular circular, but the cold weather and storms have created a demand for immediate shipment; the holiday curtailment and better feelings prevailing regarding the industrial outlook have caused a moderately improved tone in the situation.

The severe cold weather has toned up the Middle Western situation in an impressive manner. Prices are notably stiffer, while mine operations are apparently up to full rated capacity with the coal being absorbed as rapidly as it is mined. The predominating feature in the situation is the heavy demand for steam coal from Chicago which is apparently being met with some difficulty. Higher prices are to be expected most any time from now on.

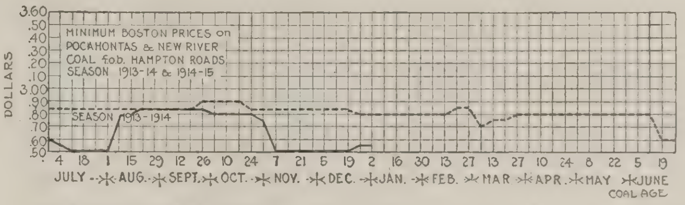
ATLANTIC SEABOARD

BOSTON

Year opens with a surplus of coal at all points. Contract demand slack and Pocahontas and New River interests pushing hard for business. Pennsylvania grades dull with occasional forced concessions. Anthracite in better demand.

Bituminous—There is no improvement in the Pocahontas and New River situation beyond what was reported a week ago. The year opens with dubious legacies from 1914—large stocks, weak prices, a surplus of coal at every loading port, and an industrial situation that is decidedly unsatisfactory. Contract demand is still very slack and there is nothing more to the spot market than has been the case for the past three or four months. The agencies are actively canvassing for business and strong efforts are made to place the January and February output. On such business there is apparently no thought of netting $2.85 f.o.b.; it is a question of getting the orders and making the price satisfactory to the buyer. There is less coal on the market at the various distributing points than for several weeks and prices on cars here are a shade firmer, but there is a lack of snap, to the trade in general.

Nothing is reported so far of the attitude Southern shippers are to take toward yearly contracts. With a certain amount of tonnage already closed at around $2.70 f.o.b. for delivery through 1915 the operators will have to have the situation more firmly in hand than they have at present to secure a gross price anything like $2.85 at Hampton Roads. If it turns out that this price can be firmly held as the contract basis it may be predicted with confidence that certain of the quality grades from Pennsylvania will be actively in the field for what tonnage can be had.



The shippers of Georges Creek are beginning to make good their arrears on shipments, the shortage being made up through the use of anthracite barges from Philadelphia temporarily diverted to the bituminous trade.

There is practically no change in prices on the Pennsylvania grades. The demand is only spasmodic and the market still much restricted. Occasional concessions are made to move distress coal at the shipping ports, but for the most part coal is coming down only on firm orders.

Anthracite—The low temperature of the past fortnight has given an impetus to retail trade and the shipping companies in consequence have more orders in hand. January is looked to for a moderate hard coal tonnage in New England.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.90@1.50	$1.15@1 .65	$1.67@1.77	
Philadelphia*.....	2.15@2.75	2.40@2 .90	2.92@3.02	
New York*.......	2.45@3.00	2.70@3 .20	3.22@3.32	
Baltimore*......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.55@2.75
Boston†.........	....	....	....	3.63@3.78
Providence†.....	....	....	....	3.48@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous mines are working more steadily. Situation more hopeful but prices still unchanged. Anthracite buying slowed down over the year-end in spite of the cold weather.

Bituminous—The demand for bituminous coal has improved, due to the long-continued cold weather. But it has not improved to an extent that would warrant any increase in prices, and coal is still selling at or about the cost of production; however, this is a distinct improvement and there is a still better feeling as to the future.

Mines are working more steadily; those on three-day schedules are now working nearer five, and there are others that are on full time. On the other hand those producing the poorest grades have not yet started up or at least are doing little, if anything. It is possible that present conditions will still improve; at least it is not expected that they will be less favorable. There will, from now until April, be a natural restriction on account of the large number of holidays, which are usually celebrated by all classes and nationalities. There is also likelihood of a shortage of railroad cars. There has already been a shortage on one of the roads due rather to a lack of motive power causing a delay in movement, but the general effect is the same as mines are unable to work steadily. Labor is still plentiful, but there is a feeling that this will only continue until the steel works resume full time when the mines will encounter a shortage.

A little contracting has already been done, and last year's prices have ruled in most instances. Only slight concessions have been made, as operators feel the absolute necessity of securing these prices. The situation appears more hopeful to most concerns. Prices continue unchanged as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—There has been a decided improvement in the hard-coal trade during the past week, and dealers are all very busy. They have all ordered new supplies and the docks are having all they can do to load the required cargoes because the coal is badly frozen and the capacity of the piers is reduced about one-half.

Broken coal is made only in sufficient quantities to take care of contract business, and there is little to be said about any special market condition. Egg is plentiful; in fact, it is troublesome and is being offered as low as the April circular. Stove is very active and is being taken from storage in large quantities; there is no premium or cut in circular prices. Chestnut is strong and shipments in the line trade slow. There is sufficient in storage to take care of an active demand at tide, and large quantities are being picked up.

Pea is very scarce, but no premiums are being paid. Buckwheat is short in the better grades and prices are firm; there is sufficient of the cheaper qualities but prices have firmed up materially from recent low figures. Rice and barley are short in all grades and are holding firm.

The market is quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.25@5.35	5.30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BALTIMORE

The coldest December weather in history of local weather bureau booms consumption of fuel. Much difficulty with frozen coal. Not much improvement in soft-coal situation at mines.

The colder weather has forced a number of the smaller consumers to get in more coal, and domestic sizes of anthracite are in healthy demand. Ice-covered streets caused considerable trouble with wagon deliveries, and the motor truck again demonstrated its superiority in such conditions. Falls of snow throughout a large part of this and neighboring states sent much of the fuel to this city in a badly frozen condition and the usual troubles with thawing resulted. This is particularly true of the smaller dealer who has not the facilities for direct dumping in many cases.

The holidays brought a nearly complete shut-down in many mining districts, but unlike previous years, it was not wholly unwelcome. Gas coals of West Virginia are sluggish, three-quarter being offered at 85c. and run-of-mine around 75c. Steam coals run from 85 to 90c. at the mines. Pennsylvania coals of better quality are probably the best feature here, as the local demand, outside of that for export fuel, is for the better grade Pennsylvania products. From medium to best they are bringing from $1.15@1.35.

The export trade is not rushing as some had hoped. Isolated charters are announced from time to time, but there is not the same busy aspect to the piers that characterized September and October loading. The bunker trade holds up exceptionally well, however, under an immense grain movement.

BUFFALO

There is the customary light movement during the holidays. Much expectation of improvement after Jan. 1. Slack continues to advance. Cold weather helps anthracite.

Bituminous—Business now is confined to routine orders on regular contracts, which must be filled anyhow. Some of the larger shippers expect a decided turn for the better after the new year is well under way, but others refuse to hold out hopes as yet.

Slack coal is still strong. It has been scarce for some time and there is no improvement in the supply, so a slight increase in the demand will insure a good trade. There are low-price mine agents here, which indicates that they are not able to sell their coal near home and are willing to bring it here for almost anything the consumer will offer. An increase in consumption would scarcely drive them off the market.

At the same time there is hope of a limited revival in demand that will give the miners work and stop the complaints of despondent jobbers. The general belief is that there will be a better outlook in the next 30 days. The Canadian trade is improving slowly; England is calling on the Dominion for all sorts of manufactures and many idle factories are starting up.

The slight strengthening of the market does not yet warrant any change in quotations which remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley prices are 25c. lower than Pittsburgh.

Anthracite—The demand is not heavy, but has increased since the weather turned colder. About the usual amount has been sold for the year and with the exception of a surplus of egg coal, the trade is in a normal condition. Some shippers say that the cold weather has not helped their rail-line trade to any extent. An effort is being made to load considerable anthracite into vessels before the ice in the harbor becomes heavy, but with this weather the Lake is fast closing and it will be difficult to navigate the inner harbor soon, though the presence of a large amount of grain to be unloaded this winter makes it necessary to keep the channels open. Nobody remembers a previous December when the harbor and Lake were so blocked by ice.

A winter, such as this promises to be, will clean up the Upper-Lake docks and make business Westward brisk in the spring. There is a good demand for independent anthracite, considerably more of it being sold in this market than formerly. Prices are on a par with the regular circular.

PHILADELPHIA

Anthracite situation shows little or no improvement over last week. Seasonable weather stimulates retail trade, but has not as yet been reflected in the wholesale market. All sizes in good supply. Bituminous slightly improved.

Anthracite—The past week was all that could be desired from a coal-burning standpoint, but nevertheless it failed to help the market as much as was anticipated, particularly in the wholesale trade. Business is fairly brisk, but dealers all have good stocks, and there is no difficulty at all in securing prompt shipments. Even stove size is in easy supply. The demand at the present time seems to be centered on chestnut, pea and buckwheat sizes, and with the curtailed work at the mines, owing to the holidays, some of the companies have drawn on their stocks to meet the current demand. Broken and egg still continue in a rut, and very low prices are being quoted by the individuals in their efforts to move egg; 50c. off circular on consignments to rail points nets the operator a fairly good return, and considerable business is being done on this basis. The demand for broken is in marked contrast to what it was a year ago; at that time many operators were turning down business for this size, but such is not the case now. The price of this coal has advanced considerably during the last three or four years and quite a number of large contracts that formerly fell to the large companies are now taken care of by the individuals.

Prices at tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75@4.85
Stove	5.00	5.00
Chestnut	5.25	5.25

Bituminous—This is the contract season of the year for both anthracite and bituminous, and the latter seems to show slight indications of an improvement, but it is so gradual that it is almost impossible to record the changes that have taken place from one week to another, though there is undoubtedly a better disposition in the trade. Prices have not perceptibly advanced, but there appears to be a stronger demand.

OCEAN FREIGHTS

Chartering light but demand even more urgent and rates still advancing.

The freight market is even higher than a week ago. Although the demand for steamers for grain, cotton, general cargo, etc., is as urgent as heretofore, even at advanced rates, the number of charters has diminished, owing to the scarcity of tonnage and the Christmas holidays. It is difficult to interest owners in export coal, and it is almost impossible to secure cable refusals, but with export coal orders firm in hand, we are occasionally able to close charters and contracts.

To	Rate	To	Rate
Havana	$1.75@2.00	Guantanamo	$2.25@2.50
Cardenas or Sagua	2.25@2.50	Demerara	4.00
Cienfuegos	2.25@2.50	Bermuda	2.25
Port of Spain, Trinidad	2.50@2.75	Vera Cruz	2.50
St. Lucia	2.50@2.75	Tampico	2.50
St. Thomas	2.25@2.50	Rio	6.00@6.60
Barbados	2.50@2.75	Montevideo, Buenos Ayres or La Plata	5.40@6.00
Kingston†	2.00@2.25	Mediterranean	9.60
Curacao	2.00		
Santiago	2.25@2.50		

*About. †Small boats to Kingston $2.25@2.50. W. W. Battie & Co.'s Coal Trade Freight Report.

HAMPTON ROADS

Shipments light and prices unchanged. Rates made for 1915 bunker contracts.

There have been a few large coastwise shipments as well as some movement foreign, but neither of these has been as heavy as might have been expected at this season of the year. The Christmas holidays have also interfered to some extent with the dumpings.

The demand for both coastwise and export shipments is still light and the greater part of the movement confined to contracts. Prices for prompt shipment remain unchanged. Bunker rates for supplying coal under contract during 1915 have been fixed at $3.30 plus trimming, and is somewhat of a change from the prices for the last two years.

Cold weather has caused the demand from retail dealers to increase somewhat although to no great extent. The call for New River and Pocahontas nut for domestic coal seems to be gradually improving, and so far as can be ascertained it is giving entire satisfaction.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Egda	Norwegian	Baltimore	Colon	1610	
Marie O. Teal		Philadelphia	Porto Rico	682	
Evelyn W. Hinkly		Philadelphia	Galveston	558	$1.10

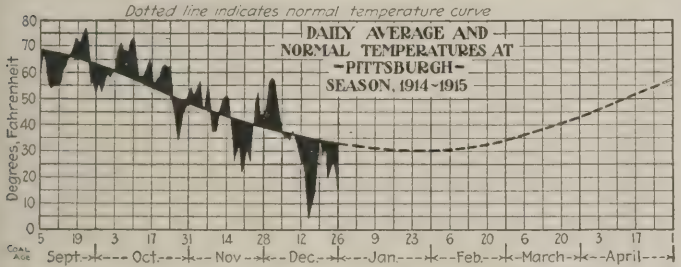
Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Increased demand for coal due to cold weather, and prospective further increase in manufacturing operations. Production about 50% of capacity against 40% formerly, and prices slightly steadier.

There is a slightly improved demand for coal nearly all along the line. The retail demand has been good for three weeks, and as the weather continues seasonably cold there is no prospect of its abating. The demand from railroads, power and manufacturing plants generally has proved decidedly better in the past fortnight, and the improvement is attributed by producers not to increased operation but to the greater amount of coal required to produce results in cold weather. A further increase in demand is also expected as reports are that the steel mills are going to run at a considerably fuller rate in January than in December. To some manufacturing consumers there has been a temporary curtailment in shipments, as a stoppage was ordered from the day before Christmas to the following Monday.



The Pittsburgh coal district as a whole is now operating at about 50% of capacity, as against not over 40% a fortnight ago. The market for free coal is a trifle steadier, though there is still some shading from $1.15 for mine-run, but on the other hand some good grades cannot be secured at that figure. The slack market has firmed up further and it is now on the regular basis of 90c., with some operators quoting $1. The market is quotable approximately as follows: Slack, 90c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district. These are prompt prices. There are no circular prices out. Some time ago one or two operators put out a circular based on $1.20 for mine-run, but this was not adopted generally. The Pittsburgh Coal Co. has issued no circular prices and nominally its circular prices are the old ones based on $1.30 for mine-run. This interest will name new circular prices about Apr. 1, when a number of current contracts expire.

COLUMBUS

The continued cold weather has stimulated trade. Prices are steadier and the volume of business larger. Better times anticipated after the first of the year.

Zero weather has had a beneficial effect on the coal trade. Prices have stiffened materially and the volume of business is increasing while a better tone is noted on all sides.

Domestic business was stimulated to the greatest extent by the more favorable weather. Dealers' orders are coming in better all along the line and one of the best features is the request for immediate shipment. The retailers' stocks are only fair and the colder weather has made it necessary for them to cover promptly.

The steam trade is still slow but a slight improvement was reported during the week. Manufacturing seems to be increasing and the colder weather makes the fuel consumption larger; railroads, for instance, require an increased tonnage for handling their trains. The small sizes are still strong but this condition is not expected to continue with the increased production of lump. Nut, pea and slack are selling around 70c. and coarse slack is only 10c. less. Steam plants which use slack exclusively have had difficulty in getting their requisitions filled.

Production during the past week has shown a substantial gain; although a holiday intervened and Saturday was a day of idleness the output compares very favorably with previous weeks. In the Jackson field the production is now about 70% of normal and the same prevails in Crooksville and Cambridge.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.70	0.25	0.65
Coarse slack	0.60	0.65	0.55

CINCINNATI

Continued cold weather and improvement in manufacturing circles have stimulated the market on all sides. Indications are that activity has begun and will continue, with much better prices.

A steadily increasing activity in all branches of the coal trade has developed an improved domestic demand and an unexpectedly heavy call for steam coal. The light buying of the past two or three months has given way to something like an urgent demand, due probably to the fact that stocks are low. The first week or so of severe weather depleted the surplus stocks rapidly, leaving the dealers with an inadequate supply for their trade. A rush of orders, especially for immediate delivery, naturally resulted.

The most encouraging factor, however, is the improvement in the steam demand. Large consumers seem to have made up their minds that the business depression is over, and are placing their orders with apparent confidence. The increasing demand for slack for coking purposes is also having a strong effect on this grade.

CLEVELAND

The coal market is holding up well in spite of the holidays. Receipts are light, but the demand is fair. Surpluses being cleaned up.

Manufacturing plants running full time the last few weeks have not closed down over the holidays as is often done, and most of those working part time will put in a few days during the holidays. This has kept the demand for steam coal well up to the production. A little warmer weather has taken the edge off the retail demand, but it is still cold enough to keep the business moving.

Only 300 cars of coal arrived here Monday. The mines worked up to Friday, but did nothing more until Monday. This will reduce the movement the rest of the week and by New Years the market will be clean. Receipts this week have been put in on contracts, and jobbers and operators did not try to place coal with outside trade.

There has been very little change in the spot price for mine-run and three-quarter coals and slack is holding up to $1.75. The coal that is coming here is being moved on contract, as shipment prices are higher than spot quotations. Jobbers paid $1.72½ for fine coal at the opening of the week and sold it at $1.75 to regular customers. This was spot business.

The domestic market is stronger and prices are firm on high-grade coals. Pocahontas, which was low a week ago, is stronger and cannot be bought below shipment prices.

For shipment the prices are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60	......	......	......	......
Lump, 6 in.	......	......	$2.45	......	......
Egg	3.60	......	......	......	......
Egg, 6 in.	......	......	2.10	......	......
Lump, 1¼ in.	......	$2.45	2.25	......	......
Lump, ¾ in.	......	2.30	2.10	$1.95@2.00	$2.00
Mine run	2.65	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.80@1.85	1.75	1.85	1.80

COKE

CONNELLSVILLE

Furnace coke contracting movement concluded, with only two or three deals hanging over. Few sellers participated, others awaiting higher prices later. Production slightly increased while shipments decrease 12,000 tons.

The furnace-coke contracting movement is now over for the present. Two or three contracts are hanging, the prospective consumers desiring to wait until the end of the month before closing finally, in order to have an opportunity to test the coke involved, which is now being shipped on a temporary arrangement. The feature of the movement just ended is that almost all the coke was sold by three interests, Washington Coal & Coke Co., W. J. Rainey and J. H. Hillman & Sons Co. The Producers Coke Co., of Uniontown, has sold some coke, but no large proportion of the capacity for which it acts as sales agent. Thse who did not sell coke are expecting to obtain much better prices later, when fresh demand arises, as the furnaces now idle have not contracted. We quote: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2@2.20; contract foundry (nominal), $2.35@2.50 per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 19 at 198,533 tons, an increase of 2258 tons, and shipments at 188,049 tons, a decrease of 12,009 tons.

BUFFALO

When the iron trade is making good progress there will be a better report possible of coke, but for the present the demand for both is not what it should be. The Buffalo customhouse report of iron-ore receipts shows 2,882,030 tons by Lake for the season of 1914 and 5,208,930 tons for 1913. Furnaces in this district are running faster than they were, but are not really active. Coke prices are $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

CHICAGO

A better demand has developed for domestic sizes and continued improvement is noted for furnace and foundry coke. Prices are as follows: Byproduct, $4.75@4.95; Connellsville, $4.75@5; Wise County 72-hr. (select), $5; gas coke, $4.25@4.50; furnace coke, $4.50@4.75.

ST. LOUIS

There are several small inquiries out for foundry coke for the first of the year and rumors that large inquiries will be sent out on the first. During the past week two or three small orders were placed for byproduct coke for domestic purposes, to be shipped after the first. Local gas house is in good demand and moving fairly good, with indications that a greater tonnage will move during the month of January than ever before. Retail prices per short ton delivered to consumers are: Local gas house, $5.75; byproduct, $6.25@6.50.

SOUTHERN

BIRMINGHAM

Lump coal shows some improvement but steam grades continue quiet.

The past ten days have been very cold, with sleet and snow, and as a consequence, lump coal has shown some improvement for immediate shipment, though prices are below the regular schedule and the retail yards are buying only in small quantities. Steam coal does not seem to have improved any, the demand being light and many of the mines will remain closed after the holidays until the demand is better. Blacksmith coal is in a normal condition, and while the demand is not quite what it should be, due to the general business conditions, still the operators seem to have no cause for complaint. Some large sales of pig iron have recently been made, but prices are low.

LOUISVILLE

Reduced operations over the holidays and increased demand as a result of the cold weather have steadied up the market.

Though operations were reduced to a minimum during the holidays, it is expected that work will now be resumed on a more general scale. Conditions seem to be better and there appears to be a more buoyant, confident feeling in all lines of commercial activity.

Prices are up slightly as follows: Block, $1.60 to $1.80; lump, $1.40 to $1.50; straight run-of-mine, $1 to $1.10; four-inch steam lump, 80 to 85c.; six-inch lump, 90 to 95c.; nut and slack, best grades, 60 to 75c., all prices f.o.b. mines.

MIDDLE WESTERN

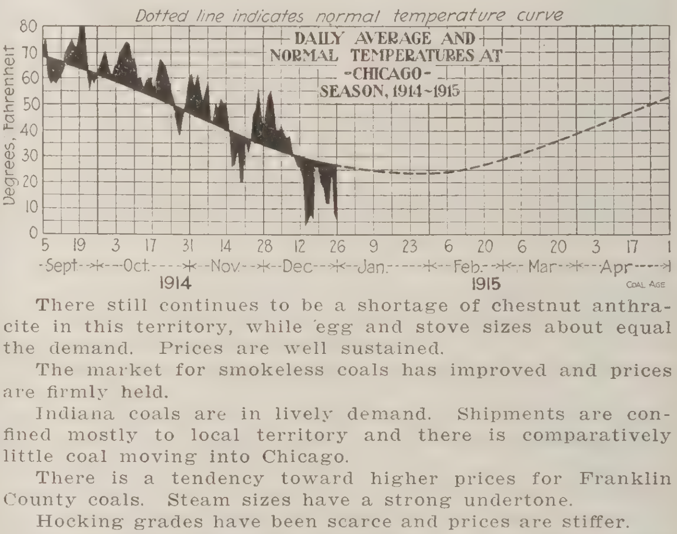
CHICAGO

Continued zero weather gives an impetus to the market. Domestic coals firm. Screenings very strong. Anthracite demand good.

A week of weather averaging near the zero mark has moved up prices generally. The buying of domestic coals from country districts has been very active. Local yard sales have increased in an impressive manner, and there has been a pronounced buying movement on the part of householders, apartment and office buildings.

Steam coals are still advancing under the influence of the increased orders from factories and screenings are averaging 80c., while it is reported some shipments have been sold as high as 95c.

There is no question but that the decision of the Interstate Commerce Commission to allow the 5% rate case will greatly stimulate industrial conditions in this market. The heavier demand has increased operations at all the Illinois and Indiana mines to maximum capacity, and the coal is seemingly absorbed as fast as shipped. In the Indiana field particularly all the mines have been operating every day, and a great many idle miners have been able to return to work.



There still continues to be a shortage of chestnut anthracite in this territory, while egg and stove sizes about equal the demand. Prices are well sustained.

The market for smokeless coals has improved and prices are firmly held.

Indiana coals are in lively demand. Shipments are confined mostly to local territory and there is comparatively little coal moving into Chicago.

There is a tendency toward higher prices for Franklin County coals. Steam sizes have a strong undertone.

Hocking grades have been scarce and prices are stiffer.

The demand for splints has improved, but not much change is noted in quotations.

Springfield domestic coals are in good demand, and screenings are still strong.

The market is steady for Eastern Kentucky coals, and sales have increased.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.50@1.75	$1.50	....	$1.50@1.60	$1.75
4-in. lump..	....	....	$1.60@1.75	....	....
Steam lump	....	....	....	1.20	....
2½-in. lump.	....	....	1.50	....	....
1¼-in. lump.	....	....	1.35@1.50	....	....
Mine-run...	1.15@1.25	....	....	1.10	....
Egg........	1.40@1.60	....	....	1.50	....
No.1washed	....	....	....	....	1.60@1.75
No.2washed	....	....	....	....	1.50@1.75
6x3-in. egg.	....	1.50	....	....	1.60@1.75
Nut.......	....	1.35	....	....	....
No. 1 nut..	1.75	....	....	....	....
No. 2 nut..	1.40@1.60	....	....	....	....
Screenings..	0.80@0.85	0.75	0.70@0.85	0.75@0.80	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.75	$1.75@1.95	....	....	....
1¼-in. lump.	....	....	....	....	$1.50@1.60
Lump & egg	....	....	$2.25	$2.25	....
Mine-run...	1.20@1.30	....	1.40	1.40	1.25
Egg........	1.60@1.75	1.60@1.75	....	....	....
No. 1 nut..	1.75	....	....	....	....
No. 2 nut..	1.40@1.60	....	....	....	....
Screenings..	0.80@0.85	....	....	....	....

Green County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40: 5-in. egg, $1.30@1.40; 3-in. egg, $1.30; mine-run, $1.10.

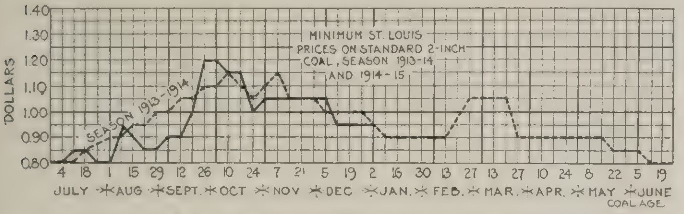
ST. LOUIS

Business satisfactory at the moment and the outlook better than for some time. Prices showing a tendency to advance. Some operators are now well covered.

Moderate winter weather has kept the local market in fairly good shape. It might be better, and could be worse, but in a general way there is little to complain of. Tonnage is usually light during the Christmas holidays, unless there be some extremely cold weather, and this brings to the retailer what is known as charity business.

There is a distinctly optimistic air as regards the future, and unless all signs fail, business conditions will soon be materially improved. There is no complaint as to the tonnage moving in from the higher grade fields of Williamson and Franklin Counties, and the prices are fairly good. During the past week there has been a slight increase in lump and egg, and the washed sizes, and there has been no important decrease in the steam sizes. The local market is not as strong on steam coal as the Chicago market, and several hundred cars have been moved there from St. Louis.

A few operators in Williamson and Franklin Counties are sold up so far that they are now asking $1.75 on lump and egg and No. 1 washed, but this is not general, the top of the market being about $1.60 to $1.65 and the bottom about $1.35 to $1.40.



In the Standard field conditions are normal, 6-in. lump bringing anywhere from $1.20 to $1.30 or $1.35, and 2-in. lump from $1.10 down to 95c. Screenings are still strong at from 55 to 60c., and the Chicago buyers are paying as high as 65c.

The country demand for both high grade and Standard is fairly good, and promises to continue.

No smokeless moving in, and anthracite is slow. Higher prices can be looked for on domestic sizes from now on and there will likely be a weakening on the steam grades.

Market is quotable on the following basis:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	....	....	$1.25	$1.00@1.10	$1.10@1.15
3-in. lump	....	....	1.40	....	....
6-in. lump	$1.40@1.65	....	1.50	1.15@1.30	1.20@1.30
Lump and egg	1.85@2.15	$2.25	....	....	1.35
No. 1 nut	1.30@1.40	....	....	0.90@0.95	....
Screenings	0.50@0.55	....	0.80@0.85	0.55@0.65	0.60@0.65
Mine-run	1.00@1.10	....	....	0.85@0.90	....
No. 1 washed nut	1.60@1.75	2.00	1.60	....	....
No. 2 washed nut	1.40@1.50	....	1.45	....	....
No. 3 washed nut	1.15@1.20	....	....	....	....
No. 4 washed nut	1.10@1.15	....	....	....	....
No. 5 washed nut	0.75@0.85	....	....	....	....

The local retail market is quotable on the following basis: Carterville, 14c. per bushel or $3.50 per ton; Mount Olive, 12c. per bushel or $3 per ton; Standard, 11c. per bushel or $2.75 per ton; Smokeless, West Virginia, $6.50 per ton; Pennsylvania anthracite chestnut, $8.50; egg and stove, $8.25; grate, $8; Spadra Arkansas anthracite, all sizes, $7.50 per ton.

SAN FRANCISCO

Colder weather stimulates the trade and dealers are rushed with urgent orders.

The weather has been unusually cold the last week, with heavy rainfall and dealers are rushed with deliveries now, while inquiries are still numerous. Prices continue at $9.50 to $11 for anthracite, while steam coal is wholesaling at $6.50 and domestic at $7.50. Many shipments of coke have arrived during the past few days and several large vessels are now unloading.

KANSAS CITY

The zero weather stimulated the market only a little. Prices still unchanged. Retail business active.

The coal market in Kansas City has not felt the stimulation that the last two weeks of cold weather should have brought. Most of the dealers account for this by the fact that the gas this year has been more plentiful. There has been no change in prices and none is expected before Jan. 15 and possibly not until the first of February. In the meantime the October circulars are being adhered to very closely.

Most of the retailers are doing very well as the streets are moderately free of ice and snow, making deliveries easy, but this has not benefited the wholesaler. The retailers had large supplies on hand, and the operators and wholesalers are selling but very little more than they did before the cold spell set in. Two more weeks of the present weather will be required to set the business going all around. Kansas coal seems to be holding its own very well, especially slack. Illinois coal is steady and selling at $1.75.

PORTLAND, ORE.

Cold weather increases activity in coal business here. Severest weather for almost 20 years.

The Pacific Northwest has had freezing weather for almost three successive weeks, with the thermometer down to 23° most of the time at night. This caused an active demand for coal and if it continues long it will mean a good volume of business soon after the first of the year, as consumers here stock up only sufficient to carry them through a couple of months of cold weather. It is reasonable to presume that January and February and possibly March will bring some cold weather and if so, supplies in the hands of the consumers are going to be low long before the winter months have passed. Prices have shown no advance as yet.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

⁂

Contract No. 22—Philadelphia, Penn.—This contract, which provides for furnishing the city with 225,000 tons of anthracite and bituminous coal for next year (pp. 933, 952, 1009, 1048, Vol. 6) has been bid on by 40 different agencies. The results have not yet been announced. Address Director Loeb, Room 225, City Hall, Philadelphia, Penn.

Contract No. 39—Youngstown, Ohio—Press reports state that sealed proposals are requested by the Director of Public Service until Jan. 4, for furnishing and delivering 20,000 tons of coal f.o.b. cars at the City Water Works Pumping Station, Filtration Plant, and City Crematory. A certified check for $2000 must accompany each bid. Address H. C. Fox, Clerk, Department of Public Service, Youngstown, Ohio.

Contract No. 40—Paducah, Ky.—The municipal light plant at this place will contract for 1200 tons of mine-run coal this month, deliveries to be made over the next year. The customary price is $1.85 per ton. Address J. O. Keehler, superintendent of light department, Paducah, Ky.

PRODUCTION AND TRANSPORTATION STATISTICS

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for November and eleven months of 1913 and 1914, in short tons:

	November		Eleven Months	
	1914	1913	1914	1913
Anthracite	1,017,942	987,487	10,223,221	9,699,210
Bituminous	3,667,385	4,509,375	44,013,552	47,171,538
Coke	602,573	999,500	8,926,580	13,011,863
Total	5,287,900	6,496,352	63,163,353	69,882,611

SAULT STE. MARIE CANALS

Coal shiments through the Sault Ste. Marie Canals for December and the season compare as follows:

	December			Season		Decrease	
	Canal			Canal			
	U. S.	Can.	Total	U. S. 1913	Can. 1914	Tons	%
Anthracite	61,650	12,300	73,950	2,744,574	2,240,505	504,069	18
Bituminous	55,000	.....	55,000	15,878,364	12,246,716	3,631,648	23
	116,650	12,300	128,950	18,622,938	14,487,221	4,135,717	

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during September and the first nine months of the last two years, in short tons:

	September		9 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	126,919	122,436	1,060,724	991,180
Chesapeake & Ohio[1]	1,006	2,526	12,994	13,163
Erie[2]	749,687	823,037	6,489,298	6,923,458
Pennsylvania[1] [3]	813,394	996,528	7,665,020	8,149,935
Virginian[2] [1]	50	69	859	317
Total 5 roads	1,691,056	1,944,596	15,228,895	16,078,053
Bituminous				
Baltimore & Ohio[1]	3,148,994	3,034,868	27,250,529	24,931,152
Buffalo, Roch. & P.[1] [2]	851,501	707,839	7,052,765	6,047,795
Buffalo & Susq.[1] [2]	132,667	90,247	1,339,193	867,651
Chesapeake & Ohio[1]	1,581,037	2,003,765	12,618,033	15,580,341
Erie[3]	12,726	6,319	306,466	58,569
Hunt. & Br'd T. Mt.[1] [2]	112,483	90,415	1,007,396	771,702
New York Central[3]	815,989	658,361	6,769,567	5,980,945
Norfolk & Western[1] [2]	2,109,476	2,509,916	17,934,899	19,880,107
Pennsylvania[1] [3]	4,378,037	4,291,425	37,774,323	36,112,774
Pitts. & Lake Erie[1] [2]	1,082,360	922,356	9,668,295	8,573,785
Pitts. Shaw. & North[1] [2]	238,849	194,453	2,037,169	1,706,532
Virginian[1] [2]	393,199	379,113	3,291,941	3,055,093
Western Maryland	271,734	255,615	2,542,963	2,303,381
Total 13 roads	15,129,052	15,144,692	129,593,539	125,969,827
Coke				
Baltimore & Ohio[1]	387,704	237,661	3,609,074	2,575,455
Buffalo, Roch. & P[1] [2]	36,996	24,824	413,103	210,270
Buffalo & Susq.[1] [2]	24,506	47,874	224,538	297,236
Chesapeake & Ohio[1]	29,680	13,439	266,886	267,408
New York Central[3]	....	....	36,207	....
Norfolk & Western[1] [2]	121,451	59,112	1,180,960	807,443
Pennsylvania[1] [3]	1,127,951	736,261	10,859,413	7,603,937
Pitts. & Lake Erie[1] [2]	525,931	390,388	5,182,891	3,913,834
Pitts. Shaw. & North[1] [2]	....	....	9,383	....
Western Maryland	5,991	3,079	59,223	51,689
Total 10 roads	2,260,210	1,512,638	21,841,678	15,727,272

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
August	19,757,104	18,740,453
September	19,080,318	18,601,926
Total, 9 months	166,664,112	157,775,152

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 351,899 short tons of bituminous coal during August, 1914, and 2,616,314 short tons during the seven months ending Aug. 31, 1914.

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during November and the past four months of last year in short tons:

	August	September	October	November
Pocahontas Field	1,277,621	1,390,531	1,021,699	837,577
Tug River District	293,179	295,332	270,651	253,975
Thacker District	286,572	295,776	264,528	235,080
Kenova District	105,724	110,158	112,455	90,772
Clinch Valley District	134,408	158,393	84,530	237,831
Other N. & W. Territory	4,211	4,781	4,860	3,849
Total N. & W. Fields	2,101,715	2,254,971	1,758,723	1,659,084
Williamson & Pond Creek R.R.	91,813	85,053	70,338	62,505
All other railroads	257,280	169,892	168,778	131,269
Grand total	2,450,808	2,509,916	1,997,839	1,852,858

Destination of shipments over this road for November and the first eleven months of last year and the year before were as follows, in short tons:

	November		Eleven Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	50,154	109,095	1,392,064	1,795,486
Tidewater, coastwise	269,169	288,201	3,474,018	3,508,282
Domestic	1,865,015	1,455,562	18,084,882	18,527,036
Coke				
Tidewater, foreign	16	......	30,507	339
Domestic	120,450	74,468	1,445,944	945,197
Total	2,304,804	1,927,326	24.427,415	24,776,340

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for July and the preceding two months of the years 1913 and 1914:

	May		June		July	
State	1913	1914	1913	1914	1913	1914
Missouri	186,366	165,395	187,723	185,731	198,723	177,093
Kansas	407,124	370,097	412,371	490,561	465,761	513,312
Arkansas	130,020	95,749	145,306	133,350	163,185	117,016
Oklahoma	252,901	241,180	255,481	273,692	272,124	234,648
Totals	976,411	872,421	1,000,881	1,083,334	1,099,793	1,042,069

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

I. C. C. No. 6653—Schrager Coal Co. vs. Delaware, Lackawanna & Western R.R.

Carload rates on anthracite coal from Schrager's washery, near Taylor, Penn., to tidewater points in New Jersey found unreasonable to the extent they exceed the rates to same points from Taylor. Reparation awarded.

FOREIGN MARKETS

GREAT BRITAIN

Shortage developing and market tense. Export trade continues the same but with vessel tonnage becoming scarcer.

Dec. 18—The London coal trade continues exceedingly brisk. Public prices advanced 24c. on Friday last, and all pit prices are either withdrawn or advanced. Altogether the market is very excited, and the shortage of all qualities by rail and by sea is causing intense difficulties. The depot trade is slow.

The main features of the coal export trade during the past week have not changed, except to become slightly more accentuated. Tonnage, for instance, has been even less plentiful owing to the severe weather. Curiously enough, Cardiff has been an exception, for boats have arrived quite freely. Prices here have strengthened, and the outlook appears much more favorable. The pre-holiday demand is having its effect upon the inland trade markets. Those in Lancashire show an all round improvement, while marked increases in demand are also found throughout Yorkshire and Derbyshire. In both the latter cases wagon scarcity is causing great inconvenience. The Scottish coal trade is again active.—"The Colliery Guardian."

Dec. 18—Business is difficult to arrange owing to congestion. Values all round have a harder tendency and are approximately as follows:

Best Welsh steam	$5.04	Best Monmouthshires	$3.96@4.08
Best seconds	4.32@4.56	Seconds	3.84@3.96
Seconds	4.08@4.20	Best Cardiff smalls	2.88
Best dry coals	4.56	Cargo smalls	1.98@2.22

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage and for cash payment.

Freights—Chartering is less active owing to stemming difficulties. Rates are approximately as follows:

Gibraltar	$3.24	Venice, Ancona	$6.84	Singapore	$5.28
Malta	3.48	Alexandria	4.95	Las Palmas	2.64
Marseille	4.20	Port Said	4.98	St. Vincent	3.00
Algiers	3.80	Aden	5.04	Rio Janeiro	3.96
Genoa, Savona	4.32	Colombo	5.04	Monte Video	3.48
Naples	4.38	Sabang	5.04	River Plate	3.72

Exports—British exports for November and the first eleven months of the past three years were as follows:

	November			Eleven Months		
To	1912	1913	1914	1912	1913	1914
Russia	230,544	379,347	1,773	3,859,229	5,598,119	3,087,805
Sweden	421,431	404,540	378,524	3,760,592	4,183,554	3,959,216
Norway	250,621	207,766	177,735	2,005,631	2,096,394	2,282,638
Denmark	286,328	244,970	252,457	2,521,576	2,739,555	2,833,642
Germany	785,086	677,074	......	7,700,534	8,296,487	5,256,765
Netherlands	235,685	157,610	65,628	1,811,015	1,869,803	1,631,581
Belgium	149,920	162,091	997	1,399,403	1,890,316	1,167,546
France	1,086,703	1,031,427	1,036,949	9,260,137	11,676,356	11,083,759
Portugal[1]	146,930	101,724	96,152	1,147,259	1,226,596	1,084,772
Spain and Canaries	350,676	280,749	132,730	3,118,654	3,354,902	2,792,016
Italy	873,867	784,135	603,161	8,355,453	8,844,673	7,865,777
Austria-Hungary	41,074	78,066	......	654,390	977,906	564,362
Greece	79,468	75,573	23,783	577,695	666,857	534,163
Roumania	10,100	28,822	......	195,000	226,203	218,218
Turkey	5,983	61,156	......	348,360	307,838	429,506
Egypt[2]	261,939	315,300	94,412	2,644,066	2,803,630	2,456,070
Algeria	125,962	113,832	44,039	955,131	1,174,495	856,562
Portuguese W. Africa	10,499	12,838	1,502	264,854	213,828	158,954
Chile	30,451	49,052	3,776	522,541	542,003	374,549
Brazil	182,435	137,971	63,350	1,472,758	1,731,663	1,101,564
Uruguay	62,074	56,039	14,826	781,372	657,793	541,491
Argentine Republic	343,594	290,262	152,775	3,037,596	3,312,713	2,688,565
Channel Is.	16,110	16,667	13,475	163,619	153,226	153,015
Gibraltar	31,815	40,897	20,493	307,483	320,999	274,815
Malta	64,460	73,060	9,514	392,755	621,489	333,748
Aden[3]	10,383	5,981	......	175,375	154,540	135,817
British India	1,482	11,955	11,423	114,371	152,003	151,207
Ceylon	18,299	15,420	4,807	212,341	213,542	244,678
Other countries	83,526	99,080	75,879	987,846	1,163,182	1,078,205
Coke	125,601	126,307	100,202	928,612	1,115,317	1,075,406
Briquettes	142,025	163,087	46,737	1,394,032	1,874,952	1,534,680
Total	6,465,071	6,202,798	3,427,099	61,070,280	70,160,934	57,951,092
Bunker	1,714,064	1,755,090	1,249,955	17,634,865	19,189,501	17,287,534

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies.

COAL AGE

Volume 7, No. 2
Issued Every Saturday
Hill Publishing Company

NEW YORK, JANUARY 9, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

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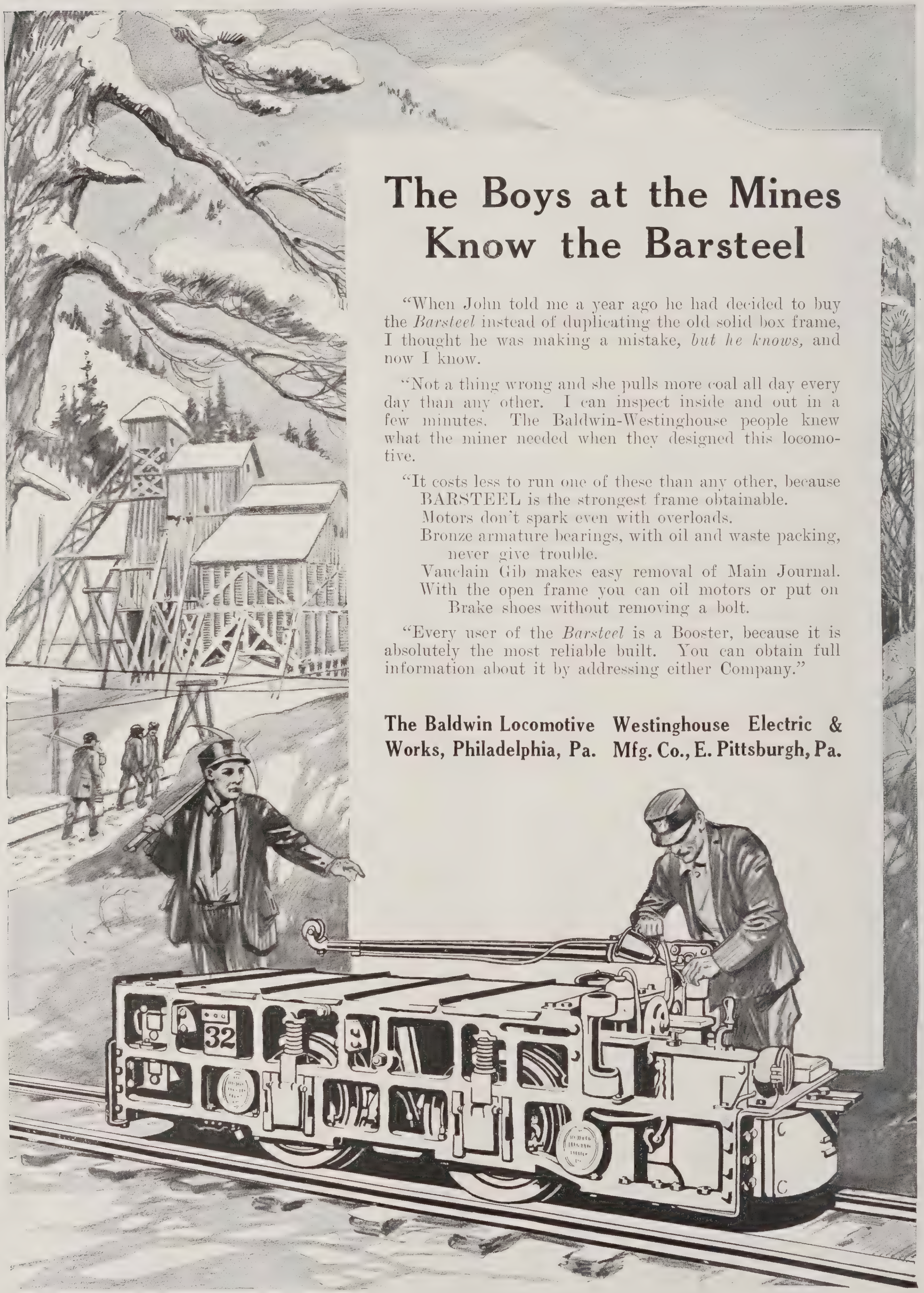

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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 14,600

None sent free regularly, no returns from news companies, no back numbers.

THE WEEKLY AD-TALK PAGE

Evidence of Progress

THAT the kind of progress we have been boosting on this page is marching steadily forward is evidenced by the statistics from Illinois.

The 1914 report shows that 77 new locomotives were purchased in the year despite the fact that the tonnage fell over a million tons. This is about one locomotive for every six already in the service. The number of mining machines in use also increased by 116, not including, of course, those cashiered for being no longer in condition or up to date. Permissible powder sales rose over 50 per cent.

The amount of mine-run coal took a slump of nearly three million tons and slack also decreased in quantity. The reason is obvious, for prepared sizes, lump, nut, and pea increased in sales, showing that rescreened coal is in increasing demand in the market.

A bad year this for the operator, perhaps, but the manufacturer does not suffer. Difficult markets demand improved machinery. The product must be sized for a particular market. The percentage of large coal must be increased when the prices are low, and the operator cannot afford to pay for hand mining and mule hauling at the sharply competitive prices.

The only person who suffers from the stress of competition is the man who sells elegant trimmings. If the manufacturer has the stuff that "pays dividends," he has the ear of every coal operator whatever the times may be in Illinois or in any other state.

Most of the machinery and supplies that help to "pay dividends" are advertised in COAL AGE. It will pay you to keep posted on them during 1915.

COAL AGE

ONE OF THE HILL ENGINEERING WEEKLIES

Vol. 7 NEW YORK, JANUARY 9, 1915 No. 2

Results of the Year 1914 in the Coal and Coke Industries

In common with other lines of business, coal mining and coke manufacture showed a considerable falling off during the year just closed. The total production of coal in 1914 was 511,099,786 short tons, which compares with 570,315,692 short tons produced in 1913. The coke output during 1914 was 34,418,933 short tons as compared with 45,953,808 short tons produced in 1913.

> *The decrease in coal production in* 1914 *amounted to about* 59,215,906 *short tons or* 10.4 *per cent.; the decrease in coke production was* 11,534,875 *short tons or* 25.1 *per cent.*

Alabama, Colorado, Illinois, Ohio, Pennsylvania and Tennessee all showed losses of more than 1,000,000 tons in last year's production as compared with the year preceding. The decrease in Colorado's production (about 1,100,000 tons), was less than might have been expected considering the serious strike that was only settled near the end of the year. The Ohio loss was by far the greatest in proportion to the state's total output, for the decrease here amounted to about 17,000,000 short tons or more than 47 per cent.

In Pennsylvania, the decrease in the output of bituminous coal was approximately 34,000,000 short tons or 19.5 per cent. This slowing up in mining, however, did not extend to the anthracite industry, for the production of hard coal (91,448,000 short tons) was practically the same in 1914 as in 1913. Anthracite is used mostly for domestic purposes and is therefore not affected greatly by lessened industrial activity in business at large.

Coke manufacture, depending as it does on the iron trade, was greatly depressed due to the slump in the steel business. In fact, one of the chief causes for so great a decrease in Pennsylvania's coal production, was the poor demand for coke—the coke counties of Fayette and Westmoreland produced about 9,000,000 tons less coal in 1914 than in the preceding 12 months. The same situation was true in Alabama, which state ranks second in importance as a coke producer.

Fuel oil again looms large as a competitor of coal in certain fields. The consumption of coal throughout the Pacific Coast states has not increased greatly in recent years due entirely to the cheapness and abundance of oil. A number of Western railroads as well as steamships and industrial plants now employ oil as fuel. This is the chief reason the coal industry in the state of Washington has had such difficulty in holding its own. The same condition as respects oil and coal exists in Oklahoma and the Southwest, but to a lesser extent.

The mine inspector's reports, which follow, show a remarkable development in 1914 in many coal fields along mechanical lines. It is gratifying to know that operators show such willingness to carry out improvements in the face of adverse business conditions. Ready compliance with the many new laws of various states, tending to increased safety, has taken place. And it may be stated that most of the new legislative provisions require considerable money to fulfill, which of course increases the burdens on an industry where even moderate profits are rare.

As to the future, we anticipate a slow but sure recovery in the coal-mining business of this country. Next to food, coal is the greatest essential to people residing outside the tropics. Consumption for industrial purposes will always fluctuate as business fluctuates, but even in periods of depression, we must keep warm—heat our houses and offices—and we must cook our food and light our homes.

The slump in coal mining has run its course. Even if business should not improve soon, very little further decrease in consumption can occur. Besides there must come a certain normal increase aside from our industrial life, due to the constant growth in our country's population. The industry has pretty well adjusted itself to present conditions and is prepared to regain, in 1915, all that was lost in the year just closed.

Reviews of Coal Mining for 1914

Alabama

By B. M. Starnes*

SYNOPSIS—The Alabama coal production was 1,745,000 tons less in 1914 than in the preceding year. Trade and market conditions were poor throughout. Despite the depression in business, many improvements were made.

The coal mines of Alabama produced during 1914 approximately 16,140,000 tons of coal, 1,745,000 tons less than in 1913. If business had been normal the output would have been at least 20,000,000 tons, as the mines averaged only about four days per week during the entire year. Alabama will probably stand in the fifth place among coal-producing states, one place lower than in 1913.

The tonnages of coal, coke and pig iron as far back as the records go, that is since about 1870, have been as follows:

OUTPUT OF COAL, COKE AND PIG IRON IN ALABAMA

	Coal	Coke	Pig Iron
1870	13,200		11,171*
1880	380,000	60,781	68,925
1890	4,090,409	1,072,942	816,911
1900	8,273,363	2,110,837	1,184,337
1910	16,139,228	3,231,399	1,939,141
1911	15,011,853	2,756,697	1,696,999
1912	16,513,040	2,881,861	1,832,146
1913	17,884,745	3,562,624	2,057,911
1914	16,140,000	2,320,000	1,795,058†

* For 1872. † Tonnage Estimated.

While it is hard to obtain the actual number of nonfatal accidents, for many of the trivial ones are never reported to the mine inspector's office, it is estimated that their number is approximately 2000. The fatal accidents for the year will be about 120, which is about the same as in 1913. Below is a comparison of accidents in recent years.

FATAL ACCIDENTS AND ACCIDENT RATES IN ALABAMA

	No. of Fatal Accidents	No. of Employees per Life Lost	Tons per Life Lost
1900	37	336	223,603
1910	238	92	67,812
1911	209	108	71,827
1912	121	193	136,471
1913	120	206	147,060
1914	120	205	134,500

There were two explosions in Alabama mines in 1914, in which five or more were killed, namely, Jan. 10, Rockcastle mine, 12 killed, none injured; Oct 5, Mulga mine, 17 killed 12 injured.

Market Conditions for Domestic and Steam Coal

The year 1914 has been a keen disappointment to the Alabama coal operators. With three months of poor business behind them, it was only reasonable to suppose that business would improve during the early part of 1914, but the year started in with only a fair demand for lump coal, due, principally, to the mild weather. Furthermore, the demand for steam coal was far below the average for that period of the year.

During February there was an exceedingly warm spell, and business in lump coal practically came to a standstill, some operators reducing the prices as much as 50c. per ton in order to move it, but without much success, as the dealers were buying only just sufficient to take care of their immediate needs. Steam coal continued dull, though prices remained about the same. During the latter part of February the South experienced a blizzard which lasted several days. This materially aided both the lump and steam business, as there was practically no stock in any of the Southern yards, and dealers were forced to buy. However, this spurt lasted only a few days and February ended with quiet business in all grades. The first part of March was quiet, but in the latter part of the month another blizzard swept the South and the demand for lump coal increased by leaps and bounds, but on account of the extremely dull steam business many of the operators had to refuse large lump-coal orders, having no place to dispose of the steam coal.

The spring schedule on lump coal usually does not go into effect until May, but, on account of the poor demand for lump, the operators decided to make spring prices effective on Apr. 1, believing that in this way business would improve. While some orders for spring and summer shipment were taken, the months of April, May and June saw only a small percentage of the usual tonnage booked. Steam coal during this time was also quiet, as far as general business was concerned, although Mobile, Pensacola and New Orleans were taking rather a heavy tonnage for bunker purposes.

During this time business seemed to be on the verge of great improvement, as the Government was buying some coal from this district for the war ships in the gulf. Indications pointed to the Navy taking a large tonnage, and this would have been fulfilled had the vessels remained in these waters for any length of time, but they did not. The French government was also purchasing coal for its vessels in the Gulf, all of which had a tendency to strengthen the market at least locally, not so much on account of the tonnage that had been sold, as because of the confidence in the market it inspired. During May and June the mines were running on an average of about four days a week.

The July markets were like those in June, with no further developments in either the Government or French business. The local demand for both steam and lump coal was small, the retail yards still deferring their orders for fall delivery.

Anticipations of Foreign Trade Fail of Accomplishment

August saw some improvement in both lump and steam business. It was expected that owing to the European war, this district would be called upon for a large tonnage of steam coal. Realizing that should this happen, lump coal would be scarce and prices would advance, the retail yards began to order lump coal. Prices at this time were about 50c. under the regular schedule on lump for August, though the steam price remained about the same. The mines were then working about four days per week.

September brought a decided change for the better on steam coal due to the prospective business with South America. That continent had been getting its supply from Europe, but the source was now cut off temporarily. Alabama operators were asked to bid on several large South American contracts aggregating approximately 1,000,000 tons of steam coal. This strengthened the market to some extent.

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*1524 Jefferson Bank Building, Birmingham, Ala.

Several small cargoes of coal were shipped from Gulf points to South America and negotiations were opened for larger business, but the lack of bottoms in which to ship the coal, and the lack of satisfactory financial arrangements prevented the closing of the contracts, and, up to the present time, these obstacles have not been overcome to the satisfaction of the operators. Consequently heavy business is still in abeyance. The demand for lump during this time was slightly better than in July and August, though far from normal. The mines were then running about three to four days per week.

October, November and December showed no material change in either lump or steam business, the demand being small, the mines producing only the tonnage already booked and running only about three days per week. Others closed down entirely to await a better market.

To sum up the year, business has been far below the average; prices on lump coal especially, have been lower than for years; collections have been poor, but in the face of it all, the Alabama operators have not yet lost faith.

Blacksmith Coal

The winter and spring of 1914 found blacksmith coal in excellent condition, the demand good and prices normal, from $1.75 to $1.90 for the second-grade coals, and $2 to $2.25 f.o.b. mines for the best grades. During the late spring and summer the demand declined, as is always the case during these months. Prices, however, remained unaltered. The early fall showed little change from the summer months, though the demand was slightly greater. November and December have seen a decided change for the better, and while the price remains as before, the demand is increasing rapidly. As a whole, the year has been entirely satisfactory to the operators making this grade of coal.

Furnace and Foundry Coke

The year started off with little sale for either furnace or foundry coke, though the latter was in slightly larger demand. Furnace coke suffered greatly due to the increase of $2 per ton by all lines on Western business, and shipments to Western smelters absolutely stopped. Though this rate has since been reduced $1, Alabama has never been able to regain what was lost at that time. Spring brought no improvement in either price or demand for either grade, and summer business was about the same. October, November and December show absolutely no market on furnace coke, many batteries of ovens being out, though foundry coke is moving better but in small lots only. No improvement can be anticipated until the iron market improves and furnaces go back into blast.

Lump-Coal Prices

In the next column is the schedule of prices f.o.b. mines which the operators established for the year on two of the standard lump coals of the district.

However, due to the extremely dull business during the entire year, the prices during last January and February were about as follows: Cahaba lump, $2.75; Cahaba nut, $2.25; Carbon Hill lump, $2; Carbon Hill nut, $1.75. Since that time, beginning with March, prices have been about as follows: Cahaba lump, $2.50; Cahaba nut, $2.15; Carbon Hill lump, $1.50; Carbon Hill nut, $1.25.

However, with a reasonably cold winter, the regular schedule prices will probably obtain as there is little stock in any Southern yard.

SCHEDULE PRICES OF STANDARD ALABAMA COALS IN 1914

	Cahaba Lump, Over 6-In. Screen	Cahaba Nut, From 3 In. to 6 In.	Carbon Hill Lump, Over 6-In. Screen	Carbon Hill Nut, From 2 In. to 6 In.
January	3.25	2.75	2.25	1.90
February	3.25	2.75	2.25	1.90
March	3.25	2.75	1.75	1.45
April	2.50	2.00	1.75	1.45
May	2.60	2.10	1.85	1.55
June	2.70	2.20	1.90	1.60
July	2.80	2.30	1.95	1.65
August	2.90	2.40	2.00	1.70
September	3.00	2.50	2.15	1.75
October	3.00	2.50	2.25	1.95
November	3.25	2.75	2.25	1.95
December	3.25	2.75	2.25	1.95

Steam-Coal Prices

The following are prices obtained for some of the standard steam coals:

ACTUAL PRICES OF STEAM COAL, BLACKSMITH COAL AND COKE IN ALABAMA, 1914

Pratt run-of-mine	$1.20@1.40	Black Creek gas lump	$1.65@1.75
Big Seam run-of-mine	1.00@1.10	Best grade washed and sized blacksmith coal	2.00@2.25
Big Seam washed	1.15@1.25	Second grade blacksmith coal	1.75@1.90
Cahaba run-of-mine	1.35@1.60	48-hour furnace coke	2.50@2.75
Carbon Hill run-of-mine	1.05@1.10	72-hour foundry coke	3.50@4.00
Washed slack	1.10@1.25	Coke breeze	1.50@2.00
Unwashed slack	0.30@0.50		
Black Creek run-of-mine	1.30@1.50		
Black Creek steam nut	1.65@1.75		

The car supply during the year has not at any time been a factor in the maintenance of price, for all lines were able to keep the operators well supplied because of the small tonnage shipped.

Labor Situation

Alabama has had no labor troubles during the past year, but, on account of the dull business, operators were unable to increase wages, as had been done in 1913. However, many playgrounds, schools, etc., were secured for the miners, and aside from not being able to make full time, labor is well satisfied.

Water Transportation

Water transportation of coal from this district to the Gulf has been held back by one cause or another, and while there has been considerable tonnage moved over this route, it is not as large as had been expected. The completion of Lock 17 during the early spring of 1915 will give this district navigable water the year round to the Gulf, and it is expected that a heavy tonnage will be moved over this route in 1915.

Despite Depression Some Mines Resume, Others Are Opened

Despite the unfortunate business conditions, W. T. Brown, of Ragland, resumed operations of his mine after more than a year's idleness. The Van Zandt mine No. 2 of the Raccoon Mining Co. was also reopened after having been closed for a year. The Gulf States Steel Co. fired up 300 coke ovens at Virginia City which had been out of blast for several months. The Hills Creek Co. with mines in Bibb County also resumed operations after several months' idleness.

There were also several new mines put into operation. The Maryland Coal Co. spent approximately $100,000 on new openings and general improvements and the Panama Coal Co. started developments on a large tract of coal land. When completed, the outlay will be about a million dollars.

The South Brilliant Coal Co. has opened up a new mine near Brilliant in Marion County, known as Parker

No. 1, and the Alabama Fuel & Iron Co. two new mines at Acmar, St. Clair County, known as Acmar No. 2 slope and No. 2 drift. In Jackson County, the Pierce Coal & Lumber Co. has started one of the most complete mines in the district and has built a 20-mile railroad connecting its road with the Southern Ry.

The Black Diamond Coal Mining Co. has started developments of a tract of coal land at Benoit, Walker County, and W. H. Parker, of Cullman, is opening a mine near Brilliant, Marion County. C. S. Bissell, of Birmingham, is developing a tract of coal land in Walker County. The Borden Mines at Drifton have been taken over by C. C. Gravelee of that place, and extensive improvements have been made. Extended changes in the plant of the Taits Gap Coal Co. have resulted in the doubling of the capacity of the mine.

The Iron Companies Lead in Uptodate Equipment

The Alabama Co. spent about $20,000 on repairs to its Ironaton washers and furnace in the past year. At a cost of $400,000, the Woodward Iron Co. constructed a battery of 30 modern byproduct ovens at Woodward, Ala., and in connection with this plant the American Creosoting Co. constructed one for treating timber at a cost of $250,000. It will use 6,000,000 gal. of tar annually. The Woodward Iron Co. has also installed two Mesta blowing engines each of 500 hp.

The installation cost $150,000, and 16 freight cars were required to transport the engines. The ventilators supply at full capacity 50,000 cu.ft. of air per min. The same company has begun the construction, at a cost of approximately $100,000, of the largest and most modern coal washer in the district, having a capacity of 3000 tons per day. The Sloss-Sheffield Steel & Iron Co. has completed and is operating two new washers at Russellville. The construction of these cost $125,000.

The Tennessee Coal & Iron Co. is still busy improving the social well-being of its employees. In 1914, $5000 was expended in improvements to its Edgewater bath house which is considered one of the most modern and complete in the United States. A new hospital, which is one of the most complete industrial hospitals in the South was erected by the same company at the Ensley plant. There will be one head physician, five assistants and five trained nurses.

The Woodward Iron Co. has constructed a track a mile long connecting its furnaces with the Atlanta, Birmingham & Atlantic R.R. This reduces the distance from its Mulga mines to the furnaces about six miles. The Illinois Central R.R. and the Southern Ry. have both announced that they will erect steel tipples of the most modern type at New Orleans to facilitate the handling of bunker coal. A fleet of barges is being built at its Holt, Ala., yard by the Pratt Consolidated Coal Co. for use in shipping its coal. The same corporation has purchased a modern steel collier at a cost of $30,000, to unload coal from barges and load it onto vessels at Mobile.

New Incorporations

The following companies were incorporated in 1914:

Little River Land Co. Capital, $25,000. E. R. Le Fevre, president. To develop lands near Gadsden.

The Cardiff Mining Co. Capital, $4000. L. B. Pettiford, president. To develop coal lands near Cardiff.

Canal Export Coal Co. Capital, $300,000. R. H. Elliott, president. To develop coal lands near Birmingham.

South Brilliant Coal Co. Capital, $10,000. G. H. Parker, president. To develop coal lands near Brilliant, Marion County.

Consumers' Coal & Fuel Co. S. J. Gaines, president. Opened up mine at Nauvoo, Walker County.

The Margaret Coal & Sales Co. Capital, $2000. Chas. De Bardeleben, president, Birmingham.

McKenzie Coal Co. Capital, $7500. A. P. McKenzie, president. To develop lands in Jackson County.

Wadsworth-Cahaba Coal Co. Capital, $5000. W. C. Beck, president. To operate mines at Helena.

Brown Coal Co. Capital, $2000. Watt Brown, president. To develop coal lands near Oneonta, Blount County.

Southern Mining & Milling Co. Capital, $100,000. Offices at Tuscumbia.

The Burnwell Coal Mining Co. increased its capital stock from $50,000 to $100,000.

Transportation Improvements and Restrictions

In November the first barge went up the Warrior River beyond Tuscaloosa. Within four hours it had been loaded with 700 tons of coal and was on its way to New Orleans. Following the decision of the Interstate Commerce Commission that the Birmingham Southern Ry. was a common carrier, officers of that road announced that many costly improvements and extensions would be made, the work on which would be started at once.

The railroads of the Birmingham district petitioned the Interstate Commerce Commission and the Railroad Commission of Alabama that they be allowed to increase their freight rates to practically every point in the South from 10 to 30 per cent. It is estimated that should these increases be allowed, they will curtail the output of coal in this district at least 500,000 tons. No decision has yet been rendered.

Large Transfers of Coal Land

Because the Markley Coal Co., of Mobile, failed to pay the state $120,000 for coal lands in Jefferson and Tuscaloosa Counties, John Purifoy, state treasurer, advertised for sale 500 shares of stock in the Mobile Portland Cement Co. valued at $500,000. This stock was pledged as security for this land by the Markley Coal Co.

The property of the Wadsworth Red Ash Coal Co., consisting of about 1200 acres of rich Cahaba coal lands near Falliston, Shelby County, has been purchased by R. N. McDonough, J. H. McDonough and J. T. Robertson, all of Birmingham, the consideration being about $175,000. Extensive improvements have been made.

The Maryland Coal Co., Henry T. De Bardeleben, president, Birmingham, purchased the entire holdings of W. G. Coyle & Co., of New Orleans, one of the oldest coal companies in the South. The equipment consisted of barges, tugs, three retail yards in New Orleans, mules, wagons, carts, a large fleet of steel barges, each with a capacity of 1000 tons, a tug boat and collier of modern type for transfering the coal from the barges to the vessels, a pump boat and similar equipment for the expeditious handling of coal.

It was held by the Circuit Court of Bibb County that a lease on coal lands was not taxable, and in rendering this decision they reversed that of the state tax commission, which body held that leases on mineral lands should be taxed, in addition to the impost on the land in fee simple. The decisions were rendered in the cases of the Red Feather Coal Co. and the Roden Coal Co., the property valuations of which companies had been raised $1,500,000 each by the State Tax Commission. This decision was important, as it was the intention of the State Tax Commission to raise the assessment of every lease-holding coal company in the state, according to the value of the minerals the property contained.

The largest single day's output of coal ever mined by convicts in the state of Alabama was recorded at the Banner mines of the Pratt Consolidated Coal Co. on Feb. 12, 1914, when 1846 tons were dumped. This not only breaks all previous records in convict mines, but has seldom been eclipsed by any mine in the state. Since the completion of the new steel tipple and concrete washer the output has been steadily on the increase until it has now reached the 2000-ton mark. Banner mine is owned by the Pratt Consolidated Coal Co., but is operated by the State of Alabama under a lease.

Arkansas

By Thomas H. Shaw*

SYNOPSIS—Production for calendar year will show a considerable decrease. Fatalities increase. Miners working slow turns, while many men have no employment at all. Labor disputes settled.

The coal mines of Arkansas during the fiscal year ending June 30, 1914, produced 2,136,783.59 short tons, valued at $3,631,100. This was a remarkable record considering the labor troubles during the year. There are 117 coal mines, 51 shafts, 53 slopes, 12 drifts, and 1 strip pit. There are 3300 miners, 1770 daymen, and 286 officemen and mine officials. Total number of persons engaged in the coal-mining industry, 5356.

There were 85,811 kegs of black powder used, at a cost to the miners of $171,622. The production for the calendar year will be less than 2,000,000 tons, owing to the labor troubles and slack work during the last three months.

The following mines have been idle over nine months: Mammoth Vein Coal Co. mines No. 1 and No. 6; Prairie Creek Coal Co. mines No. 3 and No. 4; Hartford Coal Co. mine No. 1; Coronado Coal Co. mine No. 1; Central Coal & Coke Co. mine No. 26. The following mines have been shut down over a year: Spadra Coal Co., Scranton Anthracite Coal Co., Dallas Coal Co. mines Nos. 4 and 8. The production for one year of all the above mentioned idle mines would aggregate 475,000 tons.

Accidents

The fatal and nonfatal accidents have greatly increased in proportion to the production during the past fiscal year. There were 15 fatal and 130 nonfatal accidents. The most prolific causes of accidents were the following: Dust and gas explosions, falls of rock on traveling roads and at the working face, being run over by trips of cars on slopes.

There were two mine explosions caused by windy shots, gas or dust, in which the shotfirers were killed. One miner lost his life while making up powder for a shot with an open light on his head, the spark dropping into his keg of powder. One top man fell into a slack bin and smothered to death.

Average Gross and Net Earnings

Sebastian County—Entrymen gross earnings, $900; net, $810. Room-men gross earnings, $620; net, $575. Bottom daymen net earnings, $610. Topmen net earnings, $500.

Franklin County—Entrymen gross earnings, $750; net, $650. Room-men gross earnings, $350; net, $310. (The great difference between the earnings of entry- and room-men was due to crowded condition of the mine and slow turn; the entrymen had all the advantage in this respect, as they could drive the entries narrow so as to make as little coal as possible and still make a wage on yardage and dead work.) Bottom daymen, $568 net. Topmen, $450 net.

Johnson County—Entrymen gross earnings, $850; net, $775. Room-men gross earnings, $750; net, $700. Bottom daymen gross earnings, $430; net, $426. Topmen net, $340.

Pope County—Entrymen gross earnings, $850; net, $750. Room-men gross earnings, $650; net, $610. Bottom daymen net earnings, $568. Topmen net earnings, $450.

Logan County—Entrymen, $650 gross; net, $600. Room-men gross earnings, $550; net, $510. Bottom daymen net earnings, $500. Topmen, $405 net.

Scott County—Entrymen gross earnings, $750; net, $650. Room-men gross earnings, $585; net, $525. Bottom daymen net earnings, $500. Topmen net, $370.

Market Prices

Sebastian County—Mine run f.o.b. cars at the mine, $1.60@1.75. Domestic coal f.o.b. mine, $2.25@2.75. Slack f.o.b. mine, $1.10@1.25. Coal semibituminous.

Franklin County—Mine run f.o.b. mine, $1.65@1.75. Domestic coal f.o.b. mine, $2.25@3. Slack f.o.b. mine, $1.10@1.25. Coal semibituminous

Johnson County—Average price for all grades of coal f.o.b. cars at the mine, $2.65. Coal semianthracite.

Pope County—Average price for all grades of coal at the mine, $3.55. Domestic coal, $4.50@5.15. Coal semianthracite.

Yell County—Average price of all grades of coal, $3. Coal semianthracite.

Logan County—Average price for all grades of coal f.o.b. cars at the mine, $3. Coal bituminous.

Scott County—Mine run f.o.b. cars at the mine, $1.70@1.75. Domestic coal, $2.25@3. Coal semibituminous.

Condition of Market Now and Labor Conditions

The coal market is very dull at present, mines in the Spadra field working half time. This season's run on hard coal has been lighter than any previous run for several years. Pope County mines are working less than half time. The average earnings of miners and other classes of mine labor will be less than last year. There are men on the list waiting for work at every mine in the state, and practically all the mines are crowded and a very slow turn of cars is the general condition. The miners have all prospects for hard times this winter. There are over 1000 men idle in Franklin and Sebastian Counties alone.

Strikes and Lockouts

The number of men locked out and on strike for one cause or another during the past fiscal year was 2354, over 46 per cent. of the total number employed at the mines. The number of days lost through strikes and lockouts up to July 1 was 619.

There are 507 men locked out at the following mines controlled by Bache & Denman: Prairie Creek Coal Co. mines Nos. 3 and 4; Mammoth Vein Coal Co. mines Nos. 1 and 6; Coronado Coal Co. mine No. 1. The above companies abrogated their contract with the U. M. W. of A. the latter part of March, 1914, discharged all their employees and ordered them to take their tools off the premises. On April 1, they posted notices that all employees would be reëmployed on a nonunion basis. April 6 a mob attacked the nonunion men and ran them out of the country. In June the mines resumed work under Federal guard. July 17 a mob again attacked the nonunion men and destroyed all the surface equipment at four mines. Value of property destroyed approximated: Prairie Creek

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*State mine inspector, Midland, Ark.

Coal Co. mine No. 4, $27,500, No. 3 mine, $15,000; Mammoth Vein Coal Co. mine No. 1, $35,000; Coronado Coal Co. mine No. 1, $30,000.

COAL SHIPMENTS OF BACHE-DENMAN MINES

The amount of coal shipped up to July 17 was 160 tons. The first part of October Federal troops were sent to the mines. Work was resumed the first half of November with U. S. marshals guarding the mines. There are about 55 or 60 men employed now at the Griffith pigeon holes, and at No. 4 mine, cleaning up around the surface. Mine No. 7 was recently worked by the Central Coal & Coke Co. Seven cars of 44 tons each have been shipped up to this date, Dec. 28. A total of 308 tons.

Last week at the Federal Court in Ft. Smith, F. Bache, receiver for all these companies, stated on the witness stand that if he could put the coal from No. 7 mine on the car at a profit of 20c. per ton he could get Eastern capital to reopen and operate the other mines.

It is very doubtful if this can be done under any conditions of labor whether union or nonunion, for the Central Coal & Coke Co. stopped all entry work last spring, expecting to lose the lease. Rooms were turned up to the face of all entries, and they are all practically worked out. The slope is down over eight lifts, and all entries are quite a distance off the slope. Considerable development work will have to be done before any room work will be ready, and it will take almost a full crew of daymen to operate for a small tonnage. The track in the mine and practically all the surface equipment have been taken away by the Central Coal & Coke Co. The total production for all the Bache-Denman interlocking coal companies for the fiscal year ending June 30, 1913, was 231,993.15 short tons, and for the fiscal year ending June 30, 1914, was 192,980 short tons.

MINES CLOSED DOWN

Sept. 2, 1913, the miners of the Scranton Anthracite Coal Co., Montana, Johnson County, came out on strike, alleging that John E. Daly, controlling interest in the company, was a stockholder of the West Spadra Coal Co., which concern was operating its mine at Hartman nonunion. Mr. Daly gave up his lease and the mine is still idle.

In March, 1914, the miners at mine No. 26, Central Coal & Coke Co., Bonanza, demanded pay for deficient coal. The seam is 3 ft. in thickness, and the scale for this bed calls for extra pay whenever the coal will not measure 3 ft.

During the fall of 1913 the company installed electric mining machines which cut away about 4 in.; the increase for deficient coal to meet this demand would amount to 8c. per ton; the men refused to recede from their demand, and the mine was abandoned. The other strikes lasted from 5 to 30 days at the other mines, and all differences have been satisfactorily settled.

There are two nonunion mines operating in Johnson County: the Pennsylvania Mining Co., with 178 men, and the Sterling Anthracite Coal Co., employing 75 men.

OTHER INTERESTING FACTS

The capital invested in the Arkansas coal-mining industry totals $2,379,570. The mines of the state are ventilated by 58 fans and 21 furnaces, while 36 mines employ natural ventilation. For haulage purposes in the mines, 415 mules are employed.

Colorado

By A. R. Tibbits

SYNOPSIS—The production decreased 1,109,450 tons. Labor troubles are ended and better times are expected. Routt County makes record.

The coal industry of Colorado during the year just closed was not a profitable one financially. The strike dealt it a severe blow. When the mines were able to resume normal production by reason of bringing into the coal camps sufficient numbers of men to take the places of the striking miners, the European war came to minimize the business of such steam plants as depended upon Colorado coal for their fuel, and in addition, an unusually warm fall made the local markets slack. The prolonged war in Mexico also affected the production of this state as much coal was sold in Texas which went into Mexico.

However, 1915 finds Colorado free from industrial strikes and better business is now expected. The coal strike called in Trinidad, Sept. 23, 1913, was formally declared off in Denver, Dec. 10, 1914. This also ended the strike in the northern field, which had been pending over four and one-half years. No concessions were made by the operators to the striking miners to effect this settlement, but the latter abandoned their fight upon the advice of the executive body of their organization. It was a wise move and may do much to establish friendly relations between the operators and miners.

The new coal-mining law has now been in effect a little over a year and has been the means of making material improvements in most of the mines, some of the operators of small mines, either because of limited funds or failure to grasp the importance of placing each and every mine, no matter how small, on a safe and sanitary basis for best results physically and financially, have not complied fully with all the provisions of the new law, however, the operators of large properties have been very active in improving their mines, installing numerous safety devices, enforcing regulations for the safe guarding of the underground workers. In fact the general safe and sanitary conditions in and around the mines have never been so satisfactory in this state before. That the operators made such sincere efforts to place their mines on the best possible sanitary and safety basis in the face of serious labor disturbances and bad business shows a commendable spirit.

FATALITES DECREASE

The rate of fatality is less than in 1913, but not as low as could be expected under the improved conditions of the mines and can be explained by the fact that many inexperienced men took the places of the more experienced miners who went out on strike.

The normal production of Colorado is about 10,500,000 tons annually. The decrease in 1914 is 1,109,450 tons; the decrease in 1913 was 1,740,009 tons; the total production in 1912 was 11,016,948 tons, slightly over normal.

In consequence of the dull market a number of large mines have been closed down, especially in Fremont County. The coal of this county is of a very fine domestic grade and has been in great demand. In 1912 773,-

188 tons were produced and in 1914 only 168,050 tons. Las Animas County, the great coking coal producer, dropped from 4,770,292 tons in 1912 to 2,817,678 tons in 1914. A splendid exception to the foregoing is Routt County, the last to join the widely scattered coal-producing counties of this state. It has to its credit an increase of 314,939 tons and a total production of 647,505 tons in 1914. This coal is of the non-coking bituminous variety which can be stored in the summer months and much of it is sold out of the state.

There was no car shortage as has been the case in former years. There were bumper crops in all parts of the state, but their freighting did not interfere with the coal shipping.

Colorado has enormous coal fields which have hardly been touched and the coal is of the best varieties ranging from a good lignite to anthracite, and no doubt when business improves and the manufacturing of goods is encouraged in the West, Colorado will take her place as one of the great coal producers in the United States. All this state needs is markets for its production.

SUMMARY OF COLORADO COAL PRODUCTION, 1914

Counties	Tons
Archuleta	2,601
Boulder	965,381
Delta	83,485
El Paso	269,501
Fremont	168,050
Garfield	119,179
Gunnison	399,347
Huerfano	1,690,625
Jackson	43,882
Jefferson	136,850
Las Animas	2,817,678
La Plata	139,831
Mesa	171,408
Montezuma	614
Pitkin	66,589
Routt	647,505
Weld	436,963
Total	8,159,489
Lignite coal	1,855,795
Semibituminous coal	414,124
Bituminous coal	5,838,774
Anthracite coal	50,796
Decrease	1,109,450
Average number of men employed in and around the mines	10,960
Total number of days worked	188

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Idaho

By Robert N. Bell*

SYNOPSIS—Idaho only produces 2000 tons per annum and depends almost wholly on Wyoming and Utah for its fuel. There is a good deposit of coal, however, which should be mined extensively, as a large market is available.

While rich in other nonmetallic commercial minerals, Idaho is hardly worthy of a place in the list of coal-producing states, as its total output during the past year will aggregate only about 2000 tons, which is the largest annual yield to date.

We are at a serious disadvantage in this respect, and have annually to pay a tribute of millions of dollars for our coal requirements to the neighboring states of Wyoming and Utah, from whence the bulk of Idaho's coal supply is imported. Patent was issued somewhat over a year ago to a limited acreage of promising coal land in the eastern portion of this state, near the Wyoming line.

Idaho Has Some Good Coal

This property has already been subjected to much preliminary development work and now has disclosed a series of steep pitching beds of high-grade sub-bituminous coal having low moisture, ash and sulphur contents and high-heating value for steam and domestic purposes. The workable beds are quite free from bone and range from 3 to 10 ft. in thickness.

There are four of these, all in the cretaceous sandstone and shale foothill formation tributary to the agricultural settlements of our upper Snake River Valley. There is a tributary population of 150,000 people within 100 miles. The deposits are situated 12 miles from the nearest railroad point but could be reached by a road with easy grades.

Their limited production has all been absorbed by the ranchers of the region, who haul the coal in sleighs and wagons during the fall and winter season. The deposits are somewhat disturbed by cross-faulting, which, however, does not seriously injure or crush the coal, and only causes local displacement.

Competent authorities who have examined these deposits estimate a resource of five million tons within 500 ft. of the surface outcrop, and the prospects warrant exploitation. If financed on a legitimate scale and intelligently handled, they should afford a splendid investment, by reason of the readily available local market which now pays from $7 to $9 per ton retail price on ordinary soft coal.

IDAHO KEPT IN COLD STORAGE SUBJECT TO THE ORDER OF THE EAST

Over 90 per cent. of Idaho's rock formation is of crystalline and metamorphosed varieties notably rich in metals, especially lead, silver, gold, copper and zinc, which afford a prosperous metal-mining industry.

Our state is also as rich in high-grade rock-phosphate resources as Pennsylvania is in coal. Owing, however, to the present land-grabbing instincts of the Eastern conservation theorists, in regard to this practically exhaustless asset, it is doubtful if this state will ever enjoy the industrial advantages which have been accorded the older states in the development of their resources. Rights to the land we inhabit were originally guaranteed to Idaho by the Federal Government, but it now seems inclined to give the Far West a taste of the methods of domination typical of imperialistic Prussia.

* * *

Illinois

By Martin Bolt*

SYNOPSIS—A declining market may reduce production, but the use of machinery increases as fast as ever, as the Illinois record shows. Though fatal accidents, disregarding disasters, decreased, nonfatal accidents increased, suggesting the effect of compensation. The use of permissible explosives is increasing.

Coal mining in Illinois made no gain in the year ending June 30, 1914, but rather declined, due to hard times, the ouput showing a decrease of 1,130,409 short tons from that of the preceding year.

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The reasons for the loss in tonnage are as follows: (1) Labor troubles, caused by the making of new contracts. (2) A general depression which closed down a large number of the factories entirely, and placed many others on half the regular working time or less, thus cutting down the demand for coal. (3) The fact that other states have access to Illinois markets, thus restricting the natural output of coal in this state.

Several Mines Have Not Resumed Since Apr. 1

The probable output in short tons from the shipping mines for the calendar year 1914 will be, in round numbers, 59,500,000 tons. These figures are based on the fact that the shipping mines during the first half of the year 1914 showed a loss in production of nearly 1,500,000 tons as compared with the same period in 1913.

ILLINOIS COAL STATISTICS FOR THE YEAR ENDED JUNE 30, 1914 AND 1913

Summary	1914	1913	Increase	Decrease
Number of counties producing coal	52	50	2	......
Number of mines and openings of all kinds	796	840	......	44
New mines or old mines reopened during the year	89	88	1	......
Mines closed or abandoned since last report	133	125	8	......
Total output of all mines, in tons of 2000 lb	60,715,795	61,846,204	....	1,130,409
Number of shipping or commercial mines	340	371	......	31
Total output of shipping mines, tons	59,379,182	60,515,416	....	1,136,234
Number of mines in local trade only	456	469	......	13
Output of local mines, tons	1,336,613	1,330,788	5825	......
Total tons of mine run coal	12,026,123	14,979,990	....	2,953,867
Total tons of lump coal	22,311,693	20,850,125	1,461,568	....
Total tons of egg coal	6,621,986	6,819,980	....	197,994
Total tons of nut coal	3,438,771	3,130,065	308,706	......
Total tons of pea coal	14,228,230	13,734,437	493,793	......
Total tons of slack coal	2,088,992	2,331,507	......	242,515
Total tons shipped	45,038,119	55,972,374	....	*10,934,255
Tons supplied to locomotives at the mines	709,591	904,570	......	194,979
Tons sold to railroad companies and loaded on cars	10,096,939	......	10,096,939*	......
Tons sold to local trade	2,400,985	2,345,133	55,852	......
Tons consumed (or wasted) at the plant	2,470,161	2,624,127	......	153,966
Average days of active operation for shipping mines	174	179	......	5
Average days of active operation for all mines	162	170	......	8
Number of locomotives in use	543	466	77	......
Number of mining machines in use	1,805	1,689	116	......
Number of tons undercut by machines	31,446,823	30,228,520	1,218,303	......
Number of tons mined by hand	29,268,972	31,617,684	......	2,348,712
Average number of miners employed during the year	32,262	35,401	......	3,139
Average number of other employees underground	39,281	35,662	3,619	......
Average number of boys employed underground	1,492	1,430	62	......
Average number of employees above ground	7,000	7,004	......	4
Total number of employees	80,035	79,497	538	....
Average price paid per gross ton for hand mining, shipping mines	0.6575	0.664	......	0.0065
Average price paid per gross ton for machine mining	0.524	0.521	0.003	......
Number of kegs of powder used for blasting coal	1,193,456	1,309,382	......	115,926
Number of kegs of powder used for other purposes	4,150	3,685	465	......
Number of pounds of permissible explosives used	930,596	603,420	327,176	......
Number of men accidently killed	159	175	......	16
Number injured so as to lose 30 days or more time	1,071	1,025	46	......
Number of gross tons mined to each life lost	381,860	353,407	28,453	......
Number of employees to each life lost	503	454	49	......
Number of deaths per 1,000 employed	1.99	2.21	......	0.22
Number of gross tons mined to each man injured	56,691	60,338	......	3,647
Number of employees to each man injured	75	77	......	2

*These large changes are evidently due to a more complete method of classification.—Editor.

The loss for the last half of the year may be assumed as 1,000,000 tons, but it may well exceed that figure because of the mild weather, and, further, because there are a large number of shipping mines throughout the state that have not been placed in operation since they were closed down on Apr. 1.

There have been no serious labor troubles in the mines of Illinois in the year 1914, although there was some delay in reaching an agreement, and some of the mines were closed down pending the signing of the new contract, while some continued to operate under the old scale. Some local strikes have taken place, as in previous years, but these do not materially affect the output. They are much to be regretted, as they are the cause of much bad feeling. Such differences should not arise in the coal industry of Illinois, provided, as it is, with such a detailed agreement and such a carefully specified method of conciliation.

Owing to Royalty Explosion, Accident Rate Rises

Accidents in the mines of Illinois have increased and decreased at about the same ratio as the tonnage. The number of fatal accidents for the year ending June 30, 1914, was 159, as compared with 175 for the preceding year. Based on these figures, the number of fatal accidents for the calendar year should be less than they were in the year of 1913. This is not true, however, as an explosion which took place since the close of the fiscal year caused the death of 52 men, and this will bring the number of fatal accidents for the calendar year above what it was in 1913.

The nonfatal accidents will also show an increase. The figures show for the year ending June 30, 1913, 1025 nonfatal accidents, and that in the year ending June 30, 1914, the number was 1071. There is every reason to think that the same relative increase will prove to have been maintained for the calendar year 1914.

There will be shown also a large decrease in the number of shipping mines, and the loss on tonnage will be found to be all in this class of operations. The local mines will show a slight increase in tonnage for the year 1914.

There have been no new mines of any importance placed in operation during this year. There are one or two that will begin to operate some time in 1915; one of these mines is in Franklin and the other in Vermilion County.

Taking all things into consideration, the coal-mining business in Illinois is in a worse condition than it was one year ago, and there is no sign of an early improvement. The cold weather of the past few weeks has increased business, but more than cold weather is needed to bring about normal conditions.

Indiana

By Frank I. Pearce*

SYNOPSIS—A bad year for miners and operators. The average wage decreased from $736.06 to $681.50 per man per annum. The "bituminous" coal tonnage fell 2.8 per cent. but the block coal output declined 29 per cent.

The demand for coal, the market prices, and mining conditions for the fiscal year ending Sept. 30, 1914, were exceptionally poor. Both miners and operators suffered from the adversities of the coal trade.

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The slackness was due to a general business depression and an extremely mild winter. The low prices resulted, in a large measure, from the sharp competition into which the operators entered in order to secure a market for their product. A number of mines were closed down during the entire year, and a large percentage were operated less than half time. The wage scale made two years ago when better mining conditions prevailed and which was renewed again this year without a suspension of work is the highest in the history of the state.

The operators, therefore, faced the proposition of an unusually slack market, high prices for labor, steel rails, spikes, nails, timbers, machinery, etc., and low prices for their production. The miners, on the other hand, faced the proposition of a high-wage scale and small demand for their services. The operators and miners at one or two points in the coal field are also beginning to experience much competition from coal stripped by steam shovels. In many instances this coal is produced at an extremely low cost, and as a result it is being sold at a much lower price than that at which it can be mined from a shaft, slope or drift. The outlook for next year, however, is somewhat brighter, and the indications now are that the production will equal and probably exceed the largest hitherto in the history of the state.

TABLE SHOWING THE TONS OF COAL PRODUCED AND WAGES PAID TO MINERS IN INDIANA FOR THE FISCAL YEAR ENDING SEPT. 30, 1914, BY COUNTIES, THE BLOCK AND BITUMINOUS COAL BEING SHOWN SEPARATELY

Counties	Block	Wages Paid Block	Bituminous	Wages Paid Bituminous	Total Production	Total Wages
Vigo	82,397	134,614.96	4,640,919	4,128,622.88	4,723,316	4,263,237.84
Sullivan			3,152,083	3,000,108.12	3,152,083	3,000,108.12
Greene			2,388,182	1,948,198.91	2,388,182	1,948,198.91
Vermilion			2,213,686	2,136,983.36	2,213,686	2,136,983.36
Knox			1,576,567	1,239,892.41	1,576,567	1,239,892.41
Pike			602,032	516,880.79	602,032	516,880.79
Warrick			515,368	425,218.08	515,368	425,218.08
Clay	198,899	308,053.17	266,049	254,140.44	464,948	562,193.61
Parke	28,285	42,061.22	311,397	280,968.97	339,682	323,030.19
Vanderburg			295,469	317,333.85	295,469	317,333.85
Gibson			251,379	223,003.36	251,379	223,003.36
Daviess			89,506	93,499.96	89,506	93,499.96
Fountain			19,710	15,616.84	19,710	15,616.84
Perry	3,250	2,787.35			3,250	2,787.35
Total	312,831	487,516.70	16,322,347	14,580,467.97	16,635,178	$15,067,984.67

Production

The total production for the year was 16,635,178 short tons, or a decrease of 611,387 tons in comparison with the production of the previous year. Of this tonnage, 16,322,347 tons were bituminous coal, which is 478,633 tons or a fraction over 2.8 per cent. under the production for the year 1913, and 312,831 tons were block coal, which is a decrease in production of 132,754 tons or a fraction over 29 per cent. less than the output for the previous year. Of the total production, 9,434,817 tons or a fraction over 56.7 per cent. was mined by mining machines, and 7,200,361 tons or 43.3 per cent. by hand.

In producing this coal, 500,234 kegs of black powder were used, 19,799 lb. of "permissible explosives" and 149 cases of "Hoynesite" safety powder. While it is true that much time was lost owing to the shortage of railroad cars and the occurrence of local strikes, of which there were many, yet the larger part of the time lost may be attributed to the dullness of trade.

Vigo County last year, as also in the year 1913, led in production. Last year it exceeded Sullivan County, its nearest rival, by 1,571,333 tons. This was due to the increased development in Vigo County during the past two years.

Distribution

Of the bituminous coal, 9,908,053 tons were consumed in Indiana, and 6,414,294 tons were shipped to other states. Of the block coal, 137,715 tons were consumed in this state and 175,116 tons were shipped out. A fraction over 60 per cent. of the total production was consumed within the state limits. Thus, there is a slight increase in the percentage of home consumption over that of last year.

Cost of Production

The total wages paid, as reported from the bituminous field, were $14,580,467.97, making the average cost of labor a fraction over 89c. per ton. The total wages paid in the block-coal field were $487,516.70, or a fraction over $1.55 per ton for the labor cost of production, which is an increase of about 4c. per ton over that of last year. These figures as a whole, however, show a slight decrease in the labor cost per ton for the total production of bituminous and block coal over that of last year.

Market Prices

The market prices for mine-run bituminous coal (except yearly contracts), f.o.b. cars at the mine during the year ranged from about $1 to $1.15. There was, however, during the year much coal sold for less than $1, especially during the months of June, July and August, while there was but a small amount of coal sold for $1.15. The market selling price for screened block coal (except on yearly contracts) f.o.b. cars at the mine from Oct. 1, 1913, to May 31, 1914, ranged from $2.10 to $2.25 per ton, and from June 1 to Sept. 30, 1914 from about $2.10 to $2.15 per ton. These figures show a marked decrease in the average selling price in comparison with that of the previous year.

Employees

The total number of employees for the year was 22.110, or an increase of 427 over those working last year. Of this number, 21,086 were bituminous and 1024 were block-coal mine employees.

Days Worked

The aggregate number of days the mines were reported as being in operation was 23,927, and the number of days idle, due to lack of orders, 14,798; due to a scarcity of railroad cars, 1125; owing to local strikes, 194; to permit the workers to attend funerals, 27; and on account of other causes, 1818.

Average Wages

The total wage reported from the bituminous field being $14,580,467.97, makes an average earning of $691.47 for each bituminous employee. The total wages paid to block-coal employees being $487,516.70 shows an average earning of $476.09. The aggregate wages for the state being $15,067,984.67 and the total number of employees, 22,110, shows an average earning of $681.50 for each mine employee in the state, as compared with $736.06 for each mine employee for the year 1913.

New and Abandoned Mines

Eight new mines (all of which with the exception of one or two will be large producers) were opened up during the year, and 22 were abandoned. Of the latter, there were a number that had a production of several hundred tons, and could have been worked both successfully and profitably for some time were it not for the large amount of expense necessary to keep them in repair during idle days that they might be ready to operate when orders were obtainable.

Fatalities

During the year there were 49 fatalities, the causes of which were as follows:

Falling slate at the face	9
Use of explosives (including firing of shots)	9
Mine cars and motors	7
Falling slate on haulage and traveling roads	5
Explosions of firedamp	5
Electric shock	4
Falling coal at the face	3
Falling down shaft	1
Mine cages	2
Railroad cars	1
Mining machines	1
Bursting steam pipe	1
Falling while lifting lump of coal	1
Total	49

This does not include accidents occurring in mines employing less than ten men and in clay mines and strip banks over which this department has no jurisdiction. The mining of clay and shale is rapidly becoming an important industry in this state. There are also several strip banks. In these operations, and in mines employing less than ten men, there is a total production of about 420,000 tons, and about 2500 to 3000 persons are employed. In most of the clay mines there is a small production of coal, which is used in the manufacture of clay products.

Safety and First-Aid Work

The movement for prevention of accidents, now most commonly known under the slogan of "Safety First," is gradually finding favor with both operators and miners. The National First-Aid Meeting held at Terre Haute, Ind., Sept. 12, under the auspices of the American Mine Safety Association and the Indiana Bituminous Coal Operators' Association had much to do with the progress of this important work. A large number of teams from the coal mines of Indiana were competitors in the events and won a number of prizes. It is the hope of the leaders of the "Safety First" and first-aid movements that a competitive state meeting of this kind will be held each year in the future.

A campaign of education with a view to accident prevention has been waged both prior to, and since this meeting, and the movement has been making gratifying progress. As this campaign of education advances, the importance of this work will be more fully appreciated. It is thought that three men whose lives were lost in the mines of this state during the past year, might have been saved had they been given artificial respiration in a proper maner for a sufficient length of time.

As has been stated, there were employed in and about the mines an average of 22,110 employees and 16,535,178 tons of coal were produced. These figures show a fraction over 2.22 persons killed per thousand employed and 357,861 tons per fatality, which is far better than the general average of the United States. This fatality rate, however, is far too high, and it is hoped that with the earnest coöperation of the mine operators and miners, both individually and collectively, it will be materially reduced.

Iowa

By L. E. Stamm*

SYNOPSIS—Output is practically same as in 1913. Many mines are installing mining machines. Labor difficulties seldom occur.

Statistical information relative to the Iowa coal industry is gathered by the Iowa Mine Inspectors Department for a fiscal year ending June 30. The statistics for the last half of the year 1914 have not yet been compiled, so that in making a review of the industry I am called upon to form an approximate estimate based on information furnished for the first half of the year, together with working conditions and reports of accidents received up to the present time.

The statistics for the fiscal year ending June 30, 1914, show that Iowa produced for that period 7,512,754 tons of coal. There were 258 mines in operation in 23 coal-producing counties in the state; 15,740 men were given employment in and around the mines of Iowa. The statistics relating to accidents in the mines show that there were 34 fatal and 161 nonfatal accidents for the fiscal year. The fatality rate per thousand employees was 2.1 per cent.

There was little change in the coal production during the first half of 1914 as compared with that of the first half of 1913. Working conditions were pretty much the same, and I am, therefore, led to believe that for the calendar year 1914 the state will show a production of at least 7,500,000 tons of coal, with more than 15,000 men employed, and an average working time of probably about 220 days. This takes into consideration the prevailing warm weather of September, October and November, when the demand for coal was light, and the majority of the mines were working but three and four days each week.

The United States Geological Survey in its tabulated figures of the coal industry of all the coal-producing states in the United States for the calendar year 1913, just issued, shows Iowa as ranking 10th in coal production by states, the production for the calendar year 1913 being 7,525,936 tons. As conditions in the coal production in Iowa during the year 1914 did not differ materially from conditions in 1913, I have reason to believe that my figures as given for calendar year 1914 will prove approximately correct.

Fatal Accidents

From July 1, 1914 to the present time, but 14 fatal accidents have occurred in the Iowa mines. This compares favorably with the statistical data on fatal accidents, which show the average fatal accidents in the Iowa mines in the past 19 years to be 30.3, while for the past ten years the average fatalities have been 32.5.

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*Secretary to Iowa mine inspectors, Des Moines, Iowa.

During the year 1914 considerable progress was made in and around the mines in bettering the facilities for coal production. In the agreement entered into between the miners and operators in April, 1914, to continue for two years, a scale of wages for machine mining was included, and since the signing of that agreement, a number of mines in the state have installed mining machines which will tend to increase the coal production of the state. Also a number of mines in the state have been equipped with electric hoists and electric haulage during the past year, while others have so reconstructed their top works, screens, etc., as to better facilitate the handling and grading of their product. There seems to be an increased incentive to still greater activity along these lines, as a number of other mines are contemplating like improvements.

Notwithstanding that coal is produced in twenty-three counties in Iowa, yet the bulk of the coal produced is mined in the counties of Monroe, Polk and Appanoose in the order named. For the fiscal year 1914, these counties alone produced 5,280,920 tons of coal. Considerable development work is in progress in Marion and Lucas Counties along the line of the new C. R. I. & P. Railway. These include some of the largest operations in the state, and the outlook is bright for an increased coal production in these counties.

Few Labor Troubles

But few labor troubles occur in the mining industry of this state. This is owing to the fact that both the operators and the miners have an organization, and a working and wage agreement is entered into by them for a period covering two years. The labor difficulties that do arise are chiefly local to the mines and are usually quickly adjusted by the representatives of both of these organizations. It has been the custom in former years to suspend operations at the mines while the miners and operators were agreeing upon a scale of wages and working agreement. However, a new precedent was established in April and May of 1914 when the representatives of both organizations met to perfect an agreement, the miners continuing their work while the agreement was being made. The new wage agreement will be in force until April, 1916, and it is not likely that any serious disturbance in the mining industry will occur during the life of the agreement.

Kansas

By Francis Keegan*

SYNOPSIS—Kansas has not suffered severely from the business depression. Unfortunately, the number of fatalities increased owing to a cage accident where six men were killed.

Conditions in the coal industry of Kansas were similar in 1914 to those existing in the year before. Seeing that under the law, statistics covering the coal production of the state are compiled by the Mine Inspection Department for the fiscal period ending June 30 of each year, no returns are available based on the calendar year.

The records in this office when completed will show that approximately 7,100,000 tons of coal were produced during the fiscal year ended June 30, 1914, and the production for the year ending Dec. 31, based on that produced during the fiscal year, will amount to 7,200,000 tons. This is a slight decrease in production compared with that which the year 1913 shows.

Only Work 200 Days in Year

The number of employees in the mines of the state will not be materially changed from that of the year 1913, which was 12,506. The number of days worked in the year will average 200.

During the year ended Dec. 31, 1914, there were 32 fatal accidents in and around the mines of the state. Compared with the year 1913, this is an increase of four fatalities. Mine explosions are still contributing their share to the number of deaths in the mines of the state. The necessity of installing electrical shotfiring devices in the mines is being more generally admitted, and I have no doubt that within a few years all the deep mines in the state at least will be equipped with electrical shotfiring devices, thus protecting the lives of the shotfirers.

The most disastrous accident in Kansas coal mines in many years was caused by the fall of a cage in Mine No. 7 of the Spencer-Newland Coal Co., at Mulberry. It is due to this accident that the number of fatalities at the mines increased during the past year. On the morning of Jan. 14, 1914, the engineer at this mine was lowering a load of six men when the cable parted about half way in the shaft. The safety catches failed to work and the cage with its human freight dropped to the bottom, the shaft being 130 ft. deep. All six men were fatally injured.

Steam-Shovel Development Extensive

Many improvements have been made in the mines of Kansas during the past year, especially in ventilation and sanitary conditions. The future looks bright for the industry of the state. Crawford County keeps forging ahead until today almost 70 per cent. of our coal production comes from this county. Several new mines have been opened during the past year, and the steam-shovel business is continually assuming larger proportions.

Owing to a disagreement between the Coal Operators Association and the United Mine Workers of America regarding the proper interpretation of the joint agreement, a strike was called by the mine workers officials on Nov. 1 at the mines of the Cherokee & Pittsburg Coal Mining Co., better known as the Santa Fé mines. At the present writing this strike is still in progress, but everyone is hoping that a satisfactory adjustment of the difficulties will soon be reached. Aside from this there has been no serious interference with the operation of the mines of the state during the past year.

Maryland

By William Walters*

SYNOPSIS—Output shows little change. There were 11 fatalities, 10 resulting from roof falls. A new workmen's compensation law.

The coal production of Maryland for 1914 will be about the same as for 1913, when the total output was 4,748,400 short tons.

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*State mine inspector of Maryland, Frostburg, Md.

There were no labor troubles during the year. Unfortunately more fatal accidents happened during 1914 than in the preceding year, 11 fatalities being reported from May 1 to Dec. 31. Ten of these accidents were caused by falls of rock and one by cars.

The last session of the Maryland legislature passed a workmen's compensation law, which went into effect on Nov. 1, 1914. The casualty and indemnity companies have been slow to quote a rate on this mine insurance. To insure in the state fund means the payment of $5 per year on every monthly salary of $100, or in proportion thereto. In case of death, the widow will be paid 50 per cent. of the weekly average pay; minors, a certain definite proportion. The running indemnity is not to be less than $5 nor more than $12 per week in any case.

Michigan

By Thomas Kanary[1]

The production of the state will doubtless prove to be about 1,200,000 tons when the reports from all sources in this state have been received. Of this, about a million tons were mined by machines. There were no labor disturbances in the past year. Only one new opening was made. This was near the Fordney and Chapel No. 2 mines in the City of Saginaw.

The Handy Bros. Mining Co. abandoned their No. 1 Shaft at Akron, in Tuscola County, and the Jackson Coal Co. ceased to operate the shaft in Calhoun County near Albion, but the latter will be reopened later.

Missouri

By J. P. Hawkins[2]

The coal output of Missouri for 1914 is approximately 4,000,000 tons, or about the same as the 1913 production. The year was practically free from labor disturbances, but fatal accidents in the mines increased, there being 19 fatalities as compared with nine fatal accidents in the year preceding. On the other hand, there were fewer nonfatal accidents during 1914, the nonfatals for the last year being 36, as compared with 73 for 1913.

Montana

By John Sanderson[3]

SYNOPSIS—The output was less than last year. There were 12 fatal accidents and 52 nonfatal.

The State of Montana employed 3660 men during the year 1914, producing 2,938,671 tons, valued at $4,714,023. The number of tons produced per life lost was 244,889, and for each serious accident, 56,513. The number of men employed for each fatal accident was 305; for each nonfatal accident, 70.

The percentage of men killed per 1000 employed was 3.27; number seriously injured per 1000 employed, 14.

There were 64,342 kegs of powder used in breaking down coal. The number of tons of coal mined by machines amounted to 1,093,985; hand-mined and shot off the solid, 1,844,686 tons. The percentage of machine-mined coal was 37.

New Mexico

By Rees H. Beddow[4]

SYNOPSIS—The past year showed a record output. There is a scarcity of miners in the winter months. No labor troubles. Fourteen fatal accidents.

The demand for coal and coke from New Mexico has been somewhat restricted on account of the revolution in Mexico, and the war in Europe. Considerable coal is exported from this state to Mexico, when conditions are normal, and the copper mines of Arizona which are supplied with coal and coke from this state have been obliged to reduce their orders on account of their inability to export copper to Europe, owing to the European war. Yet the demand for our coal is gradually increasing, and the production is greater this year than ever before.

The gross production for the fiscal year, Nov. 1 to Oct. 31, amounted to 3,826,885 tons, valued at the mines at $5,588,352.17. The production of coke during the fiscal year amounted to 405,127 tons, valued at the ovens at $1,341,731.62; value of coal and coke combined, $6,930,083.79.

Labor conditions have been fairly good. There has been no labor trouble between the companies and their employees for many years. During the winter months more men could be employed at most of the mines, but there is a scarcity of miners in this state during the winter months.

The industry has been fortunate this year in not having any mine explosions. This has been due, to a great extent, to taking better precaution in blasting and in guarding against the dangers arising from the accumulation of coal dust in the mines. This problem is a difficult one in this state on account of the atmospheric conditions prevailing. The humidity of the atmosphere is relatively low, and large volumes of air entering the mines absorb the natural moisture of the workings, leaving the coal dust in a very dry and inflammable condition, thus making the coal-dust problem the most dangerous one we have to face.

A summary of coal and coke production, and other data pertaining to the coal-mining industry, in the State of New Mexico, from Nov. 1, 1913, to Oct. 31, 1914, follows:

Number of mines in operation	44
Number of mines abandoned	10
Number of new mines opened	2
Tons of bituminous coal produced	3,025,786
Tons of sub-bituminous coal produced	741,912
Tons of anthracite coal produced	59,187
Total number of tons of coal produced	3,826,885
Tons of coal mined by hand	3,413,654
Tons of coal mined by machines	413,234
Total number of machines used	32
Total value of coal produced	$5,588,352.17
Number of tons of coke produced	405,127.70
Total number of coke ovens	980
Value of coke produced	$1,341,731.62
Number of employees in and about the mines	4,021
Number of employees about the coke ovens	291
Total number of employees	4,312
Number of fatal accidents	14
Number of nonfatal accidents	95
Tons of coal mined for each life lost	273,348.9
Number of employees for each life lost	308
Number killed for each thousand employed	3.24

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[1] State inspector of coal mines, Saginaw, Mich.

[2] Secretary, Missouri Bureau of Mines and Mine Inspection, Jefferson, Mo.

[3] Mine inspector, Helena, Mont.

[4] Mine inspector, Gallup, N. M.

Ohio

By J. W. Lehman

SYNOPSIS—Production was only about one-half as large as in 1913. The important Eastern field has been shut down since Apr. 1. Lake trade was very poor. Outlook is uncertain.

The coal trade in Ohio for the year 1914 was a disappointment to all concerned. In the face of excellent prospects at the beginning of the year, labor troubles intervened, which together with a business depression of a widespread nature, have combined to cut the total production to about 50 per cent. of the total of the previous year. In 1914 the total Ohio production will be reduced to approximately 19,000,000 tons, which compares with 36,285,468 tons in 1913.

At the close of the year only a portion of the state was being operated and that on a limited basis. Attempts to settle the wage agreement in eastern Ohio and Coschocton districts have all failed and it is extremely doubtful if a settlement will be reached before the convening of the Ohio General Assembly.

But, on the other hand, there has been a few bright spots in the Ohio trade which have helped to make the year one of better returns than might otherwise be supposed. There has been no car shortage at all and that has helped in the free movement of coal. Dealers and wholesalers have learned a great deal from the lessons of the year and they are in a better position to stand the dullness than formerly. Coöperation and a better feeling among coal men generally have taken the place of cutthroat competition which has characterized the trade in former years.

At the beginning of 1914, the outlook was excellent and the demand for all grades was fairly good. There were prospects of a suspension after Apr. 1 when the mining scale was scheduled to expire, and the stocking movement stimulated trade to a certain extent. So the months of January, February and March were characterized by activity in all fields. Practically full time was worked by most of the operators during that period and steam users stored quite a surplus of fuel. Prices ruled firm and while they were not high they were sufficient to yield a small and substantial profit.

All Mines Shut Down Apr. 1

Apr. 1 all of the mines of the state closed down because of the expiration of the wage agreement and the failure to formulate a new one. After a number of conferences in which operators from all the coal-producing districts of the state participated, a break in the ranks of the operators occurred. The Hocking Valley district including Jackson, Pomeroy Bend and Crooksville decided to treat alone and agreed to pay 47c. per ton for machine-mined coal on the mine-run basis.

It was not until Aug. 1, when this agreement was reached, that the mines were placed in operation. Cambridge and Massillon soon followed suit and before long all of the state, with the exception of eastern Ohio and Coshocton, was in operation. But the field still idle was by far the largest district of the state and comprised the counties of Belmont, Jefferson and Harrison. These counties in 1913 produced upwards of 16,000,000 tons of coal.

Another factor appeared early in the year which tended to confuse the situation in the Buckeye State. This was the passage of the Ohio "Mine-run" law in February, 1914, which became effective in 90 days. Instead of using the old screen system, which had been in vogue for years, the law provided that the miners should be paid for all the coal mined whether lump or slack.

This law was strongly opposed by the operators from all parts of the state. The miners' officials led by Senator William Green succeeded in having the law enacted after a long struggle. The fact that it became operative soon after the expiration of the wage agreement tended still more to make it a difficult matter to settle the wage scale. Then, too, the demand was falling off, due to the business depression, and when the European war broke out, operators were not as anxious as formerly to concede anything in order to have the scale settled. This applies more particularly to the situation in eastern Ohio.

While the mines in Ohio were idle, West Virginia operators sought to take advantage of its markets and flooded the Buckeye State with coal. When the business depression started there was a large quantity of very cheap coal on the local market. In some instances the small sizes were given away for freight and accumulated demurrage. These facts tended to demoralize the market and when Ohio mines resumed, prices were low. But despite these disadvantages many of the mines were operated at a small profit.

The price list during the year was steady except in June, July and August. The circular figures at the beginning of the year were $1.50 for domestic lump; $1.35 for three-quarter inch and $1.15 for mine-run. This circular prevailed until Sept. 1 when a new circular was put into effect increasing the prices as follows: $1.60 for domestic lump; $1.45 for three-quarter inch and $1.20 for mine-run. While these prices have not been adhered to steadily, the actual figures were not a great deal below those levels. Towards the close of the year the actual prices were: Domestic lump, $1.50; three-quarter inch, $1.35; and mine-run, $1.05 to $1.10.

Slack Was Given Away

The market for the small sizes was a peculiar one during the greater part of the year. At first there was a fair market for nut, pea and slack, prices ranging from 45 to 55c. Toward the close of the rush just previous to the suspension, there was a slight drop from those figures. But with the influx of West Virginia coal and the falling off in demand the market broke abruptly and prices went down to 20 to 30c. As stated above there were a number of instances where coal was sold at even less. Demurrage accumulated on cargoes of fine coal and many cars were given away. But this situation changed toward the latter part of the year, due to the decreased production of domestic grades and the closing of the lake trade. As a result, prices again ascended until they reached 60 to 65 cents.

One of the results of the enactment of the mine-run law was that more attention is now given to preparation. Formerly, all Ohio operators made the grades of lump, three-quarter inch, nut and mine-run. In competition with West Virginia and Kentucky coals, it was evident that a larger lump found a better market and some of the Ohio operators in rebuilding their tipples provided for a three-inch lump. In some cases even four-inch lump is made. The three-inch product, commonly known as rescreened lump sells for about 10c. more than coal prepared as formerly over an inch-and-a-quarter screen.

TIPPLES HAD TO BE REBUILT

With the enactment of the mine-run law came the necessity for rebuilding tipples in order that the legal method of weighing could be followed. During the suspension beginning Apr. 1, many of the operators in Pomeroy Bend and the smaller districts rebuilt their tipples in order to weigh all of the coal produced before it was screened. Where the tipples had not been rebuilt, a temporary agreement was entered into between operators and miners for weighing the coal at different times, but mostly with the same scales. Several of the larger companies have put off the rebuilding of their tipples in the hope of having the mine-run law repealed at the coming session of the Ohio General Assembly. The cost of rebuilding tipples in Ohio is estimated at from $12,000 to $15,000 each wherever the tipples are too squatty for screening and must be made higher.

Throughout the strike, which has already lasted for nine months in eastern Ohio and continued about four months in other districts, little violence on the part of the strikers took place. Some controversy occurred in certain parts of Belmont and Jefferson Counties over the employment of engineers and pumpers to keep the mines free from water. Several mobs were formed and in a number of cases duress was used to have the pumps abandoned. The Ohio mine department immediately got busy and after calling the men together explained the consequences of their action. With the jailing of a number of the agitators of the Industrial Workers of the World, the violence ceased. On the other hand, operators did not give the miners any cause for violence as they did not make any attempt to operate their mines with strike breakers, so called.

From the retail standpoint the year was not as bad as might be expected when the business depression is taken into consideration. The small dealers have been able to buy their coal cheaper than usual and have also been able to sell for about the same quotations as in previous years. This was especially true during the months of July and August when Ohio was flooded with cheap West Virginia coal and dealers took advantage of the low prices. Dealers have also changed their methods of doing business to a large degree. Instead of tying up with contracts they have been buying on the open market with fairly good results.

THE LAKE TRADE WAS POOR

The lake trade in Ohio was about half or even less than half that of the previous year. There were two causes for this falling off in tonnage. One was the long suspension in the Hocking Valley and the total suspension in eastern Ohio which is one of the large districts sharing in the lake trade. Only the larger operators in the Hocking Valley made any effort to ship lake coal and when they got into the game, boats had been chartered by other companies and additional bottoms were rather difficult to secure. Then again the docks of the Northwest became congested toward the latter part of the season and there was a marked falling off in lake tonnage in the latter part of October and during November. One of the larger Ohio companies which has been shipping a million and a quarter tons to the lakes only shipped about 400,000 and another had a falling off of over 50 per cent.

The steam trade was fairly active early in the year and was one of the large factors in making business good previous to the suspension. But these users accumulated such stocks at that time that they were not forced to enter the market until prices became demoralized and much of the buying since has been on the open market. Some of the steam contracts which expired during the year were renewed at the same figures as prevailed in that preceding. The depression in manufacturing lessened the demand for steam grades and to make matters worse railroad-fuel business was not as active as formerly. Taking it all in all the steam business has been bad.

FUTURE PROSPECTS

As to the prospects for the future it is a difficult matter to predict. Many coal men profess to see good business in war orders which are being received. But it is pointed out that many of these are for goods which can be manufactured without any great consumption of fuel. Furthermore, since the steel mills are rather quiet it will require some activity in iron and steel orders before any great benefit to the steam business can be counted on to a certainty.

One of the best features is the fact that coal is being used more and more as a fuel for heating dwellings. Natural gas has failed in extreme cold spells and many of the householders have learned their lessons. Practically all of the dwellings being erected at this time provide for heating by means of coal furnaces.

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Oregon

Only six mines were in operation in Coos County, Oregon, during the past year and the output was light because the Southern Pacific Co. and C. A. Smith Co. concentrated their efforts on extensive development work in preparation for a large output on the completion of the Southern Pacific R.R. to Willamette Valley, where a good market for the coal will be afforded. Only 55,000 tons were produced in Coos County and this tonnage is the lowest in years. The three largest mines are ready to multiply the output many times next year.

There are no mines or deposits worthy of mention in Oregon outside of Coos County, so the output of that area is practically the same as that of the state. Coos County has 450 sq.mi. of coal land.

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Pennsylvania

BY FRANK HALL*

SYNOPSIS—The tonnage in the bituminous region fell 15 per cent. last year, but in the anthracite region hardly any change was noted. The accident rate in the bituminous mines has been low, not a single accident occurring in which more than three men were killed.

The coal production of Pennsylvania for the year 1914 will approximate 225,000,000 net tons, as against 264,000,000 in 1913. Of the total production, 140,000,000 tons will be bituminous and about 85,000,000 tons anthracite.

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The coal trade, in sympathy with all other industries, suffered somewhat from national legislation and the unsettled conditions produced by the European war. It is difficult to say which of these causes had the greater effect on the production.

Anthracite Production Unaffected by Industrial Depression

As far as the anthracite production is concerned, the untoward influences had little effect, as the estimates for the year indicate a tonnage almost equal to that of 1913. This will be a surprise to many persons, but causes that may affect the bituminous trade have sometimes but little effect on the anthracite. More than this, the almost complete freedom from labor troubles in the latter region during the year permitted of practically uninterrupted operation, and no loss of production therefore resulted from this cause. The excessive drought, however, in some sections of the region interfered to a certain extent with the operations.

Just what effect will be felt in the future from the recent decision of the Public Service Commission in reducing freight rates on anthracite to Philadelphia it is difficult to forecast. The primary result of this action of the commission, as also of all legislative enactments affecting the industries of the country, is to unsettle trade and to a certain extent check its progress until adjustment to the changed conditions is accomplished.

The effect of the war on the bituminous trade has thus far been felt chiefly by the companies that furnish coal for the transatlantic steamers. Possibly the detriment suffered in this way may be more than compensated by increased exports.

No Accident Involving More Than Three Persons in Bituminous Region

The year has been remarkably free from serious accidents, and for the first time in many years the bituminous mines record fewer fatalities than the anthracite region. In fact, in the bituminous mines at no time during the year did an accident occur in which more than three persons were killed, a record almost without a parallel.

On the other hand, in the anthracite region there was a disaster in the 17th district in which six persons were killed by an explosion of gas, one in the 18th district by which six were killed by falling down a shaft, and one in the Third district in which there were 13 fatalities, due to the dropping of the bottom of a cage on which men were descending. It was thought probable that one of the men being lowered accidentally dropped a stick of dynamite, causing an explosion that wrecked the cage. The cause of the accident, however, has not yet been determined. It marred what would have been an unusual record of freedom from casualties in the Third district. Up to the time it occurred there had been only 17 fatal accidents reported, as against 24 in 1913 and 38 in 1912.

The Effect of the Precautionary Rules in the Anthracite Region

The strict enforcement of the mine laws by the Department of Mines and the issuance to the anthracite operators in December, 1913, of additional precautionary rules and suggestions relative to safety have no doubt lessened the dangers of mining operations. The inspectors report that the operators have with general unanimity put the rules and suggestions into practice, notwithstanding that to do so meant in many cases additional cost of operation. The rule requiring two daily inspections of every working place by the mine foreman or assistant mine foreman, in addition to the other inspections made under the law, has demonstrated its efficiency as a protection to the workmen. The other suggestions made at the time relative to accidents by falls, cars, blasts, explosions of gas, electricity and other causes are reported to have added to the safety of mining operations.

There were no serious labor troubles in the state, and strikes and suspensions were not of sufficient magnitude to affect the production in a marked degree. The general opinion among the inspectors and mining men is that the coming year will show increased activity and consequently greater output.

Plants Are Being Fireproofed and Social Changes Are Being Rapidly Made

A distinguishing feature of the coal-mining industry of Pennsylvania at present is the very evident improvement in the character of the buildings and accessories about the collieries and mines. Concrete and steel are rapidly superseding the combustible and more dangerous building materials used in the past.

The first-aid movement grows rapidly and the mines are nearly all provided with equipment and trained corps.

ESTIMATE OF ANTHRACITE PRODUCTION AND PERSONS EMPLOYED IN ANTHRACITE MINES IN 1914

Districts	Production (Net Tons)	Employees, Inside	Employees, Outside
First	2,688,000	4,160	1,550
Second	3,224,256	6,290	1,410
Third	3,673,360	5,922	1,704
Fourth	3,979,209	6,762	1,602
Fifth	4,088,000	5,200	1,500
Sixth	6,149,696	9,267	2,841
Seventh	2,988,720	4,502	925
Eighth	4,230,352	6,425	2,010
Ninth	6,773,916	8,028	2,241
Tenth	5,914,328	8,250	2,427
Eleventh	6,941,289	7,566	4,185
Twelfth	2,742,332	5,465	1,957
Thirteenth	3,371,110	4,164	2,715
Fourteenth	3,360,000	4,166	1,635
Fifteenth	2,867,760	4,641	2,068
Sixteenth	3,396,960	5,318	1,998
Seventeenth	5,491,202	6,713	2,975
Eighteenth	3,920,000	4,600	2,000
Nineteenth	3,662,604	5,229	2,596
Twentieth	2,409,120	4,560	1,595
Twenty-first	3,163,913	5,180	1,946
Totals	85,036,127	122,408	43,880

ESTIMATES OF BITUMINOUS PRODUCTION AND PERSONS EMPLOYED IN BITUMINOUS MINES IN 1914

Districts	Production (Net Tons)	Employees, Inside	Employees, Outside
First	3,225,000	4,848	801
Second	7,800,000	5,864	2,330
Third	2,100,000	4,714	682
Fourth	4,450,000	5,800	945
Fifth	5,200,000	3,400	2,200
Sixth	4,700,000	6,500	900
Seventh	6,000,000	6,200	1,250
Eighth	3,250,000	5,278	555
Ninth	6,250,000	4,500	2,250
Tenth	3,750,000	5,918	857
Eleventh	5,600,000	3,900	1,900
Twelfth	4,097,436	5,082	1,049
Thirteenth	3,675,000	4,100	400
Fourteenth	7,150,000	6,000	2,000
Fifteenth	4,800,000	6,000	700
Sixteenth	4,500,000	3,800	1,800
Seventeenth	4,424,164	5,216	573
Eighteenth	3,775,000	5,700	700
Nineteenth	6,750,000	5,930	825
Twentieth	6,300,000	6,200	800
Twenty-first	5,897,425	5,000	745
Twenty-second	4,500,000	5,900	770
Twenty-third	4,800,000	3,300	1,900
Twenty-fourth	4,500,000	5,500	500
Twenty-fifth	4,500,000	6,200	1,250
Twenty-sixth	5,181,000	5,910	850
Twenty-seventh	4,500,000	4,100	490
Twenty-eighth	4,313,327	5,600	534
Totals	136,788,352	146,460	30,556

South Dakota

By R. L. Daugherty[*]

The only coal so far discovered in South Dakota **is a** low grade of lignite which, at the present time, is only used for domestic purposes. The output is **about 15,000** short tons per annum.

Tennessee

By George E. Sylvester[†]

SYNOPSIS—A decline in production of 15 to 20 per cent. in 1914 evidenced the depression in business which with a high thermometer conspired to keep the mines idle.

The past year has been one of unprecedented dullness in the coal business of Tennessee. The general inactivity of the coal market is partly due to the industrial depression but partly also, it is a result of the open winter of last year which stagnated the market in the early part of the year, and also of the unusually warm weather this fall. This has seriously affected the local market for domestic coal on which many of our mines rely to a large extent.

While exact figures are not available, and an estimate under these conditions is unsatisfactory, I think that there was probably a reduction in this year's output of from 15 to 20 per cent.

The Decline in Business Is Not Likely to Be Permanent

Very few of our mines have been running regularly throughout the year, many having been, for considerable periods, running only a few days a week. There are, however, few mines which have been permanently closed, and there is no reason to believe that the decreased output tends to show any permanent decline in the industry, or that the state will not come back to its normal or an increased output under reasonably favorable conditions.

I consider that the mines have not become less safe and possibly have made some improvement in the last year. The use of permissible explosives is on the increase, most of our mines which would be classed as not at all dangerous using this explosive exclusively. The fatal-accident rate continues about the same and the mines of the state have not suffered from any severe disaster. This year has been free from labor troubles, and there has been little or no complaint of car shortage.

Although there seems to be no organized movement in "welfare" or "mine-safety work" among the operators, there has been much interest among the miners in "first-aid work." To this development the operators have, in most cases, given their hearty coöperation and support, and a successful field day was held in the fall under the management of the Society of Tennessee Mine Foremen.

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Italy produces neither coal nor petroleum, and the Navy Department is thus forced to buy abroad. For years coal has been purchased for the war fleet at Cardiff, Wales, while the oil used has come from the Russian wells. But experts have informed the Italian naval authorities that coal of a better steam-producing quality and a lower rate can be bought in the United States.

Texas

By Isidor J. Broman[*]

SYNOPSIS—Cheap fuel oil and industrial depression prevented the coal industry of Texas from prospering in 1914. The competition of fuel oil is particularly detrimental to the lignite production.

The production of coal in 1914 fell far short of that in the previous year. This was owing to two factors, viz.: The financial depression due to the low price of cotton, and the cheapness of fuel oil, which enabled it to compete seriously with lignite. As a result, the mines have been working only about half full time. The bituminous-coal trade has suffered less, though it also has been reduced by the industrial depression.

Bituminous Coal

I estimate the production of bituminous **coal** for the year to be about a million tons. The mine value of this output will approximate $2,500,000. The bituminous mines are located in Eastland, Maverick, Palo Pinto, Webb, Wise and Young counties. The leading bituminous coal-mining companies are: Texas & Pacific Coal Co.; Thurber; Strawn Coal Mining Co., Strawn; Wise County Coal Co., Bridgeport; Bridgeport Coal Co., Bridgeport; Belknap Coal Co., Newcastle.

The Texas & Pacific Coal Co. operates six mines, employs about 1800 miners and has a maximum daily production of about 2600 tons; the average thickness of the seam is 28 in. The longwall method of mining is used except at the Newcastle mines. Union labor is exclusively employed in the bituminous field. There have been no labor troubles of an aggravated nature during the year.

Lignite

I estimate the production of lignite for the year as approximately 700,000 tons, representing a valuation of about $1,000,000. There are 35 lignite mines scattered over an area approximating 50,000 sq.mi. These mines engage about 1600 men, and none of them employ union labor.

The miners are largely Mexicans, mostly of inferior quality and unsteady in their habits. They form a floating population with no permanent domicile. It is true that were it not for the labor of the negro and Mexican, the lignite industry in this state would, in all probability, be at a standstill. Nevertheless, one great need of the industry is for a more competent and better class of labor. In my estimation, it would decrease the cost of production, add greatly to the length of the lives of the miners and work for efficiency and general safety.

The lignite mines are located in the counties of Bastrip, Hopkins, Lee, Houston, Leon, Medina, Milam, Rains, Robertson, Titus, Van Zandt and Wood. The largest and most productive mines are located in Wood County, and the one having the largest output in Texas produces 1000 tons per day.

The mines in Texas are unusually safe. The fatality rate for the year 1914 will not exceed one fatality for every thousand men employed. This excellent record is due in part to favorable natural conditions and to the control of the mines by operators who, in the main, are zealous in the promotion of safety. At the present time the state employs only one state mine inspector. It is probable that the force will soon be increased.

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[*] Chief state mine inspector, Lead, S. D.

[†] Chief mine inspector, State of Tennessee, Nashville, Tenn.

[*] State mine inspector, Austin, Tex.

The Future of Coal Mining in Texas

It is difficult to make any statement as to the future of the coal-mining industry in this state which would not be considered rash. We have no water power worth mentioning. The state is large but as yet sparsely settled. Its agricultural resources if fully developed could support at least fifty millions of people. It has great promises of industrial growth as well as of increase in population.

Aside from the production of oil, the state has inexhaustible supplies of low-grade, cheap but efficient fuels, and these fuel supplies will supply the power needed by the industries of the state. With the advent of normal industrial conditions and with a gradually increasing knowledge of the value of our fuel resources, and a more efficient use of the fuels that we have, it is easy to see that the coal-mining industry of Texas will prosper in time to come.

Utah

By J. E. Pettit*

SYNOPSIS—Production in 1914 decreases 138,774 tons. Coke increases. There were 20 fatal accidents. Forty-two mining machines now in operation.

The total output for the Utah mines for the fiscal year—Dec. 1, 1913, to Nov. 30, 1914—is 3,149,491 tons, showing a decrease in output from 1913 of 138,774 tons. The output of coke was 348,806 tons or an increase of 34,112 tons. The mines worked approximately 196 days with 4348 men employed. We have experienced no labor troubles during the year, and two new coal properties have commenced shipping, namely, the Cameron Coal Co. and the Standard Coal Co. Two other companies have been organized, namely, the Chrystal Coal Co. and the Ketchum Coal Co.

Our mines have not worked more than two-thirds of full time because of the general depression throughout the country caused by various industrial conditions. The copper mines of Bingham and the smelters in connection have worked but half force and consequently have used only half as much coal as usual. Railroad traffic throughout Utah has been dull, the railroads using approximately 100,000 tons less than last year.

New Tariff Affects Coal Industry

Moreover, the removal of the tariff from the Canadian and Australian coals has displaced much coal in the coast cities and contiguous territories. A total of 173 accidents were reported during the year, 20 of which were fatal and 24 serious. Five of the fatal accidents occurred on the surface, two as the result of a boiler explosion in the power plant of the Spring Canyon Coal Co. Considerable improvements have been made during the year in the mines of the old companies, and thus Utah is prepared to double the output of last year.

Mine Rescue Car No. 2 has made a trip through the various camps of the state and given instructions in first-aid and helmet work, which has been appreciated by all interested. One state contest in first-aid work and two local meets have been held during the past summer. The introduction of electric mining machines in Utah during the past two years has diminished the practice of shooting off the solid, and also encouraged hand mining, with the following results: Coal mined by hand, 1,808,709 tons; mined by machines, 892,541 tons; shot from solid, 448,241 tons. There are 42 mining machines in operation.

Washington

By James Bagley*

SYNOPSIS—Fuel oil is a serious menace to coal industry of Washington. Production decreases in 1914. The majority of accidents in the mines result from the steep inclination of the beds.

Reports received for 11 months of the year indicate a decrease in the coal production of Washington for 1914. With the reports received and an estimate for December, the output for the year will be about 3,000,000 short tons; a decrease of over 850,000 tons, compared with 1913. The output for that year was abnormal, due to the strike in the coal mines of Vancouver Island, in British Columbia, about half a million tons of Washington coal being shipped to the British Columbia market.

Washington is the only state on the Pacific Coast that produces coal in any quantity. The production of coal in Washington has not increased as rapidly as the growth of the Pacific Coast States should warrant. In fact, the figures for 1914 will be about the same as 10 years ago. The production for the year 1914 is not very encouraging to the coal operators of Washington. In the past few years oil has replaced coal as a fuel in many of the manufacturing plants of the Pacific Coast States. Many of the steamers running out of Puget Sound ports are using fuel oil, which can be shipped from California at a very low cost. The railroads are also using large quantities of fuel oil—the Northern Pacific being the only railroad that uses coal exclusively. Electricity is also replacing coal in a great many cases. The natural resources of Washington enable the power companies to generate power at a very low cost to the consumer.

Labor Conditions

No labor troubles of any consequence occurred during the last year, except a few strikes of short duration, which were settled with little loss of time.

The companies working under agreement with the United Mine Workers of America renewed their contract, which expired on Sept. 1, 1914. This agreement holds for two years and is practically the same as the one it succeeds. This insures industrial peace in the coal mines of the state during the life of the agreement.

Fatalities

Seventeen fatal accidents had occurred up to Dec. 19, against 22 for the previous year. Coal mining in Washington is a more hazardous occupation than in most of the Eastern and Central States, on account of the steep inclination of the beds. The pitch runs from 10 deg. in some parts of the state to 80 deg in some of the mines in King and Pierce counties. Accidents due to the pitch average about one-third of the total.

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*Chief inspector for State of Utah, Salt Lake City, Utah.

*State coal mine inspector, Seattle, Wash.

West Virginia

By Earl A. Henry*

SYNOPSIS—The depression in business which made sweeping reductions in the production of other states merely retarded the growth of West Virginia. The tonnage produced will probably show a small increase over last year despite the strikes in the central coal field. The output was about 72,800,000 short tons.

The output of coal for the calendar year just past will total about 72,800,000 short tons. The coke produced will be about 1,600,000 tons. About 1,344,000 short tons of coal were used in the operation of the mines; 896,000 tons were furnished to local trade and to tenants and 3,136,000 were used in coke ovens. About 67,200,000 were shipped from the mines and only 10 per cent. of this coal was consigned to points within the state.

Machines Mine about 54 per Cent.

Of the whole production, about 33,600,000 tons were produced by pick-mining, at which roughly 20,000 persons were employed. The other 39,200,000 tons were mined by machine by 22,300 miners and 4300 machine runners and helpers. There were 18,300 other inside employees and 11,200 outside men exclusive of those employed around the coke ovens. These latter were tended by 1900 employees.

Excluding Supervisional Force, Output Is 933 Tons per Man per Annum

In all, 78,000 men were employed in and around the mines of the state exclusive of foremen, office employees, store clerks, etc. Of these, 29,000 were foreigners and 49,000, Americans. About 10,000 acres of coal land were exhausted during the year. Roughly, 5500 mules were employed for haulage, 1000 horses and 1700 locomotives. Of these latter, 1600 were operated by electricity, 40 by air, 25 by gasoline and 50 by steam. There were about 600 generators in use and practically 1300 boilers.

Permissible Powder 22 per Cent. of All Explosives Used

From the figures rendered available by the companies' reports, there were 535,000 kegs of black blasting powder used and 3,800,000 lb. of permissible explosives; 297,300 kegs of powder and 1,400,000 lb. of permissibles being used in pick mining, while 237,700 kegs of powder and 2,400,000 lb. of permissibles were used in machine mining.

The tonnage for the past year has been reduced by about a million and a half gross tons on account of the strike which occurred in District No. 17 beginning June 1 and ending July 14, also by about one-half million tons by strikes reported in other sections of the state.

There is, at the present time, sufficient development for an annual production of 100,000,000 gross tons from mines now in operation and the reports indicate that there are at least 100 mines closed on account of the depression in business, also, that at least 75 more are in the early stages of development and will be able to produce a considerable tonnage within the next year.

During the last year there have been about 20 new fans installed, 30 new tipples constructed, 600 new mine cars purchased, 30 new locomotives installed and 400 new dwellings built.

Coke Production Faces Steady Decline

The production of coke for the last year shows a decrease of practically 1,000,000 net tons, and, owing to the many modern changes in coke production, also the many conditions adverse to its production in this state, still further decrease is expected in this production in the next year, as only about 40 new ovens were constructed last year while about 300 have been abandoned.

These figures, of course, are not final but are based on information available at this time. They are, however, reasonably accurate, but the changes to be made when final reports are obtained will be immaterial.

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*Chief of West Virginia Department of Mines, Charleston, W. Va.

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Coal and Coke Production in the United States During 1914

The following tables have been compiled largely from data communicated by the various state mine inspectors, estimates having been made only where no such statistics were available, but in all cases upon the basis of reliable information.

PRODUCTION OF COAL IN THE UNITED STATES

States	1913 Short Tons	1914 Short Tons
Bituminous		
Alabama	17,885,000	(*e*) 16,140,000
Alaska	2,500	3,000
Arkansas	(*a*) 2,234,107	(*b*) 2,136,783
Colorado	9,268,939	8,159,489
Idaho	2,000	2,000
Illinois	(*a*) 61,618,744	59,500,000
Indiana	17,246,565	(*g*) 16,635,178
Iowa	(*a*) 7,525,936	7,500,000
Kansas	7,301,000	7,200,000
Kentucky	19,616,600	(*e*) 20,000,000
Maryland	4,748,400	4,500,000
Michigan	1,231,786	1,200,000
Missouri	4,318,125	4,100,000
Montana	(*a*) 3,240,973	(*f*) 2,938,671
New Mexico	3,634,217	(*f*) 3,826,885
North Dakota	(*a*) 495,320	425,000
Ohio	36,285,468	19,000,000
Oregon	45,000	55,000
Oklahoma	(*a*) 4,165,770	4,000,000
Pennsylvania	(*a*) 173,781,217	140,000,000
South Dakota	12,000	15,000
Tennessee	(*a*) 6,903,784	5,661,102
Texas	(*a*) 2,429,144	1,700,000
Utah	3,288,265	(*c*) 3,149,491
Virginia	(*a*) 8,828,068	9,000,000
Washington	(*a*) 3,877,891	3,000,000
West Virginia	(*a*) 71,308,982	72,800,000
Wyoming	(*a*) 7,393,066	(*e*) 6,900,000
Total bituminous	478,688,867	419,547,599
Anthracite		
Colorado	51,903	45,000
New Mexico	50,000	59,187
Pennsylvania	(*a*) 91,524,922	91,448,000
Total anthracite	91,626,825	91,552,187
Grand total	570,315,692	511,099,786

PRODUCTION OF COKE IN THE UNITED STATES

States	1913 Short Tons	1914 Short Tons
Alabama	3,562,624	2,320,000
Colorado	(*a*) 879,461	(*e*) 705,000
Georgia	40,000	40,000
Illinois	(*a*) 1,859,553	1,850,000
Indiana	(*a*) 2,727,025	(*e*) 2,650,000
Kentucky	325,862	350,000
New Mexico	471,135	(*f*) 405,127
Ohio	(*a*) 351,846	(*e*) 295,000
Pennsylvania	(*a*) 28,753,444	20,090,000
Tennessee	355,900	300,000
Utah	314,694	(*c*) 348,806
Virginia	(*a*) 1,303,603	(*e*) 900,000
Washington	75,400	65,000
West Virgini	2,472,752	1,600,000
Other states	2,460,509	2,500,000
Total	45,953,808	34,418,933

(*a*) Figures of U. S. Geol. Survey. (*b*) Year ending June 30. (*c*) Year ending Nov. 30. (*d*) Includes output of byproduct coke for Massachusetts, Maryland, Minnesota, Michigan, New York, Wisconsin, and New Jersey. (*e*) Estimated. (*f*) Year ending Oct. 31. (*g*) Year ending Sept. 30.

Canadian Coal Production

British Columbia

By E. J. Jacobs*

SYNOPSIS—Production decreased nearly one-half million tons. However, a number of old mines were improved and new properties opened. Fuel oil a serious competitor.

In 1913, labor troubles at Vancouver Island collieries prevented the total production of coal in British Columbia from being normal; in 1914 the effects of the European war are seen in decreased output of coal from mines on Vancouver Island, also in the Crowsnest district, Southeast Kootenay, while in Nicola district less coal was mined, owing to the change from coal to oil for fuel on the Canadian Pacific Ry. Co.'s main western lines.

The decreases in production of individual districts may be seen by comparing the figures for 1913 with those shown in the 1914 table below. The gross production in East Kootenay in 1913 was 1,491,332 short tons; in Nicola and Similkameen, 297,407 tons; and on Vancouver Island 1,090,312 tons; total gross output, 2,879,251 short tons, as compared with 2,434,387 short tons in 1914. The loss in quantity of gross production of coal was, therefore, 444,864 short tons.

The districts in which coal was mined, and the proportions of production of the various companies, are shown in the following table:

PRODUCTION OF COAL IN 1914

	Short Tons
Vancouver Island:	
Canadian Collieries (Dunsmuir), Ltd	596,976
Pacific Coast Coal Mines, Ltd	137,678
Vancouver-Nanaimo Coal Mining Co., Ltd	118,734
Western Fuel Co	339,314
Total	1,192,702
Nicola:	
Inland Coal & Coke Co., Ltd	62,720
Middlesboro Collieries, Ltd	67,200
Pacific Coast Colliery Co	560
Total	130,480
Similkameen:	
Coalmont Colliery	4,480
Princeton Coal & Land Co., Ltd	17,517
Total	21,997
Southeast Kootenay:	
Corbin Coal & Coke Co., Ltd	83,138
Hosmer Mines, Ltd	132,336
Crow's Nest Pass Coal Co., Ltd	873,734
Total	1,089,208
Gross production of coal	2,434,387
Made into coke	393,502
Total production, net	2,040,885

The production in December having to be estimated, there will be some changes from the foregoing figures, but the differences the revised returns will make will be quite unimportant.

Output of Coke

The quantity of coke made in 1914 is estimated at 266,483 short tons, of which 227,016 short tons was from the ovens of the Crow's Nest Pass Coal Co. and 39,467 tons from those of the Hosmer Mines, Ltd. This total output of 266,483 short tons compares with 319,323 short tons in 1913, which latter was a record year for coke-making in the province. With the exception of 1911, when labor troubles prevented production during the greater part of that year, the output for 1914 was the smallest of any year since 1906. However, an early increase in the quantity made is looked for, renewed demands for coke having led to the restarting of 100 of the Crow's Nest Pass Co.'s ovens at Michel, about the middle of December, with a prospect of still more being in use ere long.

Vancouver Island Collieries

The strike of miners employed at the several collieries on Vancouver Island, declared by the United Mine Workers of America May 1, 1913, was continued during the greater part of 1914, but meanwhile the mine owners obtained all the men they required to operate their mines, so that when the U. M. W. of A. eventually called off the strike, the production of coal was as large as market conditions called for.

The War Affects Demand

Unfortunately, less coal was required for bunkering purposes, for, as already intimated, war conditions unfavorably affected the demand for it. The activity of German cruisers that sought to destroy the shipping of the allied powers at war with Germany, for a period of four months interfered with the steamship trade, to which Vancouver Island collieries usually look for a considerable portion of their market. In December, this interference was removed by the destruction of those of the enemy's warships that had been instrumental in disturbing the mercantile service in the Pacific Ocean of Great Britain and her allies. Again, the competition of fuel oil was felt in some measure, though not in very much larger degree than in 1913.

Canadian Collieries (Dunsmuir), Ltd.

There is little that is new to tell of in connection with the Comox mines (also known as the Cumberland mines) of the Canadian Collieries, Ltd., at some of which important changes, in the substitution of electric power for steam, were made in 1913, while new equipment was added, and underground development was done. Work was stopped at the new mine known as No. 8. The improvement and extension of the standard-gage railway connecting the mines with the shipping docks at Union Bay were completed, and generally adequate provision was made for a considerably enlarged output. All through the year more miners were available than there was full-time employment for, so the labor question did not lessen production, for all the coal that could be sold was produced.

For a while there seemed to be a probability of the company's coke ovens at Union Bay being used again, after having been idle for several years, but the negotiations with a copper-mining and smelting company operating in the coast district were not brought to a successful issue before the close of the year, though not yet broken off.

At this company's Extension colliery, situated southwest of Nanaimo, good progress was made during the year. New electric locomotives were obtained to replace those destroyed by fire during the strike, and new surface buildings were erected. Good work was also done underground, so that the mines of this colliery were restored to normal productivity. The producing capacity of this colliery is now fully 1000 tons a day, as compared with 250 to 300 tons last year.

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Western Fuel Co.

Considering conditions in the early part of the year, an excellent showing was made by the Western Fuel Co.'s No. 1 mine, Esplanade, Nanaimo, which was the only one of the company's group of mines that coal was mined from in 1914. The company's Northfield (Brechin) mine was idle throughout the year; it is possible this mine may be permanently abandoned.

At the company's Reserve mine, situated three or four miles south of Nanaimo, two shafts each 10x26 ft. inside of timbers, 350 ft. apart and sunk to a depth of about 1000 ft., sinking of which was commenced in April, 1910, were completed, and tunnels of about 200 ft. in length were driven back to the coal seam. The ventilation system has been completed, and the work of making a connecting heading in the coal has been undertaken. The coal where cut showed 14 ft. thick and is clean, firm and of good quality. The surface plant here, as well as the underground installation, will be modern in every respect. The company contemplates opening another mine in the district after the improvements at the Reserve mine shall have been completed.

Pacific Coast Coal Mines

At the South Wellington mines of the Pacific Coast Coal Mines, Ltd., operations were also resumed months before the calling off of the strike. There was little worthy of particular notice at this company's Fiddick colliery, but at its Morden mine, situated two miles east of South Wellington, at which two shafts were sunk in 1912 and 1913, a reinforced-concrete and steel tipple was constructed, modern machinery installed, and the pithead generally completed along uptodate lines. An 8-ft. seam of coal, reached at 600 ft. depth, is being opened here. At the company's Suquash mine, in the northern part of Vancouver Island, completion of a new shaft and slopes to connect with older workings was resumed after interruption by the strike, beside which the requisite plant and machinery were put in.

Vancouver-Nanaimo Co.

Little information was obtained relative to operations throughout 1914 at the Vancouver-Nanaimo Coal Mining Co.'s Jingle Pot mine. This mine was worked under an agreement with the U. M. W. of A., and its output was, as shown above, about 118,700 short tons of coal.

Nicola and Similkameen

Two companies operating in Nicola district produced coal on a commercial scale in 1914, namely, the Inland Coal & Coke Co., Ltd., and the Middlesboro Collieries, Ltd. (formerly the Nicola Valley Coal & Coke Co.).

Owing to the competition of foreign fuel oil, which was substituted for coal in several cases, the demand for coal was reduced by nearly one-half, so that instead of an output of about 114,000 long tons each, as was made in 1913, the first mentioned company produced only 56,000 tons and the other 60,000 tons in 1914.

The Inland Co. continued development of its mines, chiefly the further sinking of the main slope, the extension of the levels, and driving a 300-ft. rock tunnel at the 600-ft. level to open No. 5 seam, which there shows 7 ft. of clean coal. This company's property, known as the Coal Hill colliery, is situated west of and about 500 ft. above the Middlesboro colliery.

Slackness of coal trade led to a curtailment of operations by the Middlesboro Collieries, Ltd., so Nos. 2 and 6 mines were idle, mining having been restricted to No. 4 seam, opened in 1913 on the west side of the property and known as No. 7 mine. The coal is about 18 ft. in thickness, with sandstone roof and floor. Present output from here is approximately 300 tons each working day.

In Similkameen district, the Coalmont and the Princeton collieries were operated. At the Coalmont property about 3500 ft. of development work was done. In the spring there were found two seams of coal, of 7 and 5 ft., respectively, with only a small parting between, making practically a 12-ft. seam of coal, giving on analysis, moisture, 4.95; volatile combustible, 35.93; fixed carbon, 49.47; and ash, 9.65. Small additions were made to steam-power and ventilation facilities, and preliminaries for providing transportation to the railway three miles away were taken in hand. Additions were made to both steam and electric equipment. With construction of more railway lines in progress in the neighborhood, the prospects for an increased market for coal are favorable.

Collieries in Southeast Kootenay

Three companies operated, namely, the Crow's Nest Pass Coal Co., Ltd., the Hosmer Mines, Ltd., and the Corbin Coal & Coke Co. There is little to report of the Hosmer colliery, for the reason that last summer it was closed, and it is understood that it has been permanently abandoned by its present owners, who have finally given up work in a country found to be so disturbed as to make profitable mining of the coal out of the question.

Crow's Nest Pass Coal Co.

The considerable decrease in production of coal and coke at this company's collieries, as compared with 1913, is attributed to a general decrease in consumption all over the region in which are its available markets, this having been especially true since the beginning of the war. New work was done, however, and additions made to equipment.

Development work was also carried on in the new B. mine, where a new fan was installed and the mine opened to a producing capacity of about 800 tons of coal a day.

At its Michel colliery, the Crow's Nest Pass Co. developed its new No. 8 mine to a capacity of 600 tons a day, and it redeveloped No. 3 seam on the south side of the valley through the syncline basin faults. Two new seams of coal were discovered on the south side of the valley. Generally, in 1914 the company provided for an increased output of coal to the extent of at least 1000 tons a day more than the physical output of 1913.

Corbin Coal & Coke Co.

Much more surface stripping was done at the Corbin Coal & Coke Co.'s No. 3 mine, also known as the "Big Showing," where, during the part of the year when there is no snow on the mountain, operations are conducted on the opencut or quarry system. A Marcus screen was added to the surface equipment. Production of coal was a little larger than in 1913—74,230 long tons, against 72,788 tons.

General Notes

No important progress was made in the nonproducing coal fields in the province, although more prospecting and exploration of coal measures was done in several of the outlying fields. Until a railway shall be constructed to the Groundhog field, in the northern Skeena country, where the occurrence of anthracite is claimed by owners of coal lands, no effective advance can be made toward its commercial development.

In conclusion, reference may be made to the mine-rescue work. Beside the ample mine-rescue apparatus and men trained in its use that all operating coal-mining companies have provided, as required by provincial law, the Canadian Government has two fully equipped mine-rescue stations in the province, with Draeger mouth-breathing type of apparatus. Efficient men are in charge of these stations, and it is here that training is done to give opportunity to those who take it to qualify for obtaining Government certificates of competency. As well, instruction is given in the use of the pulmotor, and in the St. John Ambulance Association methods of rendering "first aid to the injured."

Nova Scotia

By R. D. Anderson*

SYNOPSIS—Output of coal was about 7,840,000 short tons and the coke production 504,000 short tons in 1914.

The output of coal for last year was about 7,840,000 short tons and the output of coke 504,000 tons. Conditions immediately preceding the war reduced the output.

No new mines were opened during the year, and the collieries are now working about three-quarter full time.

Trade with the New England States will, it is expected, be better than it was last year, as the Dominion Coal Co. has chartered double the number of cargo boats for that trade during the present winter.

The accident list is about the same as last year, there being no great mining disasters.

Coal Mining in Alberta during 1914

By John T. Stirling†

SYNOPSIS—Production decreases about 600.000 tons. New districts being opened. Safety lamps are widely used. One hundred and forty-two men are given first-aid certificates.

During the year 1914, the coal-mining industry in Alberta, particularly in the southern portion of the province, has not been so satisfactory as it was during the year 1913.

There were 4,306,346 tons of coal produced during the year 1913, but the output for the year 1914 will probably not exceed 3,650,000 tons. This falling off is due in a large extent to the reduced amount of coal being used by the railway companies and also to the extremely mild weather which has been experienced throughout the year.

At the end of the year 1913 there were 217 mines in operation, while at present there are only 208. Thirty-seven mines have been abandoned during the present year; 4 were reopened and 24 new mines commenced.

For the last few months, the mines in the Crow's Nest Pass district have only been producing about 30 per cent. of their available output, while the mines in the Lethbridge district have been producing about 50 per cent.

The mines in the northern part of the province have been working somewhat steadily and at the present time are all practically working to full capacity. A considerable improvement has also taken place in the Lethbridge field during the last week or two and it is expected that from now on, for the next few months, the mines in this district will work steadily.

Important Developments

The most important development in the province during the year took place in the Drumheller and Brazeau districts. In the Drumheller district, where the coal mined is of a high grade, there are now eight mines in operation. The output in this district for the year 1913 was 52,894 tons, while for the year 1914, it is estimated that it will be at least double that amount. Most of this coal is shipped to Manitoba and Saskatchewan.

In the Brazeau district, the mines operated by the Brazeau Collieries, Ltd., have been so far developed that an output of 1000 tons per day is now being obtained.

The mines situated on the main transcontinental lines of the Canadian Northern and Grank Trunk Pacific railways, about 200 miles west of Edmonton, are being developed very slowly, owing to the difficulty in getting rid of the output.

Practically all the mines which have been commenced during the year have been opened with the intention of operating on a small scale for the purpose of supplying the immediate local demand. There have been no new mines opened up in the district north of Edmonton.

Most Mines Use Safety Lamps

All the bituminous and anthracite mines in the province are now being operated with safety lamps entirely, as well as the more important lignite mines. All the mines in the Drumheller district are also operated by means of safety lamps. The lamp most commonly in use is of the Wolf type, while some of the Koehler type and also electric safety lamps are being employed.

The No. 6 mine, operated by the Department of Natural Resources of the Canadian Pacific Railway Co., is equipped with electric safety lamps of the Wico and Ceag types, while a number of lamps of the Edison type are being used by the Pembina Coal Co., Ltd. All these lamps are giving satisfaction.

During the past year the Pembina Coal Co.. Ltd., has installed two storage-battery locomotives of the Edison type.

There has been a considerable increase in the number of tons of coal produced per pound of explosive used particularly in the bituminous and anthracite mines and only "permitted explosives" are now allowed to be used in these mines.

Up to the present time, there have been 87 nonfatal accidents and 19 fatal accidents in the province during the year 1914. This number is exclusive of the catastrophe which occurred on June 19, in the mine operated by the Hillcrest Collieries, Ltd., at Hillcrest, whereby 189 men lost their lives. This catastrophe was caused by an explosion of gas and coal dust. It has been impossible, however, to ascertain the cause of the explosion.

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†Chief inspector of mines, Edmonton, Alta., Can.

An order-in-council was passed during the year, putting into effect certain regulations under the Mines Act. These regulations, among other things, prohibit any person, other than an authorized person, relighting a safety lamp underground, and also make provision for the better regulating of the amount of coal dust in a mine.

Training in First Aid

During the year, further training in mine-rescue work has been carried on to such an extent that there are now 142 men holding certificates in the province for this work. A second railway car has been provided and equipped for rescue service and instruction in the Bankhead and Canmore districts. In addition to this, there is a mine-rescue car in the Crow's Nest Pass district, which operates between Lundbreck and Coleman. A mine-rescue station is also being operated at Hardieville, near Lethbridge, and substations at Commerce, Coalhurst and Taber.

The Provincial Government has organized classes in technical education at the different mining camps in the province, and while these classes are only just commencing at present, it is expected that a large attendance will be obtained.

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Coal Markets and Business Aspects of the Fuel Industry in 1914

By A. T. Shurick

SYNOPSIS—The year has been a generally unsatisfactory one in every respect for the operators. A notable dullness marked the early part of the period, due to the generally adverse interpretation placed upon the drastic legislation, both national and state. This situation was accentuated to an acute degree by the European war, with the result that the last half brought about even more distressing conditions. Production for the year has shown a heavy decline. In labor circles there was a general uneasiness supplemented in a few instances by determined fights between the unions and capital. In general, the period has been one of uniform recessions marked by aggressive retrenchment policies in all directions.

While the year 1914 opened under moderately auspicious conditions, this soon gave way to a disappointing dullness, and the last half found the commercial world grappling with the most tremendous demoralization in history. That the gun was loaded, we have all vaguely understood; but that the trigger would ever be pulled we had never seriously considered. Falling thus as a distinct surprise, the shock could not have been more severe. Our threatened entanglement in Mexico, the Colorado strike with its accompanying spectacular demonstrations extending from coast to coast, and the failure of several powerful banking and commercial institutions, were all dwarfed into insignificance.

But that we still have much cause for self-congratulation, even in the midst of all this disarray, is an important compensation for us. Our losses, sacrifices and sufferings have been insignificant as compared with Europe; and while these warring states are steadily weakening, the potential strength of this country is increasing in a like proportion so that we may ultimately occupy a position in the world's business and commercial affairs perhaps never dreamed of.

One of the most impelling constructive developments of the year was the general abatement in destructive legislation, so inimical to the industrial progress of the country. Popular disapproval of these policies was evident in the November election, the defeat of Governor Cox of Ohio forming an example in which the coal industry is more particularly interested, and politicians must soon awake to a realization that such policies cannot be considered as a passport to public favor.

General Conditions

As compared with the previous year, 1914 was generally unsatisfactory in every respect, and a period of pronounced discouragement to both operators and sales agents. Even in the face of a possible suspension at the mines the market began to develop soft spots as early as March which were followed by a persistent and extreme dullness throughout the year. By the middle of summer the selling agents were reporting the situation as one of the dullest in their recollection, and strict curtailment propagandas were put into effect, which for a time gave encouraging hopes of rectifying the trouble. Producers also placed a favorable interpretation upon the European war at first, seeing indications for an immediate expansion of our export business on a tremendous scale with the result that extra supplies were ordered and sales agents showed a marked hesitancy to commit themselves on future negotiations. For a brief time there was a sharp flurry in export business, but through it all consumers showed every confidence in being able to obtain adequate supplies and when the fallacy of expecting any important relief in this direction was finally and definitely disposed of, hopes of any improvement were abandoned by even the most optimistic. The placing of the New Haven contract, involving a quarter of a million tons, with Cape Breton interests for shipments in English vessels further accentuated the depression in the New England district.

Though the close of the year brought many rumors of industrial improvement and resumption in manufacturing districts, it is becoming more and more evident that the process will be slow. And in view of the weak prices ruling through most of the period, it is clear that consumers will be conservative as regards negotiations on new contracts. The one predominating condition that has been brought sharply home to the coal industry during the year is how completely dependent it is upon the general prosperity of the country at large.

Financial

The adverse conditions prevailing in the world's money markets have exerted such an impelling influence upon the coal business that this subject seems to justify more than cursory examination. Never before in history have the effects of a panic been so keenly felt; not that previous depressions or decisive wars have failed to create equally acute conditions, but business has expanded so tremendously and the commercial machinery of the world is today so closely interlocked, with each unit dependent upon the others that the abrupt disruption of this condition could not but create a situation that would extend to the remotest parts of the world.

One of the first developments immediately following the various declarations of war was the establishment of moratoria on the part of nearly all the involved states. Perhaps the most amazing feature of this was the disposition on the part of the European countries to shift the blame for this demoralization onto the United States—a responsibility which, strange to say, appears to have been generally accepted in this country. The statement was repeatedly made that we were unable to meet our maturing obligations when, as a matter of fact, it was the Europeans themselves who suspended payment of all indebtedness, a condition which was not at any time considered in this country.

The effects of these moratoria in this country were, of course, enormous, particularly as regards England. As is well known, London is the chief clearing house of the world; not only was she responsible for her own indebtedness to us, but practically all of our foreign and export business the world over is cleared through the London banks. The British moratorium, originally declared for 30 days only, ran over a period of three months before it was finally lifted, and during this time it is estimated that our exports, for which payment was held up in London, aggregated nearly half a billion dollars.

The close of the year found a distinctly improved sentiment prevailing in business circles—improved, that is, as compared with conditions immediately succeeding the European war. The very unexpectedness of the war alone was sufficient to cause a more or less complete collapse of the world's financial machinery; particularly was this the case in this country which had been struggling along for a long period under the burden of what the large business interests chose to interpret as adverse legislation. Considering these conditions, therefore, the renewed optimism at the end of the year is even more gratifying.

Certainly the first shock of the war was succeeded by a wonderfully effective constructive propaganda. Exchange, commerce and credit, problems requiring immediate solution, were hastily patched up with temporary expedients and later reëstablished on a permanent basis. Restrictions were slowly removed, the exchanges gradually getting under way during the last month, and investment and speculation resumed, though on a much reduced scale. There is a growing conviction among conservative observers that, with the bottom of the depression now past, the recovery should continue even though the war still exists.

The President's Message

The reassuring statements in the President's last message toward the close of the year, such as "The road at last lies clear and firm before business, the road to ungrudged and unclouded success," lacks nothing of the customary beautiful phraseology, though the practical business man would no doubt prefer something more tangible. The one ameliorating condition in the message seems to lie in his assurances that the drastic legislation had been concluded, for the time being at least.

Mr. Wilson also reminds us that the foreign wars have created unexpected and unprecedented opportunities for American manufacturers, but his query: "How are we to carry our goods to the empty markets of which I have spoken if we have not the ships?" seems hardly justified. Certainly where profitable investments offering reasonable security can be obtained there should be plenty of private capital available, and if the investment is not profitable, it is illogical to expect or desire that the Government should participate in it.

In general, the present administration has not favorably impressed the country, particularly the mining industry. It is now thought that what is required more than anything else is a government that will adhere more particularly to governing, and cease interfering with the normal course of business. Mr. Wilson is a serious man and there are few that will question his sincerity, but his position on some of the leading questions of the day, as for instance the labor problem, is the cause of no little uneasiness.

Transportation Statistics

A study of the performance of the principal coal carriers throws interesting light on the progress of the coal industry through the year. Almost without exception these roads show a consistent loss throughout most of the year, and in no important case is the customary 10 per cent. increase in tonnage noted.

Anthracite Shipments—The hard-coal tonnage for the first eleven months showed a decline of more than three-quarters of a million tons. There was considerable activity in anthracite over the last month of the year, due to more or less continuous cold weather; this will cause a substantial increase in shipments over that for December, 1913, which were relatively light, and the final loss in anthracite shipments will not exceed half a million tons.

The Thirteen Leading Coal Roads—Of the many railroad statistics, this government compilation, showing the monthly results on the thirteen leading bituminous coal roads, is by far the most comprehensive statement of this kind there is. Unfortunately, it is considerably delayed in publication; but it covers, perhaps, 40 per cent. of the aggregate bituminous tonnage in the country and hence forms a valuable criterion of the situation. The accompanying table shows the report for October and the first ten months of 1914, the latest report available at this time.

It will be noted that the gross tonnage for the ten-month period shows a loss of nearly 12 million tons for 1914, as compared with 1913. This falling off may seem unimportant as compared with the gross tonnage involved, but it should be remembered that in periods of normal progress there is an average increase of ten per cent. per annum in the tonnage; an actual falling off below the previous records is, therefore, a matter of some concern. During only one month did the 1914 tonnage exceed that of last year; this was in March and was due entirely to anticipation of a more or less protracted suspension pending the arranging of a new wage scale, the consumers pushing rather aggressively for deliveries.

Bituminous Coal Movement—The following is a summary of the movement of coal and coke over 13 principal railroads during October and the first ten months of the last two years, in short tons:

	October		10 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	166,214	127,374	1,226,938	1,118,554
Chesapeake & Ohio[1]	1,645	1,274	14,639	14,437
Erie[2]	794,528	866,730	7,283,826	7,790,188
Pennsylvania[1] [3]	1,046,703	1,055,344	8,711,723	9,205,279
Virginian[2] [1]	. 50	25	909	342
Total 5 roads	2,009,140	2,050,747	17,238,035	18,128,800
Bituminous				
Baltimore & Ohio[1]	3,401,618	2,802,702	30,652,147	27,733,854
Buffalo, Roch. & P.[1] [2]	985,223	688,013	8,037,988	6,735,808
Buffalo & Susq.[1] [2]	168,148	103,697	1,507,341	971,348
Chesapeake & Ohio[1]	1,570,072	2,026,604	14,188,105	17,606,945
Erie[3]	13,298	9,330	319,764	67,899
Hunt. & Br'd T. Mt.[1] [2]	127,898	87,386	1,135,294	859,088
New York Central[3]	889,153	708,974	7,658,720	6,689,919
Norfolk & Western[1] [2]	2,094,949	1,997,839	20,029,848	21,977,946
Pennsylvania[1] [3]	4,887,840	4,233,393	42,662,163	40,346,167
Pitts. & Lake Erie[1] [2]	1,144,112	866,057	10,812,407	9,439,842
Pitts. Shaw. & North[1] [2]	270,174	197,958	2,307,343	1,904,490
Virginian[1] [2]	476,482	341,703	3,768,423	3,396,796
Western Maryland	284,108	255,848	2,827,071	2,559,229
Total 13 roads	16,313,075	14,319,504	145,906,614	140,289,331
Coke				
Baltimore & Ohio[1]	388,337	208,866	3,997,411	2,784,321
Buffalo, Roch. & P[1] [2]	32,059	28,920	445,162	239,190
Buffalo & Susq.[1] [2]	30,965	52,437	255,503	349,673
Chesapeake & Ohio[1]	33,035	8,713	299,921	276,121
New York Central[3]	....	....	36,207	....
Norfolk & Western[1] [2]	114,312	63,625	1,295,272	871,068
Pennsylvania[1] [3]	1,152,950	720,070	12,012,363	8,324,007
Pitts. & Lake Erie[1] [2]	567,661	346,818	5,750,552	4,260,652
Pitts. Shaw. & North[1] [2]	....	....	9,383	....
Western Maryland	4,891	2,796	64,114	54,485
Total 10 roads	2,324,210	1,432,245	24,165,888	17,159,517

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
August	19,757,104	18,740,453
September	19,080,318	18,601,926
October	20,646,425	17,802,496
Total, 10 months	187,310,537	175,577,648

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 349,160 short tons of bituminous coal during September, 1914, and 2,965,474 short tons during the nine months ending Sept. 30, 1914.

The Pennsylvania R.R.—The Pennsylvania R.R., with its gross tonnage of 70 million tons of soft coal per annum, was a full 6 million tons behind the movement of last year at the end of the first eleven months.

The Sault Ste. Marie Canal—The coal tonnage through the Sault Ste. Marie Canal fell off 4 million tons, or more than 20 per cent. below the movement last year. This was due to the light demand during the winter of 1913-14, which left heavy stocks at the Upper Lake ports.

ANTHRACITE

The salient feature of the anthracite trade in 1914 was the obviously heavy stocks available at all times throughout practically the whole year. All the enormous storage facilities of the large companies, as well as the yards of the smaller individuals were taxed to their utmost to carry the large surpluses, and at no time was there a general shortage on all sizes.

This rather unusual condition was due for the most part to the unusually mild winter of 1913-14, and consequent light consumption which resulted in large stocks being carried over after the April discount went into effect. Even in the early months of the year, which are commonly regarded as the best of the season for the anthracite trade, an intermittent curtailment of mining operation became necessary, and by the middle of February individual operators had cut the regular circular down to the Apr. 1 basis.

By mid-summer the most rigid curtailment became necessary. The stringency in the money market and the difficulty in obtaining ready cash caused a heavy reduction in the usual summer stocking of domestic coal, consumers preferring to pay the higher winter prices rather than reduce their bank balances under the unfavorable conditions that existed. The depression in industrial circles had a blighting effect on the steam sizes, and the situation on these grades became almost as badly demoralized as bituminous coal. Even the early fall months, which are usually a period of great activity in anthracite circles, failed to show much improvement, and it was not until well into December, after several weeks of unusually severe weather, that the market toned up to any appreciable extent.

Evidence of the exceedingly adverse conditions prevailing in all directions is apparent when one remembers that at scarcely any time during the year were the individuals able to exact their customary premiums from the consumers. Nearly every coal season is marked by certain periods during which substantial advances over the regular circular are obtainable; but this year it is doubtful if many of the individual operators will average up to the full circular on the year's business.

There were no important changes in the gradation or marketing of any of the anthracite sizes. Stove coal during parts of the year was in urgent demand, which fact not infrequently assisted the operator to move the other sizes. It was commonly thought in trade circles that the price might be advantageously increased on this size, and thus divert a portion of the demand to other grades.

WEST VIRGINIA COALS

The opening price on Pocahontas and New River coals at Hampton Roads was $2.85 f.o.b., although $2.75 more nearly represented the actual market. The evident determination on the part of certain agencies to regain lost tonnage was a potent factor in weakening prices and this was further accentuated by the fact that the Hampton Roads yards were congested with heavy excess tonnages throughout the entire period. There has seldom ever been such a complete absence of spot business while contractors were generally forced to protect the consumers against a decline. The market was obviously distressed to absorb even the curtailed production then in effect and what few orders for prompt shipment did come in were always filled with the greatest dispatch.

When the large consumers began to make heavy cuts on their contracts, the operators failed to meet this with a like restriction in production and the market became so glutted with coal that no further pretense of maintaining the $2.85 basis was made. Finally, when $2.50 became readily obtainable and buyers failed to respond even at this low figure, severe restrictive measures were forced upon the operators; this, together with the prospects of a lucrative export business, which appeared early in August, caused a temporary stimulation.

The situation was indeterminate for a short period and prices stiffened up, but when nothing tangible developed in the export trade there was another relapse to the $2.50 level on which still further cuts would have been made only that sales agents were convinced of the futility of any such move. The general softness of the market toward the year end, as evidenced by the closing of a large power-house contract on a $2.70 basis, shows a distinctly adverse outlook for the new year.

The desperate plight of the Pocahontas and New River shippers forced them to guarantee low water rates to the New England trade by which they were, for a time, able to supplement a considerable amount of the higher grade Georges Creek tonnage, and though the latter soon met these new delivered prices and regained a portion of this business, the West Virginia coal still retained a substantial part of it.

The Georges Creek coals, as usual, were very closely held and seldom loaded except on firm orders. The anticipated boom in export business created more or less of an acute situation on these coals for a short time, the operators in that district having been long interested in building up a foreign trade.

A striking effect of the European war was the abrupt cessation of operations on the part of the Berwind-White Co. This concern being one of the most favorably situated coal producers in the country, as regards the marketing of its product, has scarcely ever been compelled to seriously restrict operations even in the face of the most severe depression, but with German shipping driven off the seas, the first month of the war found this company working at less than half capacity.

It should be remembered that the Berwind-White Co. is practically in control of all the bunkering business in New York Harbor, and is said to be closely affiliated with the German lines particularly; in fact, there were well defined rumors current that considerable of this company's coal found its way into the German cruisers in Southern waters. The most significant feature of interest in this connection, however, is the fact that a disposal for this large surplus tonnage must be found, and the New York agencies are anticipating an aggressive competition on new business from this company.

NEW YORK

In the Eastern bituminous market the opening of the year found operators generally reluctant to quote on the new contracts, partially because of the expectations of a general revival in business, but more particularly because it was thought there would be a heavy stocking movement in anticipation of a prolonged suspension when the wage agreement expired Apr. 1. But when this time arrived the miners apparently realized the hopelessness of their position, with the result that agreements were quickly effected in most districts shipping the Eastern market.

In the meantime some stocking had been done through March, which was the only month in which there was any activity of any kind. This left the consumers with large surpluses on hand, so that the market was poorly equipped to withstand the succession of adverse conditions, both legislative and commercial, which developed during the first half of the year. It was well into July before the situation showed any indication of clearing up, and this was, of course, immediately reversed with the declaration of war in Europe.

Heavy restrictions in general manufacturing went rapidly into effect, the results of which became more and more apparent in the coal industry. The only ameliorating condition in the whole situation at this time was a spurt of activity in the export business, although this was more in shape of irregular trade and failed utterly to relieve the pressure on the general market; as a matter of fact the August exports from this country showed a severe slump of about 20 per cent. as compared with the same month last year.

There has seldom ever been a year so completely discouraging to the Eastern bituminous trade as 1914. The coal agencies were compelled to canvass aggressively for business throughout nearly the whole period and competition was at its keenest. But in spite of these adverse conditions, there is one significant and encouraging fact that will do much to cheer the operators as to the future, and that is the obviously determined efforts noted on all sides to obtain higher prices; tangible evidence of this move on any important scale was first noticed in 1913, and it was rigidly adhered to throughout the year just closed. Occasional tonnages on demurrage were, of course, sacrificed, particularly in late April and early May, when it became clear that no protracted suspension in mining would occur, but on regular business concessions on old figures were slight.

Among the features of purely local interest at New York was the severe decline in slack coal as compared with 1913, this being due especially to the curtailment of production at the steel plants and cement works. The high-grade volatile coals were in strong demand throughout the year, and at no time were subject to any heavy cut.

THE PENNSYLVANIA COALS

The superabundance of the West Virginia coals in the New England markets had an exceedingly adverse effect on the Pennsylvania grades in that direction. The higher grade qualities did fairly well but when the Hampton Roads shippers break below their standard $2.85 level, there is little hope for the medium- and low-grade Pennsylvania product. That the Pennsylvania operators are making a determined effort to overcome this difficulty is evident from the much greater care they are exercising in preparation of the coal and also by the increasing complaints regarding the impurities in the West Virginia product.

The second month of the year found such a large excess accumulation of the Pennsylvania varieties at Philadelphia and New York that certain of the transportation lines were forced to declare embargoes. A temporary stimulation occurred when this congestion had been relieved which was fairly well maintained due to the slight flurry preceding the expiration of the old wage agreement, but this was followed by a period of exceeding dullness and frequent reports of demurrage coal. Operators struck their minimum price early in the year and maintained it throughout the period and at no time was there any activity in the market with the possible exception of a fleeting spurt the first of August.

As would naturally be expected in the face of a market such as this, a certain amount of coal was sure to accumulate on demurrage, but it must be said that the Pennsylvania operators were eminently better off in this respect than the West Virginia companies who showed a pronounced disposition to force business on the slightest excuse. The market was not relieved in any way, throughout the year, constant pressure on the trade being the characteristic feature.

THE EXPORT TRADE

American operators anticipated such unlimited possibilities in the export trade when the European war was precipitated that they even went so far as to be conservative about future commitments, in spite of the fact that they were facing one of the most depressed markets in the history of the trade. Prices stiffened up perceptibly, and there were well defined rumors of moderate premiums offered in the offshore trade.

Indeed, a substantial increase might have been experienced in the export business, had it not been that all German and Austrian shipping was abruptly interned, while the English government was reported to have chartered 1500 steamers, with the result that there was a runaway market in ocean freights, the situation finally culminating with rates entirely prohibitive for coal shipping. The difficulty in making proper financial arrangements also accentuated the trouble, South American merchants demanding credit extending over two to four months, and frequently asking renewals at the end of that period.

The Georges Creek shippers, who have always shown a keen interest in the offshore business, entered aggressively into the market, giving preference to foreign loading over their regular coastwise trade. For a few weeks their routine business even suffered, and it was necessary to divert some bottoms to Hampton Roads for loading, but this did not prevail for long.

The early prospects for American operators in the foreign markets were distinctly better during the past year than ever before, several large tonnages having been contracted for in Italy, while the South American trade continued to show a steady increase. The temporary embargo against coal shipments from Great Britain when war was declared diverted a large number of inquiries to America, but the high freight rates and long-term credits caused this business to be regarded with disfavor in most instances, so that there was little closed. After the embargo was raised, this narrowed the market for the American product, and the situation was still less favorable. When the unprecedented advance in vessel rates occurred toward the close of the year, this developed such a tense situation that schooners, which ordinarily operate in the Coastwise trade only, entered into the export business.

One of the significant developments in this trade during the year was the completion of two of the largest coal piers in the world at Hampton Roads, which will add materially to our exporting capacity. It is also interesting to note that the Government has undertaken to facilitate this branch of our foreign business by directing the efforts of the Government's technical staffs to the assistance of American coal exporters.

Close observers believe that the American companies will gain a strong foothold in the foreign markets before Great Britain is again in a position to properly care for her interests in this direction. It is also thought that even when the war has ceased it is more than possible that England will never again dominate the world's coal markets as she has in the past, but will more likely endeavor to conserve her already depleted reserves.

The opening of the Panama Canal was another important development of the year but it has been in operation over too short a period to draw any conclusions on the ultimate results. There have, nevertheless, been a number of significant changes in this direction.

On the whole, the year has been a most important one for American coal exporters for the reason that it has taught them much regarding the foreign markets, the competitive coals and the methods under which they will be expected to do business. When war was first declared there was a rush of American sales agents to the Southern markets in unprecedented numbers, and, although their reports on the situation were more or less uniformly discouraging, they have gained a knowledge and insight into existing conditions which will be invaluable in the years to come. It is clear to all that American exporters could have materially increased their tonnage had they been willing to meet certain conditions as to credits, etc.

Connellsville Coke

In the Connellsville coke region we find particular evidence of the acute depression. The output for the year was only 13 million tons, the smallest since 1904, with the single exception of 1908, the year immediately following the panic of 1907. Prices were also at a low ebb; in fact, they were so generally unprofitable that many of the properties acquired at the high figures prevailing on Connellsville coke lands, in late years, were compelled to suspend operations.

Consumers as a rule showed a disposition to buy in the spot market, and no doubt they were able to fill their requirements at figures substantially less than contracts were bringing. It is a notable fact, however, that quotations in the prompt market were at a somewhat higher level than in other years, though this is in a measure offset by the higher wage scales now in effect.

The Lake Markets

In sharp contrast with the year 1913, the past twelve months have undoubtedly been one of the worst periods in the history of the Pittsburgh district, both as regards prices and production. The Lake demand was altogether unsatisfactory, while the steel mills did not operate on an average of 60 per cent. during the year, and the railroad consumption was heavily curtailed. One of the chief causes for this condition lay in the settlement of the biannual wage scale; there is invariably a heavy stocking movement against the possibility of a long suspension, and the cleaning up of these surpluses often drags out over a long time, particularly when consumption is light as has been the case during this year.

The Lake trade opened quite inauspiciously, and the movement was consistently below previous records throughout the entire season in spite of the fact that shippers continued optimistic for a better business during the whole period.

The open winter of 1913-14 left heavy stocks on the Upper Lake ports so that the past season opened with prices 10 to 15c. below those for the previous year. In fact, supplies were so excessive that there was no anxiety whatever over the possibility of a long suspension in the central competitive district. About a half million tons of coal had been loaded on vessels during the winter, most of which was not required until late in the season as is evident by the fact that one cargo of Hocking coal, loaded during the winter, was not delivered until late in October. The movement to Lake Superior only touched the two million-ton mark one month during the season, although this was a common average during the previous year. The gross tonnage for the year was nearly a fourth less than in 1913 and conditions have seldom been worse. The heaviest loser was, of course, Ohio; computed on the basis of past performances, Ohio should have shipped 4¾ million tons, one-half of which would have come from the No. 8 field, which was closed down throughout the entire season.

There is no doubt that the mine-run law has seriously affected the value of the Ohio screenings; there is not only a larger percentage made, but they are of such inferior quality that consumers can seldom be prevailed upon to accept them when any others are available. Experienced and conservative sales agents estimate that Ohio screenings are now worth 85 to 90 per cent. what they previously brought under the old law

THE MISSISSIPPI VALLEY

The winter of 1913-14 was so exceptionally mild that the domestic business in the Middle West seemed to grow steadily worse through the opening months of the year, though a little spurt was evident immediately preceding the expiration of the old wage agreement when there seemed to be possibilities of a more or less protracted suspension of mining. The fact that the cessation was not of sufficient duration to clean up the accumulated surpluses proved a serious blow to the market. With the large supplies thus left over, and the disposition among consumers to refrain from doing their usual summer stocking for the ensuing winter, the market continued to drag heavily throughout the summer months. Though operators maintained an optimistic attitude during most of the year, it cannot be regarded as other than a most unsatisfactory period.

Anthracite shipments to this district have been substantially reduced, due probably to an extensive advertising campaign by the gas-house coke producers. The business this year was particularly poor, prices ruling most of the time substantially below the circular and the demand light.

The operators in the southern Illinois field found their market still further curtailed, due principally to the continually advancing wage scale. In fact, this section experienced a disappointment in all directions, as is evidenced by the fact that nine mines out of a total of 34 in the Williamson County field, were idle through practically the whole of the year. Another development which promises to create important complications in the Illinois district is coöperative mining. The move is proving a menace both to the legitimate operators and the miners' organization, and, unless some determined efforts are made to stamp it out, it may shortly become one of the serious problems of the local coal industry.

The year 1914 will long be remembered as one of severe stress and keen disappointments. But we enter the new period with a distinctly optimistic feeling in all quarters, much encouraged by the success that we have had in coping with the difficulties of the past 12 months.

Coal Receipts by Water at the Port of Boston

The accompanying tables show total coal receipts at Boston, furnished by courtesy of the Boston Chamber of Commerce. Anthracite shipments made a slight increase over last year, but the bituminous arrivals were substantially less. This is the first instance of a decrease in the soft-coal arrivals for a number of years.

RECEIPTS OF ANTHRACITE COAL BY SEA AT BOSTON

	From Philadelphia		From New York Ports		Totals	
	1913	1914	1913	1914	1913	1914
January....	53,845	43,375	103,685	54,797	157,530	98,172
February...	38,135	28,708	71,396	53,895	109,531	82,603
March.....	39,319	44,489	54,270	87,779	93,589	132,268
April.......	40,860	66,767	90,387	96,577	131,247	163,344
May.......	52,908	59,337	106,889	136,778	159,797	196,115
June.......	51,925	65,300	101,180	104,286	153,105	169,586
July.......	47,986	55,934	108,113	89,274	156,099	145,208
August.....	56,325	51,984	92,818	105,452	149,143	157,436
Septemb.	45,033	69,111	111,734	108,006	156,767	177,117
October....	42,789	59,130	71,785	87,326	114,574	146,456
November .	57,156	39,462	77,358	92,244	134,514	131,706
December..	55,902	41,201	114,513	77,827	160,415	119,028
Totals 1914		624,798		1,094,241		1,719,039
1913........		582,183		1,094,128		1,676,311
1912........		579,778		1,054,378		1,554,156
1911........		592,368		1,289,399		1,881,767

RECEIPTS OF BITUMINOUS COAL BY SEA AT BOSTON, SHOWING PORT OF SHIPMENT*

	Baltimore[1]		Norfolk[2]		Newport News		Philadelphia		New York		Totals		Foreign[3]	
	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914
January...........	88,653	90,891	168,131	202,986	50,171	57,776	33,702	29,873	....	....	340,657	381,526	37,391	27,100
February..........	77,186	100,143	221,436	193,630	78,265	43,938	15,161	49,636	....	....	392,048	387,347	25,200	14,200
March.............	94,407	92,463	227,697	224,945	81,359	70,966	22,433	35,945	1,094	....	426,990	424,319	26,445	21,367
April..............	95,767	107,870	232,210	232,458	88,530	53,397	16,255	24,400	....	1,625	432,762	419,750	27,500	27,500
May...............	105,849	112,518	195,931	247,494	77,750	86,237	33,950	34,427	800	1,470	414,280	482,146	13,300	50
June..............	112,934[1]	109,271	179,936	184,340	80,834	50,296	53,195	52,739	....	....	426,899	396,646	15,750	....
July...............	123,784[1]	108,285	160,515	215,926	56,445	31,957	62,506	27,352	....	....	403,250	383,520	21,876	13,976
August............	110,795[1]	86,665	222,974	240,366	57,646	46,420	74,903	63,621	....	....	466,318	437,072	15,750	14,000
September.........	71,577	99,755	242,290	254,920	57,571	50,751	59,458	46,515	....	....	430,896	451,941	13,300	14,129
October...........	86,444[1]	86,565	205,438	227,812	19,144	31,560	65,835	18,138	1,330	....	378,241	364,075	15,247	20,850
November..........	89,554	102,372	208,275	225,159	38,438	53,817	46,769	30,793	....	....	383,036	412,141	24,000	56,093
December..........	107,564	61,468	220,846	187,596	51,494	34,254	69,406	42,967	....	....	449,310	326,285	33,900	48,787
Totals 1914........	1,158,266		2,637,632		611,369		456,446		3,095		4,866,768		258,647	
1913........	1,164,514		2,485,679		737,647		553,573		3,274		4,944,687		269,659	
1912........	1,361,994		1,836,750		945,803		322,334		9,639		4,465,520		309,106	
1911........	1,576,397		1,218,391		921,220		381,961		3,776		4,101,745		263,861	
1910........	1,595,554		795,475		1,243,857		292,636		25,515		3,954,251		296,564	
1903........	481,111		314,505		596,439		595,824		93,940		2,081,819		1,226,134	

* Courtesy of the Boston Chamber of Commerce, Statistics Department.

[1] Includes small shipments from Washington and Georgetown, D. C. [2] Lamberts Point and Sewalls Point. [3] Almost exclusively from Louisburg, Cape Breton, except during 1903 when a large tonnage came from Great Britain to relieve shortage because of strike.

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British Honduras as a Coal Market

British Honduras offers a limited market for coal, says the *Daily Consular and Trade Reports.* The trade for the last four years has been about equally divided between England and the United States. The following table shows the value and origin of the imports:

	From United Kingdom		From United States	
Year	Tons	Value	Tons	Value
1910......................	772.5	$4,235	2,008	$8,960
1911......................	2,877.5	18,102	680	4,123
1912......................	2,272.0	12,244	1,400	10,122
1913......................	1,552.5	10,813	1,180	8,178

There is no duty on coal. The amount of coke imported is less than a ton a year.

It would appear that in view of the amount of coal from England there would be an opportunity for a further advance in the sale of the American product. The chief consumer of the Welsh coal is the Stann Creek Ry., a short line, Government owned, with its tidewater terminus at Stann Creek, the second largest town in the colony. It is directed by a superintendent whose headquarters are at Stann Creek.

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With a given fuel, there is a proper thickness of fire and a certain definite draft needed for every load on a boiler. These thicknesses and drafts should be determined experimentally and the requirements indicated should be closely followed.—Bromley in "Power."

Marketing and Shipping Conditions on the Atlantic Coast in 1914

By G. G. Wolkins

SYNOPSIS—The year just ended was peculiarly unsatisfactory for most of the bituminous interests. In Pocahontas and New River there was depression throughout, with poor industrial conditions and an over-production of coal the chief elements. Export trade was especially disappointing, failing when it was most needed. Georges Creek coals were uniform as to price and consistent as to output but the Pennsylvania grades suffered from the large output in West Virginia. Water freights reached the lowest level in years. Anthracite shipments increased and that trade enjoyed a generally satisfactory year.

The year 1914 fell far short of the satisfactory record that distinguished the preceding twelve months. It ended as it began, in a slow inactive market for all varieties, with over-production and low prices in bituminous consistently the chief factors all through the year, and relieved only by one or two short periods of "prospects"—periods that became in fact the despair of operators and selling agents. The slack industrial situation combined with other conditions to make 1914 a colorless and mediocre season in the coastwise coal trade.

Partial Pennsylvania Suspension

There are few features that stand out in a review of conditions during a year in which coal was so sluggish. The long-heralded suspension of mining in central Pennsylvania had actually very little effect on the tide-water market. So long as there was a pronounced surplus of Southern coals it mattered little to New England if every bituminous operation in Pennsylvania should shut down. Stocks were large, and a controversy over weighing and checkoff was not serious enough to cause apprehension in so dull a market. The "suspension" showed its less serious side when in many instances mine workers on good terms with their employers were accommodating enough to cut coal for such orders as seemed urgent and then resumed the "suspension." A large number of the mines affected would have closed down for most of the time anyway, purely through lack of business. Differences were gradually adjusted and no more was heard of labor troubles the rest of the year.

Possibility of an increase in tolls was an uncertain element, especially in the spring when contracts were being made, but the much postponed decision late in the year finally disposed of the matter. New England was interested because a percentage advance would have been adverse to all-rail delivery and distinctly in favor of water shipments from Baltimore, Hampton Roads and Philadelphia. The order affecting rates on anthracite to Philadelphia for use there had no effect on shipments to New England.

General Conditions

Speaking broadly, the Seaboard bituminous trade was throughout under severe depression—a situation it shared with most other industries. The market was slow and apathetic, regardless of season. In New England the trade has become more and more involved with the increased use of steam colliers. The larger consumers are receiving fuel almost exclusively in this way and with the advantage of regular movement it is possible we shall not again have the kind of winter market that could formerly be counted on, due as it was, in large part, to the slow movement of sailing vessels during the storm season. Facilities are now well adjusted to these modern methods and aside from its effect on fuel *consumption* the weather is not now the factor it used to be.

Soft spots in the market appeared prominently early in March and there followed a long period of extreme dullness. The mills had more water power than they could use, as it was the heaviest in years, and as a result even the contract demand was light. Late in April some extra requisitions from the Navy Department caused talk of better conditions but it was soon over and by July the season was commonly referred to as "the dullest on record." It was realized that only the most rigid curtailment could mend matters, and for the time this was enforced there was a steady improvement in the position of all grades.

The Collapse of the Export Bubble

But it was not allowed to last. The European war seemed to open a wide vista; American shippers saw a broad market before them and one that grew more and more extended as they dreamed. A few New England buyers became worried and tried to make extra purchases but their offers were refused and shippers began saving output two months ahead to send to the far corners of the earth.

For a few weeks there were some export orders, prices hardened at $2.85 Hampton Roads, and there were rumors of 10@15c. premium, but gradually there came a change. It appeared that German and Austrian ships were driven out of trade, that the English government was chartering all the tonnage it could lay hands on, in all 1500 steamers it was said; in other words, suitable carriers were scarce with rates high, and American shippers could not compete.

It appeared also that exchange was difficult to arrange; in South America merchants were requiring two, three and four months' credit, and then usually a renewal, a circumstance not at all attractive. The American shipper had always looked upon offshore business as quick-cash, and the results of some of the August transactions were disappointing. So the export trade sagged off, and with this prop removed from an otherwise weak market, late October saw the bituminous trade again in the doldrums and the outlook more discouraging than before.

The interesting thing was that throughout the 60 days or so of dalliance offshore, the New England market was not at all responsive. The local buyers who had been turned down by Baltimore or Hampton Roads shippers either stayed out of the market or bought small quantities from Pennsylvania, apparently very confident that Philadelphia and New York could meet all requirements if by any chance the Southern ports could not. It was a dull season and the consumer refused to be scared.

New Haven R.R. Fuel Purchase

Notwithstanding the great pressure to sell output from all the American fields, the New Haven R.R. in October placed an order for 200,000 tons or so of its Boston requirements with interests that ship provincial coal from Cape Breton. It was later followed by another order for 75,000 tons from the Boston & Maine R.R., an aggregate of 275,000 tons that for years has come from either West Virginia or Pennsylvania. The use of English colliers has made the deal all the more criticized and it will be some time before the local agencies feel right about this remarkable transaction.

The Close of the Year

Late in the year, there were a few small signs of improvement. Scattering plants, mostly special lines of textiles and shoe factories, were running to capacity on foreign orders, and it was predicted that other industries would gradually fall into line. The process will be gradual, however, and New England buyers are likely to be even more conservative this year than last; they have observed the course of prices in 1914 and unless the unforeseen occurs, the spring of 1915 will probably be a slow season for placing yearly contracts.

In general, 1914 held up to the coal trade some rather plain truths. The operators were especially impressed with the fact that their output and profits depend on the general prosperity of the country, and that only by keeping in intelligent touch with market conditions and regulating their output accordingly can they secure a reasonable net return on their product.

Pocahontas and New River

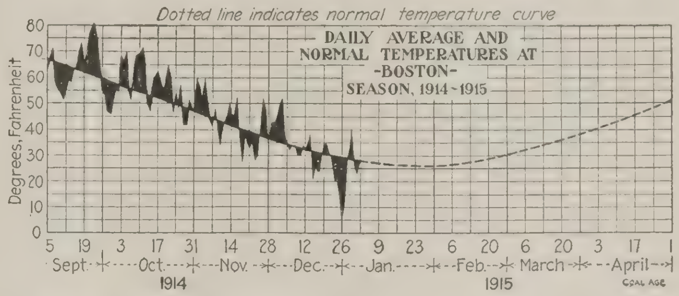
The Hampton Roads piers were glutted with coal practically the whole 12 months. It was nothing unusual to see 600,000 to 800,000 tons standing on cars at the three terminals. With that as a preliminary it is not surprising that, except for brief intervals, Pocahontas and New River were weak in price throughout the year; $2.85 f.o.b. ($1.45 at the mine) was early announced as the season contract basis but the fact that through February and March spot sales were made at 5@10c. less did not inspire much confidence among buyers.

So the season dribbled along, contracts being closed very slowly and in most cases at certain alongside or on car arrangements that did not disclose the base price, although it was understood that $2.75 was not far from the actual figure. A clause protecting against a decline in the market was freely given; in fact this was the only form of contract buyers would consider. There was also an evident determination on the part of some shippers to regain tonnage lost in 1913 and still under the cloak of minimum water-freight guarantees most of the remaining contracts were gathered in. The spot market was extremely sluggish and as early as March it was observed there had not been a slower or duller period for West Virginia coals since the summer of 1912.

For a time it seemed the operators were agreed that nothing could be gained by forcing supplies on a reluctant market. Contract demand slackened materially during April; most shippers, committed on marine transportation, were obliged to load vessels as they arrived, and never was there a season when cargoes were handled so quickly or the boats themselves made such uniformly fast trips. The market absorbed the coal with increasing slowness and it became apparent prices would give way. Concessions at distributing points like Boston and Providence had a serious side when considered in connection with contract business on which shippers were most anxious to see the season basis maintained. Had it not been for these early contracts the spot market would probably have been forced so low that shipments "on the market" would have been discouraged.

Again, large consumers were holding shippers down to minimum deliveries, and various Pocahontas and New River operators apparently concluded to keep mines running, regardless of the prices that could be had; $3.30 and less was the figure at Boston in May, some 50@60c. less than contracts had been closed at, and there was no longer any pretense of netting $2.85 at Hampton Roads. Even a general curtailment of three days a week in Pocahontas failed of results and delivered prices were frankly based on $2.50@2.65 on the few sales that were made.

In brief, the New England Tidewater market in June and July was as near demoralization as at any time since 1909. A three- to five-week wait on large vessels for disposition orders was not unusual; buyers grew so callous to low prices that they ceased to respond, and it was soon plain that any ordinary "cut" was as ineffectual as none at all. On-cars Portland, "distress" Hampton Roads coal sold at $3 in July. The most drastic restriction clearly was the only hope and by Aug. 1 most of the operating interests got into line on such a plan.



The attractive export market loomed up at this juncture and all were most keen for a share of it. In a few weeks $2.85 was once more reasonably firm and on-car prices in New England stiffened, although this was only because the surplus supply was shut off. The export business, however, falling far short of expectations, let the West Virginia coals in for a decided relapse late in September.

All outlets proving spotty and unreliable, the situation was desperate enough. Had it not been for the well grounded conviction on the part of selling agents that even a radical "cut" would accomplish nothing, $2.85 would have been more severely slashed than it was. Had there been any spot demand of any consequence there would surely have been a scramble to see who would go lowest but as it was, quotations as low as $2.50 were general.

A few fall contracts were held in abeyance because of the softness of the market. There was apparent, in November, a further lack of coöperation among operators; some were restricting output consistent with market conditions, but others were not, and the cost must have been serious to the latter. New England is so widely tied up on yearly contracts that sales in the fall were most infrequent, especially on Pocahontas and New River, and in December, buyers not being interested at any price, the year closed with $2.50@2.75 f.o.b. the nominal range, the figure depending on the degree of distress in which shippers found themselves. The closing of a large powerhouse contract for an 18-month period, at a price understood to net $2.70 f.o.b. was a further indication that 1915 prices would open under a severe handicap.

The lack of a consistent policy among the Pocahontas and New River interests and the too frequent recourse to "market cargoes" were the leading features of the trade in 1914.

Georges Creek Coals

On the other hand, shippers of Georges Creek were able to follow their usual even course with regard to output and prices. When the demand became slack, the output was curtailed, and when a broad market seemed in prospect in August the operators had the coal on hand in enough volume to give the prompt service desired.

Georges Creek is popular with many buyers in this territory and while its following is relatively small, as compared with the users of Pocahontas and New River, it can always command the top of the market and when other shippers are short of orders the Georges Creek factors are usually well supplied. It is, therefore, a simpler matter to adhere to a price program and particularly so when a very large proportion of what comes to New England is in steamers and barges controlled by Georges Creek operators. There is not often the need to sacrifice this coal at the loading piers.

The year opened with Georges Creek firm with regard to price but facing extremely light inquiry, both spot and on contract. A more or less drastic restriction was in force through January and February, relieving the shippers of any pressure to shade prices. Early in March they had closed about their usual contract tonnage on the same basis as the year before, namely, $2.85@2.95 f.o.b. Baltimore. A certain amount of business had been lost on the low water-freights the Pocahontas and New River people were, in some instances, willing to guarantee, but the Georges Creek shippers came quickly into line on delivered prices and regained, during March and April, most of the tonnage the Southern agencies had hoped to take away. At the same time, in some directions, West Virginia coals made serious inroads on Georges Creek, and the aggregate for the year was considerable.

In June there was again a period of lively competition with Pocahontas and New River on delivered prices, but it soon subsided and the balance of the summer quotations were steady and firm in spite of an extremely dull market. The shippers were all the while in position to name figures alongside Boston that would defy analysis but they preferred to shorten production and hold the market so far as they were able. During July Georges Creek was put on wheels only on firm orders; there was no spot market, and therefore no accumulation at any of the loading ports. So far was this carried that when spot business did develop, principally for export, in August, foreign steamers were given loading preference, while coastwise bottoms were obliged to wait.

Georges Creek shippers have long been much interested offshore and for a few weeks in August and September they had had so much more business than they could handle comfortably that there was anxiety here among consumers who depended on this grade for their supply. In several cases bottoms intended to load Georges Creek were diverted to Hampton Roads, but in October all this ceased and the coal was again coming forward in normal amounts. Arrears were soon made up, and except for short intervals when weather prevented, Georges Creek was in good supply the balance of the year, with enough orders to insure a steady flow of coal to Tidewater.

F.o.b. Philadelphia the season price was $2.92@3.02, and $3.22@3.32 f.o.b. New York, the same as the year 1913-1914. All-rail trade on Georges Creek was normal and even throughout the season, $1.67@1.77 f.o.b. mines being the range of prices.

The Pennsylvania Grades

The superabundance of Southern coals the year through had a blighting effect on bituminous from Pennsylvania. Prices were low and the market much restricted, so that neither in tonnage nor in returns at the mine could the year compare with 1913. The quality grades had about the usual patronage; in that respect they compared favorably with Georges Creek, but the medium-priced coals went through a very unsatisfactory season.

So long as Hampton Roads shippers hold firmly to a basis of $2.85, there is a good market for Clearfields and Cambrias that ordinarily range from $1.15@1.50 at the mine, but otherwise the outlet is narrow. There is increasing complaint, however, that the West Virginia coals are not as free from impurities as formerly and that is an element that will probably be more emphasized as time goes on. Many of the central Pennsylvania operators are taking the greatest pains with uptodate equipment to clean coal properly and if this can be done systematically there is no doubt of an increasing representation in this market.

As a case in point, the Navy Department in 1914 awarded more than one contract to Philadelphia and New York shippers in direct competition with the best of Pocahontas and New River, and after exhaustive trials. The year further established the fact that the largest of the naval colliers can safely load at the Philadelphia coal piers, thus demolishing a time-honored argument for Hampton Roads and Baltimore loading.

The market record last year on the Pennsylvania grades seems too dreary to go much into detail. In February accumulations were so large at Philadelphia and New York piers that an embargo was in force on certain of the railroads. When that congestion had been relieved, labor differences served to curtail output during April and May, to quite an extent, and quotations were a trifle firmer than early in the year. The higher grades from Somerset and Cambria Counties were up to $1.60@1.70, the less favorably known Clearfields 95c.@$1.15, and the better varieties $1.20@1.40. Trade was dull, however, in every direction, and only by holding shipments well down to actual requisitions could the operator make anything like a showing. When demurrage accrued the operating margin quickly vanished. The poorer grades from Clearfield fell off to 80@85c., or 10@15c. lower than in 1913.

The much diminished transatlantic traffic from New York was a heavy blow to the bunkering trade and indirectly to all the districts in Pennsylvania. This was further accentuated when, late in the fall there were quantities of coal offering in New York Harbor that had been *taken out* of ocean liners.

Throughout the twelve months, "distress" coal was offered both at New York and at Philadelphia and there was hardly a week when there was any life to the market. For a short time in August a few comprehensive orders were placed with Pennsylvania shippers, orders that the Southern agencies had declined, but the demand was momentary and had no general effect on the depressed situation.

From September to the end of December there were only small fluctuations in price; operators had set their minimum back in the spring, and further reductions were only made when they had coal on hand they were under compulsion to move. At no time, however, was the proportion of coal on wheels anything like as large as in the Virginia. By and large the Pennsylvania interests seem to have shown good sense through a very trying year. In the fall, many of the mines were on a two-day-per-week basis.

The all-rail business shared the disadvantages of the market at tide. At times it was fully as stagnant and as a whole has been unrelieved by any favorable features. The low prices at New England Tidewater distributing plants had a natural tendency to limit the rail market, and a constant pressure to sell coal was the characteristic feature.

WATER FREIGHTS

As usual, coastwise freights in 1914 kept step with the coal market. Rates were uniformly low. There was no such level as the 95c.@$1 rate that prevailed early in 1913; in fact, it would probably be difficult to find an instance where more than 80c. was paid a sailing vessel or barge, 2500 tons and upward, Hampton Roads to Boston, at any time in the calendar year. On the other hand, during June and July large vessels could be had for single trips at 55c., and steamers were let at 50c., the lowest rate per ton in twenty years. There was a surplus of steam, sail, and barge tonnage at all times and only when storms worked havoc or delayed movement was there any change; 65@70c. was the highest range that obtained for any period longer than a week.

A chart of rates would not be so significant or comprehensive as in years back. The volume of coal carried to Boston in sailing vessels has steadily decreased and that carried in steamers has steadily increased. Coal steamers almost exclusively are on Government form calling for a *per diem* charge rather than a rate per ton and it would therefore be very difficult to make a comparison. Then again, most sailing vessels in the trade are now taken on season charters at a reasonable rate through several months if not the entire year, and this, of course, tends to make rates steadier.

Several steam colliers built for the coastwise trade not only took cargoes to the Pacific coast *via* the Canal but went during the fall with grain, cotton, and other supplies across the Atlantic, availing themselves of the high rates. Sailing vessels also took freights through the Canal and to South America, but many of the coal schooners lay idle for months. Owners suffered heavy losses in 1914; in one gale alone, in January, more than $1,000,000 in vessel property was lost along the coast.

The Reading barge rate on bituminous was reduced Mar. 1 from 90c. to 80c., Philadelphia to Boston, and was further reduced in July to 75c., at which point it remained the rest of the year. Through the spring, summer and fall 40@45c. was the market rate for New York loading to points south of Cape Cod, but this was advanced to a minimum of 50@55c. in November when thick weather affected the supply of barges. 50@55c. continued the rate on anthracite coal carrying railroad transportation from New York to Boston, and 75c. from Philadelphia, the same as for several years.

CAPE COD CANAL

The Cape Cod Canal was formally opened July 29 and has been more or less in use since that time. So far it can admit vessels only up to 15-ft. draft, and it is perhaps too early to measure its usefulness. It is supposed to make a saving of 70 miles in the passage to Boston in addition to avoiding the treacherous shoals in rounding Cape Cod. At current water rates there is an impression that 7c. per cargo-ton is more than transportation owners can afford to pay.

ANTHRACITE

The hard-coal trade in general afforded a pleasing contrast to the situation in bituminous. While early in January the demand was listless, due to the mild weather, lower temperatures began to prevail and lasted well into March. Orders were plentiful in consequence and not in years was there so little coal in consumers' cellars as in the spring of 1914. April business, therefore, was excellent and all the companies that regularly ship to this market had a most satisfactory trade through to July 15. Receipts of anthracite the first six months at the Port of Boston were more than 50,000 tons in excess of the corresponding period of 1913 and that is an indication of the increase all over New England.

Directly business sagged off in July the mining interests cut down production, so the rest of the year there was mined only slightly in excess of what the market readily absorbed.

Stove coal was in short supply the whole of the first half-year, and into the fall the shippers were obliged to restrict orders to not more than a third in a cargo. The demand for this size has so much increased here, to the exclusion of egg size, that dealers were anxious over the prospect for fall and winter. They, of course, used every effort the first of the season to get stove shipped and accepted as little of the egg and chesnut as possible, and one result was that in the dullness through November and December, stove was as easy to get as any other size. An advance of 25c. on stove at wholesale was rumored in March as an effort to shift demand to other sizes but nothing came of it. Broken size was also in short supply in the spring but was rapidly corrected as the season advanced.

There has been some mild agitation here in favor of what used to be known here as "No. 4 Stove," a size between the present stove and chestnut. One of the objections urged is that the demand would be so great there would be even more difficulty supplying it than has been the case with ordinary stove, well mixed with small egg.

Wholesale prices on anthracite, delivered alongside Boston, remained substantially the same as established in 1912, namely, $5.25 as the net circular per ton 2240 lb. The only change involved the Pennsylvania state tax first assessed in July, 1913. Some shippers added a flat 10c. to the price and others charged the exact amount laid upon them.

Boston retail prices were advanced in July and again in August, 25c. in each case, as against three similar advances in 1913. Egg size, however, was brought to the level of stove, so that $7.75 was the price of egg and stove and $8 the price of chestnut the end of December.

The New York Markets in 1914

Bituminous

By J. W. Searles*

SYNOPSIS—The market was generally adverse throughout nearly all of the year. Prices were weak though maintained at fairly good figures.

The New York market for bituminous coal during the year 1914 was influenced by the conditions which obtained generally in the Eastern States. In the fall of 1913 there was a decided improvement in business and prices hardened immediately as a result of the increased demand. Consumers who inquired for figures on coal to be delivered during the winter months found the operators reluctant to quote, as they had every reason to believe that the coal trade would share in the general revival of business. They also expected consumers to accumulate large stocks in anticipation of a probable suspension of operations at the mines on Apr. 1, when the wage scale expired.

Unfortunately, the improvement in general business did not continue, and though January shipments of coal were in fair volume, there was a considerable falling off in demand during the following month. Consumers took coal rather freely in March, in aticipation of trouble at the mines, and this prevented the establishment of a new winter record for dullness. While the miners had asked for a considerable increase in wages, when the time for negotiations arrived they found it impossible to sustain their position, and their early acceptance of the old wage scale stifled the hope that stocks might be materially reduced before work was resumed.

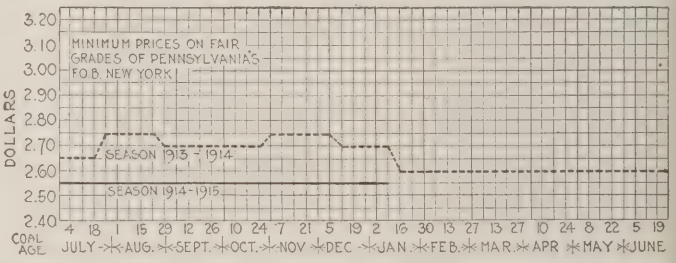
The long-deferred action of the Interstate Commerce Commission on the question of railroad freight rates was partly responsible for the general stagnation, which became more apparent as the summer approached, and the coal trade suffered in common with all other branches of business. Coal did not begin to move freely until July; in fact, the better tone of the market was only becoming apparent when the breaking out of the war in Europe sent a chill over the business of the whole country. The curtailment of Trans-Atlantic sailings almost immediately affected the bunker trade of the Seaboard and particularly that of New York Harbor. To a certain extent, this was offset by the heavier demand from semifreight lines and tramp steamers carrying goods to foreign ports.

The whole Eastern market was, however, favorably affected by the increase in coal exports to Europe and South America. While most of this coal moved from the James River ports, and the balance from Baltimore and Philadelphia, the absorption of a portion of the surplus from the Eastern fields strengthened the general market, and the prices for Southern coals in New England.

Late in the fall the demand from abroad for our cereals and manufactured articles increased as did also the consumption of coal by the railroads moving this freight for export. The seasonable weather in December was also a favorable factor.

There have been but few years when there were more discouraging conditions in the bituminous trade than in 1914, and the firmness with which prices held during this trying period speaks well for the trade in general, indicating a determination to curtail operations rather than force coal on the market at unprofitable figures. Of course, there were offerings of demurrage coal from time to time, and some low prices were recorded, but most of these were for fuel which had been shipped to tidewater in March and April in anticipation of a prolonged period of inactivity at the mines supplying the New York market. Throughout the year there was a fairly good demand for high-grade low-volatile coals, and it may be said that practically none of these was sacrificed. The high-volatile coals, including those from the gas regions, were in much less demand than formerly, due to the conditions in the iron and steel trade and such other industries as require fuels of this character.

Probably no industry is of more importance to the bituminous coal trade of the United States than that of steel production. Quite a large portion of the coal mined in Pennsylvania and West Virginia is manufactured into coke, and the inability of the iron and steel manufacturers to take their usual supplies had a marked effect on the soft-coal market. While many of the mines producing coking coal suspend operations when there is a decline in the demand for coke, this is not true in all cases.



Some Market Changes

One of the most striking features of the year was the change in the market for gas slack. In 1913 this commodity brought high figures, and during the greater portion of the year was in such demand that it was almost impossible to purchase "spot" supplies, practically all the tonnage being under contract at prices satisfactory to the operators. This year many contracts were written on a lower basis, and during the greater part of the time it was almost impossible to move slack at any figure. The situation was directly traceable to the curtailment in the production of the steel plants and cement works.

Each year shows an increase in the use of bituminous coal in and around New York, and this is one of the most encouraging features of the trade. The general falling off in the quantity of anthracite steam sizes, available for shipment to the New York market, is forcing some of the larger consumers and many of the smaller ones to increase the proportions of bituminous coal, or to use it exclusively. As many of the hotels, office buildings, etc., are equipped for the burning of anthracite coal, the point has been reached where it is necessary for the anthracite producers to conserve a considerable quantity of their steam sizes for this class of trade, the demands of which are increasing. The larger consumer must continue to displace anthracite with bituminous coal.

While the foreign demand for American coal is helpful and the efforts of our shippers to enter the export field are most commendable, the home markets are those in which the bituminous coal producers must sell all but a fraction of their tonnage. Nothing but a revival of business in the East will put the industry on anything like a capacity basis. It is too early to predict to what extent general trade will be benefited by the recent advance in freight rates, but one result will no doubt be the releasing of some of the orders for needed materials which the railroads have long deferred placing.

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It is not necessary to refer to the many factors which enter into the full situation. Of course, the most important is the trend of affairs in Europe. The bituminous-coal industry is surely on a much better foundation than it was a few years ago, notwithstanding recent failures, practically all of which serve to emphasize the fact that all business, to be worth while, must be conducted at a profit.

* * *

Anthracite

By G. W. Seiler*

SYNOPSIS—There was a fairly good year in anthracite though not what might have been expected. The industrial situation caused a marked restriction in buying on the steam grades and the domestic sizes were heavy during much of the year.

Though production has not increased during the past year, it has at least equaled the previous year's record, and this, notwithstanding the general business depression that swept the country during the last six months. The bituminous trade has passed through one of the worst periods in its history, due to the curtailment among large industries and the shutting off of bunker and export trade through the European war, but with anthracite the demand has not abated except in the steam sizes and that only in the lower grades. Even this might be explained by the fact that the better-grade steam sizes are in popular demand in large cities, where the use of soft coal is prohibited, while the lower grades are more dependent upon the manufacturing trade.

During January, February and March, particularly in February, there was a shortage of steam sizes in all grades, due to the extreme cold weather and the meager stocks of the large companies. The middlemen profited by this shortage as premium prices were obtained. Prepared sizes during that period were also in good demand, particularly at line points. By the middle of March conditions rapidly changed and Tidewater prices among the individuals fell off to the April circular.

The usual opening spring prices were announced on Apr. 1, and instead of charging the Pennsylvania state tax of 2½ per cent., most of the companies issued a straight circular on prepared and pea sizes, which included this tax. This made the circular price for upper port coal as follows:

Broken	$4.60	Pea	3.55
Egg	4.85	Buckwheat	2.80
Stove	4.85	Rice	2.30
Nut	5.10	Barley	1.80

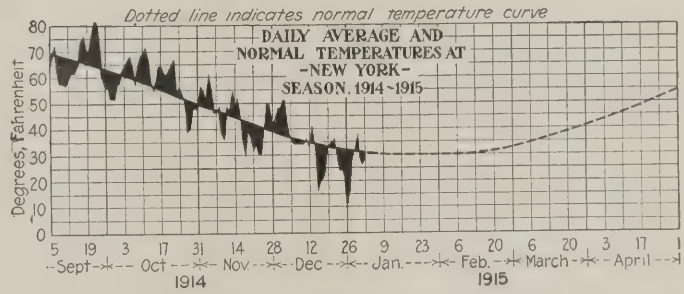
The regular increase of 10c. per ton each month on the prepared sizes became effective May 1, so that by Sept. 1 the full winter circular of 50c. per ton higher prevailed.

The Heavy Demand for Stove Coal

The spring demand for coal was about normal and continued so until July, at which time egg and nut fell off, while stove continued in strong demand during the remaining summer months and was the best seller during the fall. But at the close of the year stove weakened and sold by the individuals at ten to fifteen cents off.

This large demand for stove is due to the fact that it is 25c. cheaper than chestnut, which, in itself, has obligated the dealer to push the sale of stove in preference to nut. Though it was rumored that the large companies were considering making the price on both sizes alike, nothing developed on these lines. Equalizing the prices on these sizes would doubtless revive the old popularity of nut coal and furthermore it would necessitate increasing the price on nut the same amount.

Egg coal continued to be the stumbling block with the individuals during most of the year, selling at 25 to 50c. off circular, according to the conditions existing; throughout the entire fall there was no difficulty in securing this size from the individual operators at 50c. off. However, most of this low-price egg was the Lehigh grade, the free burning and Wyoming qualities bringing better prices. The large companies, due to their stocking facilities and trade connections, easily avoided the predicament the individuals were confronted with to move this long size and avoid heavy demurrage charges.



The Outlook for 1915

The anthracite trade can congratulate themselves on having passed through the year of 1914, a period of many perplexities, with better success than their bituminous friends. Only recently, Commissioner Rice, of the Coal Merchants' Association, stated, that from statistics then at hand, local retail conditions during the year were the best for a long time. With the exception of February and March, the retailer at no time experienced any difficulty in securing his supply of coal, while prices were unusually well maintained and collections very satisfactory, due to the splendid system adopted by the Coal Merchants' Association.

The coal trade is very optimistic as to what the new year of 1915 will develop. The recent 5 per cent. increase in freights may possibly help to better conditions throughout the country, and while a feeling of uncertainty prevails as to what effect the continuance of the European war will have on the business conditions in this country, nevertheless the year 1915 cannot be much worse than its predecessor. The possibility of a busy fall and winter ought to be in store for us, considering that the anthracite wage agreement of 1912 expires Apr. 1, 1916, and a repetition of the winter of 1911 may again develop at the close of 1915.

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Philadelphia Coal Market in 1914

SYNOPSIS—In the anthracite market nothing sold well but stove, and the demand for it compelled the making of large quantities of less easily salable sizes. It is likely that a readjustment of prices may be made with the idea of making this size less popular. Both anthracite and bituminous markets were distressingly dull and prices low most of the year.

Anthracite Market

The year just passed might be characterized as one of over-production of anthracite, as is witnessed by the fact that dealers were constantly well stocked throughout the year and the large operators carried heavy reserves. It is doubtful if at any other period was this so evident as in close of the year 1914. It is understood that the gigantic storage facilities of the various companies at Hauto, McClellan, Schuylkill Haven, the Amboys and Port Richmond are crowded with coal, including fuel of almost every size with the possible exception of stove. For coal other than of stove size, if the active periods of April and May be eliminated, at which time it is always rather difficult to supply the demand, there has never been a call that could not be immediately supplied. In fact, taking the year as a whole, it is doubtful if the steam-size market has ever passed through such a season of adversity.

The Delayed Winter of a Year Ago

The months of January and February, which are usually considered as two of the best coal-burning months, showed business fair, and while there was a good steady movement, it was necessary in some quarters to curtail the production. This was occasioned by unusually mild weather, and it was not until the close of February and early March that the temperature fell to anything like its normal level. Several heavy snowstorms followed by low temperatures temporarily created an active call for replenishment of supplies, but as early as the middle of February, "individual" operators were creating a market for their output by offerings at the April circular or even less.

The month of March, outside of the flurry early in the month, resolved itself into the waiting attitude which characterizes the market at this time, and the first of April found the trade good, but rather indifferent in marked contrast to its stand in previous years. The reduction of prices on the first of April no longer improves the volume of sales as definitely as it did formerly.

While at that time the operators are well supplied with orders, the dealers state that there is a gradual falling off in the business from householders, who used to take on their supplies at the low prices. For several years domestic consumers have had no fear that there would be trouble at the mines and consequently they have been unwilling to tie up their money in a cellar-full of coal that will not be used until the following winter. Consequently, during the fall and winter of 1914, the requisitions to dealers were coming in one- and two-ton orders.

April and May brought the usual spring reduction, putting the business on a better footing, and the demand for these two months equalled the output of domestic coals.

Some Price Cutting in the Summer and Fall Months

But in the month of June the trade first commenced to give indications of what might be expected for the balance of the summer. The large operators rigidly curtailed the production at the mines and, even then, it was found necessary to dump much of the output of steam as well as some of the domestic sizes, because the demand for certain sizes of fuel compelled the operators to mine more coal than could be disposed of in its entirety. The industrial depression was no doubt largely responsible for the falling off in the call for small sizes, and the individual operators whose facilities for storage were small, forced the prices for these sizes to a rather low level.

Concessions on Circular Prices

The contract prices at the beginning of the year were: pea, $2.25; buckwheat, $1.25; rice, 85c., but during the summer months, these figures were forced down in some cases 25 to 30c. per ton. It was only with the help of stove coal that the large operators were able to dispose of their other sizes, as in most cases, the "individuals" were not hesitating to make concessions from the circular price in order to move their product, irrespective of size.

It was hoped that October and November would prove more active than the early fall, but conditions remained about the same, and while a considerable tonnage was placed, it was only by the most strenuous effort that much was accomplished.

In December the market improved, due to the fact that better weather conditions prevailed, and the year closed with the prospects of good business for the balance of the winter season.

Few Premiums over Circular Prices in 1914

It is doubtful if there ever has been a period during the last few years, when the "individuals" have lacked the opportunity to sell their output at a premium over the so called circular prices, but this chance was not given them during the past season. The quiet demand which has existed throughout the year has resulted in little premium coal, and the average prices realized will probably fall considerably short of the maximum figures received by the large operators for their respective sizes.

Egg, chestnut and pea have been sold at anywhere from 15 to 60c. less than the prevailing prices, depending on the season of the year, and the smaller sizes were sold in some instances at figures that would hardly net the freight. Offers of $2 for pea, $1 to $1.15 for buckwheat and 65c. for rice, indicate the trend of individual offerings.

The Demand for Stove Coal Unbalances the Industry

A summary of the trade for the year would indicate that there has been no size, with the possible exception of stove, which has maintained its strength throughout. This size has doubtless been the means of moving the other domestic sizes. It is not unreasonable to predict that there may possibly be a change in the price of this size in the beginning of the coal year, or Apr. 1, in an effort to divert the demand to other sizes.

The statement below will give some idea of the fluctuations of the stock on hand at the Tidewater storage points and indicates that, despite the demands of winter, these stocks show an inclination to increase.

STOCKS OF ANTHRACITE ON HAND AT TIDEWATER STORAGE POINTS

Month	Tons	Month	Tons
January	591,000	July	514,000
February	523,000	August	582,000
March	632,000	September	645,000
April	453,000	October	745,000
May	485,000	November	811,000
June	554,000	December	800,000

Bituminous Market

The year just passed has been disappointing in almost every respect. Commencing as it did during the month of January and continuing well into February at what were considered as abnormal figures, the market receded till prices hardly paid for the cost of operation. The market continued strong during the first two months of the year, but about the first of March, indicated not only a substantial decrease in demand, but also in prices.

It was confidently expected that the threatened strike of the miners in the Ohio and western Pennsylvania fields would have the effect of instilling activity into the trade, but on the contrary, but little interest was shown. This was probably due to the fact that the railroads, as well as the industrial establishments using this class of fuel, had fairly large stocks of coal and were consequently indifferent to the importunities of salesmen. This condition brought prices rapidly to a lower level. From the settlement of the differences with the miners, after a conference of about four weeks, until the first of the year, conditions went from bad to worse, and quotations were lower than for several years.

Buyers Refuse to Contract with Results Satisfactory to Themselves

Many establishments refused to contract at a fixed figure, preferring to buy their requirements on the open market, and the judgment of their purchasing agents has been justified, for at no one period during the last six months, has it been impossible to secure prompt shipments, at prices considerably less than the contracts offered. The medium grades of coal are now offered at from 90c. to $1 at the mines, with the better grades from 30 to 35c. more than these figures, and the most optimistic see little room for improvement in the near future. Altogether, the past year has not been profitable for the bituminous operators, and more than one will find that he has lost money.

Coal-Trade Conditions in Buffalo during 1914

SYNOPSIS—Stagnation was the dominant feature of the Buffalo market during the year. Only about two-fifths as much iron ore was received as in 1913, and there was a marked decline in sales of coal and coke to Canada. In the anthracite trade, conditions were far more satisfactory and the year closed with prospects at least normal.

The dullness that pervaded the Buffalo market well back in 1913 in the bituminous and coke trade has continued. As a rule, no reports have been received from any source that did not complain of decline in demand or of factories shutting down. All bituminous coal and coke business has stagnated so badly that a report of conditions, in detail, would fail to discover anything like the variety that is common in a normal year's transactions.

In some respects it has been fortunate and in some quite the opposite that certain of the leading coal operators in Pittsburgh have a way of signifying about Apr. 1 what they will call the Buffalo price for an indefinite time. This forms a foundation to work on, but when prices sag and the informal circular remains unchanged, it is not easy to say what should be done.

The only coarse that seemed feasible during the past year was to continue the Pittsburgh figures; namely, $2.80 for lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, at which prices the best Pittsburgh coal has always sold to some extent. There has been no particular change in the relative market prices of Pittsburgh and Allegheny Valley coals, the latter running from 20 to 30c. lower than Pittsburgh for prepared sizes, all slack selling about on a par.

There has been no change in the number of blast furnaces in this district, though some of them have not been active of late. The amount of iron ore received here by lake during the season of 1914 was 2,770,000 tons, as against 5,200,000 tons in 1913, which tells the smelting story pretty well.

The decline in the demand for coal from Canada has been greater during the year than from the Buffalo territory in our own country. Canada has for some time been suffering from land booms and the war has affected the Dominion much more than it has the United States. Buffalo sells a large part of its coal in Canada and was consequently materially affected by the changed conditions.

There are no figures available showing the amount of coal, either anthracite or bituminous received in Buffalo, but the estimate of 6,250,000 net tons of anthracite and 7,500,000 tons of bituminous, has probably not been exceeded. Of this amount, about 1,600,000 tons of anthracite and 3,000,000 tons of bituminous, as well as 475,000 tons of coke are annually exported to Canada, which sufficiently indicates the importance of the Canadian trade to Buffalo.

The anthracite trade has been satisfactory for the most part and the outlook for it at the close of the year is fully up to the normal. There has been practically no change in the Buffalo situation during 1914. In the former year several independent anthracite companies located branch offices here. These are still doing business and local bituminous shippers have continued their anthracite sales, so that the trade appears to have been kept up. The indepnedent anthracite price has not lately been at a premium, though sometimes during the previous year it was easy to obtain 50c. or so extra on prompt shipments.

Lake shipments of anthracite closed on Dec. 9. The amount shipped, according to the custom-house record, being 4,386,226 net tons. The amount for the season of 1913 was 5,033,696 tons, which was the largest in the history of the trade. It is likely that there is as much coal on Upper-Lake docks now as there was a year ago.

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The Hampton Roads Piers in 1914

By J. W. Bunting*

SYNOPSIS—The Norfolk & Western Ry. increased its dumpings 400,000 tons but apparently the two other roads made no gains. The activity of the shipments to Italy and the establishment of trade with Greece were the principal developments of the year. New facilities for handling were put in operation.

The year now closing has seen great activity at Hampton Roads, as well as many improvements for the prompt handling of both cargo and bunker vessels. Early in the year the large steel pier of the Norfolk & Western Ry. was completed at Lamberts Point and almost immediately great improvement was noticed in the rapidity with which vessels were dispatched on calling there. This pier has made numerous records for heavy dumpings, such as 872 cars in the space of 24 hr. It had hardly been working six months when the Chesapeake & Ohio Ry. completed its dumping facilities at Newport News. With these piers and those of the Virginian Ry. at Sewalls Point, Hampton Roads is now in position to lead the world in the dumping of coal into all classes of vessels.

Prices Were High just after the War Broke Out

There have been constant changes in the prices of the various grades of coal handled out of Hampton Roads and while it is difficult to arrive at a definite average price for the year a fair estimate would be about $2.80 to $2.85 for New River and Pocahontas run-of-mine and $2.60 to $2.65 for high-volatile coal. There have been times, of course, when prices have gone considerably above these quotations especially just at the outbreak of the European war when some of the suppliers were quoting as high as $3.10 per ton on New River and Pocahontas, although it is not believed that any great amount of coal was sold at this figure.

The South American market since the beginning of the war in Europe has been a large buyer of coals from Hampton Roads, although there now appears to be some falling off in the demand from this source. This is no doubt due to the buyers not having used the supply which they took in early in the fall and the prospects are that they will again be drawing heavily from this market during the beginning of the new year.

It was hoped that 1914 shipments would show an increase over 1913 of at least one million tons but from statistics now obtainable it appears that the figures for the two years will not be markedly different though, perhaps, there will be a gain of about 300,000 tons for 1914.

The European war undoubtedly caused some gain in the export movement during certain months but at the same time there was also some reduction in the coastwise movement for factory and other use in New England. September was a record month for heavy dumpings at this port, the quantity of export coal during that month amounting to about 50 per cent. of the whole movement which is unusual for Hampton Roads. The total dumpings for September were 1,271,772 tons; August came second, 1,108,539 tons being shipped during that month.

An explosion in the Eccles mines of the New River field during April greatly reduced the output from that region for some weeks and to some extent helped to cut down the total movement for the year.

Coal Shipped to Italy, Greece, Norway, Sweden and the Canaries

Large orders have been placed at Hampton Roads ports by foreign buyers all through the year, the most notable, no doubt, being those from Italy and Greece. Coal has for many years moved in large quantities to the Italian market but there has been little demand from Greece until the present year when contract was made for furnishing this market with about 100,000 tons. Until the outbreak of the war there was a growing demand from Austria but under present conditions this has been entirely cut off. Norway and Sweden have also taken some few cargoes. Some coal has also been shipped to the Canary Islands. This is not usual, though they had bought coal in the United States before whenever there was a difficulty in getting it from England or Wales.

There seems to be a decided difference of opinion among the various coal suppliers as regard the South American market and although inquiries for large quantities have been made at different times there have been no reports of any very large contracts being closed and so far as can be learned such coal as has moved to the South American countries has been sold mostly in one- or two-cargo lots.

There was much disappointment at Hampton Roads when the contract for supplying the U. S. Government was awarded. Heretofore, practically all or at least the best part of this business was handled here but under the present arrangement shippers at the Northern ports were awarded a large share of this business. While practically all the supplies at Hampton Roads were assigned some business at the same time they did not receive as large a percentage as in previous years.

Over a Million Tons per Month Loaded at Piers

There have been five months, viz.: March, April, May, August and September, when the total shipments amounted to more than one million tons per month and up to Dec. 1 there were only two months where the dumpings fell below 925,000 tons. Of the total dumpings during eleven months the Norfolk & Western Ry. has moved within about 100,000 tons of the combined movement of the Chesapeake & Ohio and Virginian Railways. Without taking into consideration the dumpings for December, the Norfolk & Western Ry. on Nov. 30 was within about 20,000 tons of its yearly movement for 1913. After

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deducting this tonnage from their December movement the balance of the month's business will be their gain for the year and this should amount to at least 400,000 tons. The outlook, however, for the Chesapeake & Ohio and Virginian Railways is not so bright and it is not anticipated at this time that either of these roads will have made any gain over their 1913 movement from this port.

Taking the year 1914 as a whole it has hardly come up to the expectations of the shippers from Hampton Roads but there is some satisfaction in knowing that even with conditions entirely different from the previous year there will be a gain of at least a quarter of a million tons.

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Trade Conditions and Tonnage at Baltimore, Md., during 1914

By W. R. Hough

SYNOPSIS—A year of uncertainty has been passed. A flat industrial situation strongly affected the bituminous trade. Anthracite operations were, however, firmer. In face of the fact that railroads showed a big falling off in general tonnage, 1914 was a banner year in the export movement of fuel from Baltimore.

A twelvemonth on the whole unsatisfactory, a period of poor demand and poor prices, a time of general uncertainty, closed with December. Whatever its causes a deepening feeling of depression swept over the industrial world here, as in other parts of the country, in January and February of 1914. Every effort was made by operators, shippers and dealers in general to stand firm. January contracts were entered into in good form despite the growing depression. The previous summer and early fall had seen a boom period in the coal trade—a period when the Great Lake region had taken the largest tonnage in its history and when other sections had been clamoring for fuel almost at any price at times. It was felt generally that things would brighten up, and in evidence of good faith along that line not a few contracts were entered into at better figures than at the same time the previous year.

Good times failed to materialize by the time that the general contracting season in April approached, however. Rate-decision delay and other causes were attributed for the growing business depression, but the fact remained that the coal trade had difficulty in maintaining contract rates on the old basis in not a few cases.

Things dragged, tonnage movement going from bad to worse, until the great European war suddenly sprang into existence in July. Then followed even greater uncertainty. Some held that business, and through it the coal trade, would be further demoralized; others that it would be a stimulus to American manufacturing. September saw a rush of export coal from this port; a rush that rolled close to 130,000 tons for the one month, and many thought these figures might be maintained. But the drop came again, and the year went out with the export trade about on a normal basis.

A feature of the early months of the year was the fact that many coal-property developments were made in Pennsylvania, West Virginia and Kentucky. Several local concerns were rushing development plans despite the decreasing demand. All seemed to feel that a resumption was coming. After mid-summer, however, a decided change took place. Development was largely stopped, and it soon became apparent that the market was over-stocked on soft coals even with the old production basis. Prices kept sliding. The last month of the year saw West Virginia gas coals selling generally below the dollar mark. Steam coals were on the same level. In Pennsylvania and Maryland similar conditions prevailed for the less desirable grades. Best coals were to be had by the trade at the mines at about $1.35. In order to keep up organization great quantities of fuel were disposed of at less than actual production cost. Cancellation of contracts during October and November proved most demoralizing. All in all it was one of the worst fall and early winter periods in the history of the bituminous trade.

Anthracite dealers had the same experience in a measure with industrial coals.

A bright spot was the export trade. While the government in November ordered that no more official export figures be given out at the close of monthly periods, it is learned that the total exports were approximately 966,000 tons over the local piers. This is a gain of nearly 100,000 tons over the export total of 1913. Italy, Cuba, Argentina, Mexico, Egypt, Greece and Spain, in the order named, were the largest takers of export coal. Greece and Argentina were to a considerable extent virgin territory, the coals being shipped to displace Welsh coals used formerly.

Most of this export coal came here over the Baltimore & Ohio R.R., showing one of the few features of gain by that road. On general coal haulage the Baltimore & Ohio totaled approximately 33,000,000 tons in 1914, against 35,000,000 the previous year, thus sustaining a loss of 2,000,000 tons.

The Baltimore & Ohio handled a total of a little more than 3,000,000 tons of fuel over the local piers—Curtis Bay and Locust Point—in 1914. This included nearly 1,000,000 tons of export coal, bunker fuels, and the general harbor delivery trade as differentiated from the all-rail deliveries at local yards. The Western Maryland R.R. handled approximately 600,000 tons and the Northern Central about 300,000 over the piers during the year, as far as can be ascertained from unofficial figures. It is estimated that the Northern Central sent to this city approximately 1,000,000 tons additional for all-rail delivery, mostly anthracite coal, and the Baltimore & Ohio about the same amount all-rail fuel, the larger portion being bituminous. This would bring the local total for all kinds of fuel, export, bunker both foreign and domestic, harbor delivery and all-rail close to the 6,000,000-ton mark.

There is one feature worth mentioning in summing up 1914—the trade enters 1915 confidently. All feel that the worst period is now over.

The 1914 Export Coal Trade

By F. R. Wadleigh

SYNOPSIS—The year 1914 was one of considerable importance in the American coal-export trade. A large tonnage has been shipped to Mediterranean countries which have heretofore taken little, if any, American fuel. Scarcity of ships available, high and fluctuating freight rates, and unsatisfactory banking and financial conditions especially in South America have combined to lessen the volume of coal exported during the latter part of the year.

The year 1914 is one that is likely to be long remembered by all persons interested in the exportation of coal For purposes of comparison it is advisable to divide our coal exports for both 1913 and 1914 into two six-month periods, as conditions before and after the European war was declared were entirely different.

Under normal conditions, as they existed at the close of 1913, the outlook was favorable to a considerable increase in our coal exports, especially in the Mediterranean countries. In Italy, actual contracts for quite large tonnages had been closed, principally for Hampton Roads and Baltimore coals, while a small but steady and increasing business was going on with South America.

This increased business is shown by the following table of coal exports:

UNITED STATES EXPORTS OF BITUMINOUS COAL FOR THE FIRST SIX MONTHS OF 1913 AND 1914—FROM HAMPTON ROADS, PHILADELPHIA AND BALTIMORE

Country	Long Tons 1913	Long Tons 1914	Increase
Italy	173,411	505,162	
France	16,145	40,922	
Austria	30,298	19,892	
Egypt	86,420	38,961	
Spain	37,270	38,665	
Africa	58,137	69,796	
Brazil	114,204	98,430	
Chili	71,001	26,591	
Argentine	27,728	94,721	
Uruaguay	......	33,804	
Cuba	692,293	532,605	
West Indies	277,831	274,727	
Mexico	187,742	61,786	
Central America	36,106	36,133	
Total (including other countries)	2,397,301	2,477,542	170,241

To	1913	1914
Europe	401,681	713,398
S. America	212,933	253,546
West Indies, C. America, Mexico	1,193,952	905,251

The decrease in the last group is due entirely to the disturbed condition in Mexico and a decreased consumption in Cuba.

To Canada, the largest buyer of our coal, exports, for various reasons, showed a marked decrease, as shown below.

U. S. EXPORTS TO CANADA, FIRST SIX MONTHS OF 1913 AND 1914

Anthracite 1913	Anthracite 1914	Bituminous 1913	Bituminous 1914
1,972,613	1,776,551	5,460,321	3,489,581

The last six months of the year have shown a considerable increase in our export coal trade, due largely to war conditions. This increase was not as great as would have been the case had ships been available; financial difficulties, terms of payment, etc., have deterred exporters from taking orders they were actually offered.

The temporary stopping of British coal exports brought in a flood of inquiries and orders for U. S. coals, but as soon as British coals were allowed to go forward, inquiries dropped off, especially as shipping rates from this country advanced at the same time and vessels became scarce.

The fact that there have been ample supplies of British coals available for export at all times since the export embargo was removed, has undoubtedly kept down our foreign sales. The prices of British coals were not raised, indeed they have actually been lowered on some of the best known coals.

Statistics of our exports are at hand only to Oct. 31 and these not in detail. For the first four months of the second period of the years under consideration, exports are as given below:

U. S. EXPORTS, BITUMINOUS COAL, JULY 1, to OCT. 31, 1913-1914

Destination	1913	1914
Argentina	34,149	113,183
Brazil	126,895	137,023
Uruaguay	......	38,015
Cuba	419,300	375,719
West Indies	246,429	235,440
Mexico	229,520	227,479
Other countries	416,379	836,585

U. S. EXPORTS TO CANADA, JULY 1 to OCT. 31, 1913-1914

Anthracite 1913	Anthracite 1914	Bituminous 1913	Bituminous 1914
1,567,723	1,575,015	6,202,145	4,731,886

It will be seen from the above that our exports to "other countries," under which are included all European countries and Chile, show an increase, during the four months of 100 per cent.; most of this increase is in shipments to Italy, notwithstanding high freights.

For the first six months of the year prices as quoted on the market, varied but little, from $2.80 to $3 f.o.b. Hampton Roads, for New River and Pocahontas. At Philadelphia, good steam coals were quoted at from $2.60 to $2.75 f.o.b. Baltimore coals were from $1.10 to $1.75 f.o.b. mines.

These prices generaly have varied little throughout the year, until recently. The U. S. Navy contract, closed in June, was at prices of $2.83 f.o.b. Hampton Roads and $2.65 f.o.b. Philadelphia. The Panama R.R. contract was just awarded to a Pocahontas shipper at $2.70 f.o.b. Hampton Roads; other bids on Pocahontas and New River coals were from $2.75 to $2.85 f.o.b.; Pennsylvania coals at $2.65 f.o.b. Philadelphia. Some Pocahontas & New River coals for export were sold as low as $2.70 f.o.b., with commissions included.

FREIGHTS ON COAL

To cover the variation in ocean freights and the causes for the great changes that took place would require more space than is available.

During the first part of the year freights were normal, with a downward tendency. The variations in chartering prices throughout the year is shown in the following table:

FREIGHT RATES DURING 1914

Destination	Jan.	Mar	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Buenos Aires	$3.64	$3.40	$3.28	$3.28	$3.16	$5.60	$4.86	$4.13	$4.01	$5.83
Rio de Janeiro	3.76	3.64	3.40	3.03	2.92	5.84	5.46	3.76	4.13	6.07
Alexandria	3.40	3.16	2.92	2.92	2.55			3.40		
Genoa and Naples	2.92	2.67	2.43	2.24	2.43		5.42	3.03	4.86	4.86

The last month of the year witnessed an unexampled rise in freights, the latest available quotations being as follows, on Dec. 22: To Buenos Aires, $6.07; Rio Janeiro, $5.50; Genoa and Naples, $8.40.

The scarcity of vessels for coal cargoes has induced the offer of high rates to the coastwise coal transportation companies for the use of their colliers; it has also brought about the entrance of schooners, usually engaged in coastwise traffic, into the export trade.

Some of the principal events affecting our export coal trade during 1914 may be chronicled as follows:

The completion of the two largest coal piers in the world, on Hampton Roads, has added greatly to our facilities for handling tidewater coal.

The European war, with its upsetting of all calculations, but with the assured effect of increasing our coal exports and expanding our markets.

The greatly increased interest of our coal companies in the export trade and its possibilities, as shown by the numerous investigators and salesmen sent out, as well as by the formation of at least one large company to handle export business.

The first avowed efforts of the U. S. Government's technical departments to assist our export coal trade; the opening of the Panama Canal; and the appointment of commercial attache's to six of our foreign embassies.

Worth noting also is the recently closed contract of the Egyptian State Railways for 120,000 tons of Welsh colliery screened ordinaries at $4 per metric ton (2204 lb.) f.o.b. (which at present freight rates, would be about $8.75 delivered); 60,000 tons of Fairmont double screened 1½-in. coal at $7.28 per ton delivered, 5000 tons of Island Creek (W. Va.) 1¼-in. coal at $6.68 per ton and 5000 tons of New River coal at $6.80, delivered. On the basis of present freights, it is not likely that the U. S. shippers will make any profit on these shipments.

On the whole, 1914 has been a most important year to U. S. coal exporters. The year's events have taught them much needed lessons regarding foreign markets for coal, the selling competition, the competitive coals and the needs and business methods of foreign countries; all this in addition to actual increases in tonnage that are likely to be permanent.

What effect the continuance of the European war will have on our coal exports is problematical. At present, Great Britain, our strongest competitor, has more than ample coal and labor to meet all demands both for home and export.

We cannot compete on anything like equal terms as to price, with the British coals, as long as ocean freights remain as they are now, with rates from Cardiff to Genoa at about $3.83 per ton as against about $8 from the U. S.; Cardiff to Buenos Aires $3.90; from U. S. $6.

Numerous inquiries for bids on large tonnages of export coal have been received since the beginning of the war; most of them turned out to be merely inquiries and led to no actual business.

However, our foreign coal shipments could have been largely increased had our exporters been willing to make delivered prices or to have given long credits; the lack of satisfactory banking and collection facilities were ample reasons for their unwillingness, together with the reported financial conditions in most of the foreign countries needing fuel, especially South America.

* *

Pittsburgh Coal and Connellsville Coke Markets in 1914

By B. E. V. Luty

SYNOPSIS—The year just past was, so far as concerned the coal market, the worst for a long time. With mines working far below capacity concessions from circular prices were frequent and heavy. The curtailment in the production of pig iron and steel products was reflected in a reduced coke output and unprofitable prices. Both coal and coke would receive a pronounced stimulus from a revival in the iron industry.

Throughout the Pittsburgh coal district the year 1914 was by all odds the worst for some time, presenting a sharp contrast with 1913, which was a season of heavy production and quite satisfactory prices. In 1914 prices were altogether unsatisfactory and the tonnage was light, the output being between 50 and 60 per cent. of nominal capacity, though probably less than 50 per cent. of that which could be produced with all physical conditions satisfactory.

The main cause for the coal trade being thus depressed was the poor industrial situation. The steel mills, upon which the Pittsburgh coal district largely depends for custom, did not operate at an average capacity of more than 60 per cent. during the year, while railroad consumption was materially curtailed and the Lake demand was altogether unsatisfactory.

For the low prices ruling in 1914 there was a contributory cause, namely, the settlement of the mining scale without a cessation of operations when consumers had expected a suspension. This, of course, did not alter the amount of coal produced or consumed in the year, but it upset a market that was already weak, so badly that no definite recovery occurred throughout the remainder of the year.

In 1914 a suspension was likewise expected, and stocks were laid in against it, but in addition to the settlement being reached four days before the termination of the old scale an arrangement was made whereby the miners were to remain at work during the taking of the referendum vote. As late as the beginning of September some operators were still attributing the light market demand to the fact that the stocks laid in prior to Apr. 1 had not been entirely consumed.

Nor did the anticipation of a suspension cause any particularly strong market during the period when stocks were being accumulated. The year opened with circular prices at 90c. for slack; nut, $1.15; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, with a 10c. concession to dealers on screened coal, but these prices were frequently cut. In February the cutting became more pronounced and even in March the market was not altogether steady. In the first two months mining operations were at 50 to 60 per cent. of capacity, while in March they did not much exceed 75 per cent. In April demand was so light that operations dropped to an average of less than 50 per cent. and the only hope of the operators lay in the Lake trade.

This opened quite inauspiciously, little coal moving in May, and not much more in June. Month by month there was hope of an increase, as the Northwest was taking but little more than half as much coal as in the previous season, but navigation ended earlier than usual and with no better movement in its second half than in its first. Prices on Lake coal were all low.

Lake Coal Shipments in 1914

Shipments of coal to the Lakes in 1914 amounted to about 23,000,000 tons, a decrease of about 6,000,000 tons from 1913. The Pittsburgh district furnished 49 per cent. of the total, Ohio falling far behind its usual proportion, on account of the deadlock on system of wage payment.

The 1914 shipments, as compiled on excellent authority, with some minor estimates, were as follows, in tons of 2000 lb.:

	Cargo	Fuel	Total
Pittsburgh district	10,427,000	768,000	11,195,000
Other Pennsylvania districts	423,000	13,000	436,000
West Virginia	8,841,000	265,000	9,106,000
Ohio	1,263,000	100,000	1,363,000
Kentucky	886,000	9,000	895,000
Totals	21,842,000	1,154,000	22,996,000

The estimates made refer chiefly to the light shipments in December, mostly for winter storage.

Even before the Lake-shipping season closed $1.15 for mine-run was a high price, obtained only occasionally for the best grades of gas coal, but the cessation of Lake shipments did not demoralize the market to the extent that might have been expected, evidently for the reason that the limit had already been reached. Mine operations were reduced, and in the last two months of the year did not average more than about 40 per cent. of capacity.

How extremely bad the market situation was is illustrated by the so called "circular prices" announced late in the year. In 1912 the price announcement occurred Nov. 4, while in 1913 it was made on Oct. 1. The circular price for 1912 was $1.15 for mine-run, an advance to $1.22½ being announced in April, after the wage increase, while the fall circular carried an advance to $1.30. The announcement of Oct. 1, 1913, was of a 10c. advance to $1.40, but this increase did not hold even for a day. The circular price for 1914 was therefore $1.30, but it was scarcely obtained even in March. About Nov. 10 one of the larger operators made a price announcement of 85c. for slack, $1.05 for nut and slack, $1.15 for nut, $1.20 for mine-run, $1.30 for ¾-in. and $1.40 for 1¼-in., at the same time openly quoting 5c. a ton discount for prompt lots. These prices did not obtain, however, other operators preferring to maintain the figment of the old circular prices until such time as the market should improve and it might be possible to name prices that would be somewhat remunerative and would have a chance of being held.

Much of the Pittsburgh district coal that goes to nearby consumers is controlled by long-term contracts, the price being based on the mining rate. In the two largest contracts it is understood the rate with the present mining scale would be $1.12½, but while these contracts are supposed to be exceptionally favorable to the buyers it is doubtful whether in 1914 the shipments to other consumers, who buy from time to time, averaged much higher in price.

Connellsville Coke

Connellsville coke production in 1914 was light, while the prices realized were unsatisfactory. The output was about 14,000,000 tons, or the smallest since 1904, with the single exception of 1908. The average price realized was also the lowest since 1904 with the exceptions of 1908 and 1911.

As explained in this review a year ago, many of the Connellsville operations are heavily bonded, and in order to meet sinking-fund and interest charges a considerable portion of the price realized on coke must be set aside. The prices obtainable in 1914 did not, as a rule, provide sufficient margin for this purpose, and a curious feature of the trade was that many of the producers wh most needed revenue refused to sell at going prices an thus had particularly light operations, with the result tha their financial showings must have been extremely poor Little is publicly known of their financial statements o operations, but there is room for conjecture that ther were many defaults in interest payments. A few oper ating companies have been definitely forced to the wall being bought out by the bondholders.

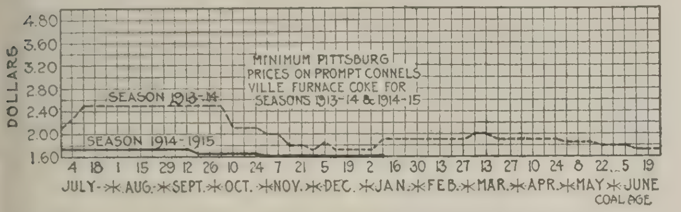
CONNELLSVILLE COKE STATISTICS FOR 1914*

1914 Week Ending	Merchant Production	Furnace Production	Total Production	Shipments Cars	Shipments Tons
Jan. 1–3	49,803	62,131	111,934	2,952	109,912
Jan. 10	94,310	166,360	260,670	7,114	258,459
Jan. 17	95,852	172,505	268,357	7,286	264,784
Jan. 24	104,595	186,460	291,055	7,982	290,586
Jan. 31	99,110	201,945	301,055	8,203	298,541
Feb. 7	97,720	207,255	304,975	8,346	303,852
Feb. 14	101,290	198,960	300,250	8,230	300,301
Feb. 21	102,020	201,140	303,160	8,884	324,170
Feb. 28	108,390	205,480	313,870	9,388	341,784
Mar. 7	119,540	226,150	345,690	10,562	383,842
Mar. 14	122,805	230,600	353,405	10,410	377,045
Mar. 21	126,780	237,300	364,080	10,167	369,530
Mar. 28	127,507	232,511	360,018	9,587	347,490
Apr. 4	131,480	224,840	356,320	9,712	348,950
Apr. 11	130,750	223,975	354,725	9,695	348,411
Apr. 18	126,600	208,055	334,655	9,059	325,545
Apr. 25	125,452	188,305	313,757	8,628	310,209
May 2	122,960	182,650	305,610	8,613	309,439
May 9	116,185	195,915	312,100	7,987	291,166
May 16	113,990	180,725	294,715	7,555	275,830
May 23	107,390	150,240	257,630	7,572	276,072
May 30	105,048	138,980	244,028	6,950	252,437
June 6	108,629	134,980	243,609	6,921	254,841
June 13	110,375	149,240	259,615	6,902	253,352
June 20	108,115	154,460	262,575	7,092	260,265
June 27	107,943	153,610	261,553	7,366	270,397
July 4	110,182	149,070	259,252	7,407	272,902
July 11	109,215	155,390	264,605	6,946	257,107
July 18	114,545	153,655	268,200	7,015	258,762
July 25	116,650	151,640	268,290	7,253	267,361
Aug. 1	112,605	156,970	269,575	7,238	269,591
Aug. 8	108,840	155,230	264,070	7,277	269,968
Aug. 15	103,780	153,560	257,340	7,027	260,490
Aug. 22	97,700	161,965	259,665	7,370	273,397
Aug. 29	94,695	164,988	259,683	7,112	264,113
Sept. 5	98,425	169,445	267,870	7,290	270,310
Sept. 12	88,805	162,150	250,955	6,921	255,865
Sept. 19	79,870	163,825	243,695	6,915	256,537
Sept. 26	84,901	162,320	247,221	6,693	248,066
Oct. 3	89,897	159,255	249,152	6,843	253,852
Oct. 10	84,590	161,520	246,110	6,601	244,593
Oct. 17	86,249	151,480	237,729	6,358	236,109
Oct. 24	86,779	142,740	229,519	5,771	214,132
Oct. 31	79,634	126,330	205,964	5,596	207,004
Nov. 7	82,629	128,925	211,554	5,493	203,743
Nov. 14	80,989	125,325	206,314	5,670	210,387
Nov. 21	86,709	114,095	200,804	5,370	200,022
Nov. 28	86,859	92,580	179,439	4,760	176,749
Dec. 5	89,335	106,240	195,575	5,299	196,157
Dec. 12	89,720	106,555	196,275	5,408	200,058
Dec. 19	94,120	104,413	198,533	5,085	188,049
Dec. 26	91,445	116,685	208,130	5,600	207,280
Dec. 28–31	78,156	98,348	176,504	4,480	165,824
Totals	5,391,962	8,609,473	14,001,435	383,961	14,075,638

*From the "Weekly Courier."

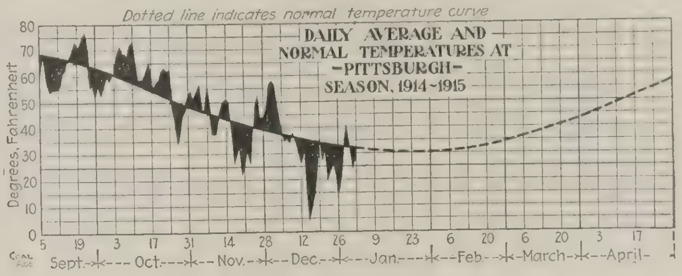
There are other Connellsville operations that were earl in the field, buying their coal acreage at relatively lov prices and making such profits in their early years as wipe out all obligations and leave them as net gain whatever margin there may be between the bare cost of production and the selling price. To such producers the year 1914 made quite profitable returns.

Late in December, 1913, some contracts for the first half of 1914 were closed at $2, a price higher than it had been thought would be obtained. Many consumers refused to pay this amount, and bought prompt coke from time to time to tide them over, eventually striking a lower average than $2. In June a distinct improvement in the steel trade caused a burst of confidence among buyers, and a few made contracts for the second half at $2. Others decided to buy from month to month, a course which later events made eminently satisfactory to them. Many of the contracts made for 1914 were not fully carried out, as they were the familiar requirement contracts, deliveries being based upon whether the furnace ran or not, and as pig-iron production was greatly curtailed the furnaces that had paid the highest prices for coke were the ones most likely to blow out.



While the prices realized were quite unsatisfactory to the heavily bonded operations, these requiring as a rule $2 or more in order to show a profit, prices at no time in 1914 were as low as they were in some previous years. Prompt coke usually sells at a lower price than contract coke. During the first half of 1914 prompt coke averaged fully $1.85, in the third quarter $1.70 and in the fourth quarter $1.60. Much lower prices for prompt furnace coke have frequently obtained, the market for several months in 1909 being $1.40 to $1.45, while the same level was held early in 1911. Toward the close of that year some contracts were made for a six-month period at $1.55 and $1.60, so that coke prices in 1914, while low, were not extremely so.

Some allowance should be made for the fact that a general wage advance was made early in 1913, so that costs were higher in 1914 than in earlier years. However, while the leading coke interest, the H. C. Frick Coke Co., a subsidiary of the Steel Corporation, adhered to the advanced wage scale, several of the merchant operators made reductions early in the year, and the supply of labor was so plentiful that they experienced practically no difficulty in obtaining men to work at lower rates than were being paid at the majority of plants.



Toward the close of 1914 there was a general contracting movement for the new year, the regular basis being $1.75, but in several instances there were slight cuts from this figure, still leaving the average of all contracts above $1.70. Nearly all the furnaces depending upon Connellsville coke purchased a supply during this period, except those that were out of blast—a very considerable proportion. These, of course, could not buy at the going market as it was recognized that they would not blow in unless general conditions greatly improved, in which event the coke would be worth more money.

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Coal-Trade Conditions in Cleveland during 1914

By A. E. Cornell

SYNOPSIS—The season opened under fairly propitious circumstances. During the summer, however, Lake tonnage was decidedly less than in the previous year. At the present time manufacturing has been to a considerable extent resumed and market conditions are more favorable.

One year ago the coal trade in Cleveland and along the Great Lakes was closing a prosperous year. Prices had been profitable and shipping had been large. But under it all there was a feeling that the best had passed and the coming season would not be the "boom year" that 1913 had been.

Factories were running short of new work and an open winter was cutting into the business of the docks at all Upper Lake ports. By the time Lake shippers were ready to buy their 1914 requirements the markets were off and Lake coal sold at 10 to 15 cents below the prices of 1913. Although the central competitive states, Ohio, Indiana and Illinois, and western Pennsylvania were likely to stop producing temporarily while a wage contract was being drawn there was no anxiety over the supply of coal. The Upper Lake ports were so well stocked with fuel carried over that it was not likely there would be any need of new coal until June or July. At that time the local market was not using more than 60 per cent. of its normal requirements.

During the winter of 1913-1914 shippers had loaded vessels with close to 500,000 tons of coal and this was available at the opening of navigation, Apr. 15, should there be any necessity to rush it to the Northwest. It turned out that this storage was not needed until late in the season and in the latter part of October a cargo of Hocking loaded in the winter was delivered.

April, May, June and July shipments of Lake coal were much smaller than in 1913. In August, bituminous fuel going to Lake Superior passed the 2,000,000-ton mark for the first and only time during the season, while in 1913 these same docks received more than 2,000,000 tons during each of the five mid-summer months. Anthracite shipments showed large losses in April, May, August, September and October.

Based on the shipments of 1913 with scattered data for 1914, the Lake movement of bituminous coal, bunker and cargo, during the past year aggregated 21,850,000 tons, a decrease as compared with 1913 of 22.85 per cent. Anthracite shipments show a loss of 19.5 per cent., or an aggregate traffic of 4,052,000 tons.

The West Virginia Lake business is expected to show the smallest relative loss. None of the Ohio fields began shipping until mid-summer and shipments then were confined to Cambridge and Hocking. The No. 8 field of Ohio did not ship a pound of new coal in 1914. When No. 8 operators saw they could not expect to sell in the Lake market, they went to West Virginia and bought for their trade. This helped West Virginia to hold up better than Pittsburgh.

The large amount of coal left over on the Lake docks made it possible to restock them early in the fall. This precluded the necessity of paying extra freight to have boats deliver cargoes in late November and early December. Less than a half-dozen steamers received extra freight rates. A few cargoes of hard coal were moved in December at an advance of 10c. a ton and a few of the smaller docks on Lake Michigan paid a like advance, but boat owners were glad to get cargoes of coal at the contract rate regardless of the lateness of the season.

Independently of either the rate for mining proffered in the No. 8 district or the justice of the price asked by the miners, the screen-coal law has greatly injured the coal-mining industry in Ohio. The amount of fine coal produced has increased and its quality is inferior. The slack that has come into the Cleveland market during the last few months is less pure than formerly and consumers are not buying it whenever a better grade of fuel can be obtained at a reasonable figure. Ohio fine coal, produced under state jurisdiction through the industrial commission on the mine-run basis, is worth in the open market about 85 to 90 per cent. of what it was when lump mining was the standard. Ohio's advanced legislation has not advanced the coal-mining industry of the state, but has positively injured it.

Trade conditions of the last year in Cleveland have not been more than 50 per cent. of capacity. This has materially reduced the consumption and has been keenly felt by jobbers and operators. The first quarter of 1914 was the busiest of the year. Shops and factories were doing a fairly good business and the demand for coal was proportionate, with prices that were profitable. As the winter demand for heating and power fuel decreased, the summer trade showed little life and throughout the warm months Cleveland was the dumping ground for surplus coal from all fields. This is a consignment market to such an extent that it feels over-production more quickly than many large centers.

With the close of the lake season and the curtailment of production the market has not been so flooded with consignment coal as it was during the summer, but there is still too much fuel of this kind to make it a safe market in which to speculate. Industry has increased in Cleveland and the factories are now working on an average of 60 per cent.

During the last year about 3,410,000 tons of coal were brought into Cleveland. This is figured as consumption, though some of it has been reconsigned. In 1913, 4,061,583 tons were brought in and the local industries were accredited with using all of it. This shows that the decrease of consumption, due to the inactivity of local industry, was approximately 651,583 tons.

Market Conditions in Cincinnati in 1914

By Kenneth C. Cardwell

SYNOPSIS—Being largely a manufacturing city Cincinnati suffered keenly in the general depression. Competition in the coal trade forced prices far down and retailers secured heavy stocks at about $1 per ton. The market consequently did not respond when cold weather arrived. The present tone is optimistic and the trade is hopeful for a successful year in 1915.

Cincinnati, being one of the busiest manufacturing centers in the land, suffered with the rest of the country, and perhaps to an even greater extent than the average city, on account of the general dullness in business throughout 1914. Normally a large consumer of steam coal of all kinds, the inactivity among the numerous industries caused the amount of this fuel used to fall far below that of an average year; and, as usual, with an almost complete lack of demand, the anxiety of shippers to dispose of their product increased to a point where astonishing price concessions were made. This, also, as usual, failed to stimulate the market, but was responsible none the less for some extremely cheap fuel.

Toward the end of the year another result became visible, affecting the domestic trade. Desperate efforts to dispose of the prepared grades during a dull fall had the same effect upon prices as that already noted in the steam market; and not a few retailers in and around Cincinnati loaded up on bargain coal, purchased for about $1 a ton or a trifle more. The result was that the extremely cold weather of the latter part of December failed to stimulate business with the shippers to any appreciable extent, the retail trade being already supplied.

A rather remarkable consequence of the general business depression has been noted by several leading selling agencies, disposing of large volumes of coal for shippers. During the entire year, in consequence of the relative idleness of manufacturing concerns, the railroads have had ample equipment available at all times, and have been able to move cars with remarkable speed. The entire production of the mines could thus be rushed to the market. This has been largely responsible for the amount of distress coal disposed of, as well as for some unusually energetic selling work. Thus, the volume of business handled occasionally ran far above what might have been expected.

Business conditions which characterized the year as a whole made it quite impossible for the total volume of coal moving to and through this market to equal that of last year. The figures available on the subject show in every class of fuel, except anthracite, which is a small item, a decrease as compared with 1913, both in receipts and shipments. The figures for 1914 are up to Dec. 12 only, while those for 1913 are for the entire year. This will, however, not make a great amount of difference.

MOVEMENT OF COAL AND COKE, RAIL AND RIVER, CINCINNATI

	Received	Shipped
1913		
Bituminous (rail)	6,210,832 tons	4,466,406 tons
Coke (rail)	149,654 tons	87,070 tons
Anthracite (rail)	13,689 tons	6,782 tons
River	1,935,994 tons	225,587 tons
1914		
Bituminous (rail)	6,041,155 tons	4,192,204 tons
Coke (rail)	76,987 tons	33,127 tons
Anthracite (rail)	20,703 tons	16,007 tons
River	754,460 tons	190,016 tons

The marked decrease in the volume of river traffic was due largely to the fact that during the entire summer and for the greater part of the fall the Ohio River was so low that shipping was impossible, and no coal moved. After the spring rise no coal came down, either from Pittsburgh or from the Kanawha district, until December, when a heavy movement began, and continued until ice in the river stopped the traffic. Probably 200,000 tons were received in Cincinnati during December, while an equal amount passed down for the lower river ports.

In the general bituminous market, sales of nut and slack were reported as low as 15c. a ton, as compared with a normal price, for good gas and splint, of 75 to 80c. It is estimated that reductions from circular, through the season, averaged 20 to 25 per cent.; and while these were most marked in the steam grades, they were also to be observed in the domestic market.

This condition, naturally, had its effect on the renewal of contracts. While some large dealers were able to renew agreements with good customers at figures close to those of other years, it was inevitable that the keen competition for business should have a depressing effect on prices. It is probable, therefore, that an average reduction of 5 to 10c. a ton for steam coal, or about 10 per cent. prevailed in the closing of contracts for 1915.

The widespread labor troubles in the Ohio field, which still continue, have not affected this market in any perceptible degree. The same is true of the relatively lesser labor troubles in the Kanawha district. The temporary withdrawal from the market of certain sections in that field by reason of sporadic labor difficulties did not affect Cincinnati in the slightest degree; which goes far to show just how bad business was.

In spite of the exceedingly poor record of the past year, and the fact that as yet no change has taken place in the conditions responsible therefor the trade is rather more optimistically inclined than otherwise. Seasonable weather indicates that there will certainly be good business in the retail trade, and with the generally expected revival in manufacturing, and the apparent improvement in the steel and iron industry, not to mention railroad business, it is felt that steam business will also pick up, and that 1915 will be a good year in the coal trade.

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General Conditions in Coal Trade in and about St. Louis in 1914

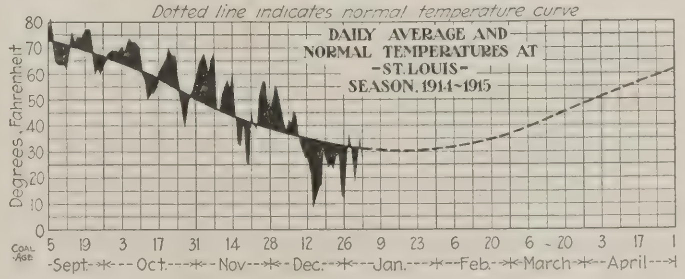
By E. J. Wallace

SYNOPSIS—Due to general industrial conditions many of the manufacturing plants in and about St. Louis were obliged to close down. This greatly decreased the consumption of steam coal. Mild weather, particularly during the early part of the year caused a light and uncertain demand for domestic fuel. Anthracite and smokeless coals have been largely displaced during the past season by gas-house and byproduct coke.

To the industries which look to southern Illinois for a large tonnage of steam coal, the year 1914 has been a failure. The principal reason for this is the fact that St. Louis is a large manufacturing center catering almost exclusively to the wants of railroads. These being unable to secure better freight rates and lacking sufficient working capital have not been in the market for any considerable quantities of material, and many of the largest plants in the city and vicinity have consequently closed down.

The European war, to a certain extent, has affected some of the chemical plants, while the general business depression and the difficulty of securing money from the banks for short periods has doubtless had its effect. The lumber business has been suffering throughout the entire season, while lead and zinc mining in southeast Missouri has not been developing its usual tonnage, and the iron and steel mills in and about St. Louis have experienced difficulty in holding their organizations together.

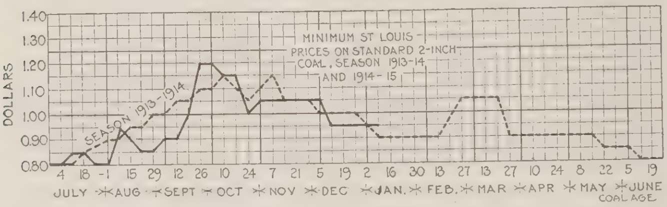
As a consequence operators in the southern Illinois fields have found that the past year brought them a decreased market in which to distribute their product. With nine idle mines out of a total of 34 in Williamson County, there was still an overproduction. One new mine was sunk by J. L. Mitchell, northwest of Johnston City, near the Franklin County line; one, the Oak Ridge, at Herrin, was closed during the year, and the Donnelly-Koen-



icke mine, at Cambria, was burned and abandoned and two or three others were partially dismantled. Williamson County tonnage will probably show a decrease for 1914, while Franklin County may reveal an increase. Saline County has shown but little change.

Financial troubles worried the operators in all fields throughout the season. In Perry County and in the Big Muddy field of Jackson County, there was practically no change, except that the year was a disappointment as far as the marketing of coal was concerned. In the Standard field, no new mines were opened, while a few of the older ones were abandoned. The tonnage from this field will likely show a decline.

But one serious disaster occurred during the year, namely that of Oct. 26, at Royalton, when an explosion killed 52 miners. There were a few minor accidents, but it is calculated that the total loss of life will be less than usual when the tonnage is considered. There were fewer petty grievances and strikes during the year than in the 12 months preceding, although every district had its troubles. Many operators have been handicapped by various miners leasing mines and operating them on a coöperative basis, selling the output for whatever the coal would bring and dividing the net returns among themselves. This became quite a serious matter during the summer months, and it is thought may develop trouble from now on, not only among the operators, but in the United Mine Workers of America.



So far as the local coal trade of St. Louis is concerned, the year 1914 opened with a slow market; prices were below normal for winter conditions, and were such on all grades of coal that the operators could only about break even on the cost of production. The first of the year saw weather colder than had prevailed up until that time, but not sufficiently severe to create a good market. Screenings were in fairly good demand at from 60c. to 65c. for Carterville and 45c. to 50c. for Standard. Domestic sizes were barely moving, Carterville and Franklin County lump averaging about $1.35 to 1.40, while nut brought $1.25 and mine-run $1.10. The winter was a warm one with little snow. This caused a light demand for domestic grades, and business conditions, instead of improving, apparently grew worse, resulting in a decreased demand for steam coal. There was no genuinely cold weather, excepting for a day or two, and this, of course, developed an unusual or spasmodic demand. Throughout January and Freburary, there was a tendency for a slight improvement in all grades of coal in anticipation of a suspension of mining on Apr. 1. This, however, failed to develop any noticeable strength, excepting in isolated cases in domestic sizes.

In the latter part of March, screenings brought as high as 85c. for Carterville and 80c. for Standard. Other coals were practically at the same level on Apr. 1 as they were at the beginning of the year. There was no demand for storage coal. This was a disastrous condition for several operators who had anticipated a rising market and an indefinite shut-down.

Throughout April, prices on screenings continued to advance, as much as $1 being paid for Carterville and 75c. for Standard. Throughout the summer months, the market was in a worse condition than in previous years on account of the financial inability of the public in general to lay in a winter's supply of coal as early as June or July. This held prices on domestic sizes down until August. Meanwhile a small tonnage of steam coal brought a fair price.

With the beginning of August, the demand for domestic sizes picked up, while that on steam sizes went in the opposite direction. The top of the market was reached for domestic coal in October, when Carterville and Franklin County 6-in. lump brought $1.75, and 2-in. lump from the Standard field sold for $1.15. The bottom of the screenings market was reached about this time, when Carterville slack was worth 15 to 20c. and Standard sold for the freight with a maximum of 5 cents.

For the bituminous shippers in the St. Louis market, the past year has been, with but few exceptions, an extremely unsatisfactory one. Many mines did not work at all, on account of mining conditions, while others which went into the hands of receivers were disposed of, but failed to operate. There was throughout the entire year, however, an optimistic belief that conditions would become better. This did not materialize for the shippers.

From the retailers' viewpoint, business was extremely good during the early part of the season, while the spring and summer were perhaps the dullest that the retail trade has ever experienced. Fall and winter developed the fact that there was a good tonnage of coal moving in small quantities, which increased the cost of delivery. There was an increased demand for Illinois coal during the past year, especially on the Carterville grade. This is caused, it is believed, principally on account of the desire for economy on the part of the consumers.

Anthracite, Smokeless and Coke

The year opened with but little demand for anthracite, but a considerable tonnage was sold during the latter part of March for April shipment at circular prices. Failure on the part of the consumers to move this tonnage brought a sudden end to anthracite shipping, with the result that independent coal started to move in at prices below circular. As a rule, this was of inferior quality.

The anthracite business revived in July and August, but the tonnage was apparently below that of previous years. This was probably largely on account of the extensive advertising of gas-house coke, which, to a large extent, is taking the place of anthracite and almost entirely displacing smokeless. The year closes with a poor anthracite market, caused by jobbers over-buying and shipping without orders, and in selling at from 25 to 35c. below circular with but little demand.

Smokeless lost, perhaps, one-half of its tonnage in the St. Louis market during the past year, on account of the introduction of gas-house coke above mentioned. This grade of coke brought in by the dealer cost on the track from $5.50 to $6 for byproduct and from $4.50 to $5 for gas-house. Local gas-house coke costs the dealer about $4 on the track, the consumer paying $5.75, delivered. There is a tendency on the part of the public, however, not to buy high-priced fuel. Illinois coals are, therefore, attracting some business that in the past went to anthracite, smokeless and coke.

The Year in Hard Coal

The Bureau of Anthracite Coal Statistics' record of shipments in the years 1911, 1913 and 1914, assuming that the shipments for December were equal to those of December a year ago, show 69,954,297 tons for the record year of 1911, 69,069,628 tons for 1913 and 68,302,961 tons for 1914. Thus the shipments in 1914 were 1,651,336 tons less than in 1911 and 766,667 tons less than last year. If the tonnage of the Lehigh & New England R.R. was included in the Bureau of Anthracite Statistics' figures, shipments in 1914 would probably exceed those of the previous year.

The decrease in production and shipments as compared with 1911 was due partly to the warm weather which curtailed demand this fall, partly to the recent drought in the anthracite region and partly to the continuation of the "button" and other strikes called in violation of the agreement between the operators and their employees signed in May, 1912. The output lost in these sporadic strikes would be more than enough to account for the difference in production in 1914 and 1913.

If the quantity of anthracite sold to local trade and employees be put at 3 per cent. of the shipments—a proportion that has held approximately, in recent years—then the total marketable output in 1914 was 70,352,050 tons, as compared with 72,052,926 tons in 1911 and 71,141,717 tons last year. This does not include the coal used in the operation of the mines themselves, which is equal to 12 per cent. of the quantity shipped.

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The Labor Situation

SYNOPSIS—The evictions of miners in eastern Ohio are set for Jan. 15. J. S. Coxey of "army" fame is talking about operating a coöperative mine. The Union proposes to start tent colonies. In Colorado the U. S. troops are being withdrawn. In Arkansas the men at the Kali-Inla mine expect to strike. In West Virginia, the Central West Virginia Coal Operators' Association was formed Dec. 29.

The Ohio officials of the United Mine Workers of America are taking steps to fight the eviction orders of the Pursglove-Maher Coal Co., which were served last week. The date for the eviction is fixed at Jan. 15. A formal demand for the ten months' rent due the company from the men was made, and this was followed by the order to evict in case the rent was not forthcoming.

Some of the operators believe that the order of eviction is a prelude to an attempt to operate the mines on the "open shop" basis. So far no effort has been made to work the mines in that way. President W. R. Woodford, of the Pittsburgh Vein Operators' Association, is authority for the statement that the action of the Pursglove-Maher Coal Co. is of its own individual election and may not be followed by other eastern Ohio operators.

Most of them, however, are outspoken in the statement that they will not permit the miners to occupy their houses indefinitely without paying rent. The miners claim that the contract calls for the rent of their houses to be deducted from their wages, and that they cannot be evicted for nonpayment of rent, as they are quite willing to have deductions made as agreed.

Arbitration Is Sought through Department of Labor

The Board of Trade of Wheeling, W. Va., has taken action looking to the intervention of the Department of Labor in the strike situation. A committee from the board conferred with Congressman Francis, of Martins Ferry, and requested him to use his influence to have the matter arbitrated. Whether the Federal government will take such an action is a matter of conjecture.

It has been argued that the differences between miners and operators in eastern Ohio are wholly as to what constitutes an equality with the old scale, for both sides say they are willing to resume at the exact equivalent. However, neither side likes to leave the equivalency to arbitration.

One operator in Belmont County who has accepted temporarily the 47c. rate because he has to have coal for his own local use and, saving freight, can pay the price demanded, says that he finds the cost of mining has gone up 8.2 per cent., or is now 3.55c. per ton higher than under the old scale.

One of the remarkable things about the eastern Ohio situation is the fact that the international officers of the Union steadily refuse to allow the men to hold a referendum vote on the proposition of the operators. Ostensibly, the miners' organization strongly favors the principle of referendum voting, but it is being withheld at this time.

Annual State Convention in Ohio

Secretary-Treasurer G. W. Savage, of District No. 6, United Mine Workers of America, has issued a call for the annual state convention to meet at Columbus, Ohio, Tuesday, Jan. 12, in the state capitol building. The local unions elected delegates this week. The new governor, Frank B. Willis, will be inaugurated Monday, Jan. 11.

It is said that the Union is preparing to purchase tents to house the strikers, and will buy 35,000 shoes for their use and for the use of their families.

General Jacob S. Coxey, who sprang into national fame a few years ago by marching an "army" of unemployed to Washington, D. C., and demanding work, plans to operate a mine in the eastern Ohio field on the coöperative plan. He proposes to lease a large tract of undeveloped property and organize a company among the miners. This proposition is not regarded seriously by most of the coal operators.

New Bache-Denman Development

The recent hearing in the federal court as to the cancellation of the coal leases held by the Bache-Denman and other allied coal companies, showed that the Kali-Inla coal mine near Adamson, Okla., still belonged to the Bache-Denman Co., or its directors. This mine is worked by 350 union miners. They have, hitherto, believed the plant was not owned by any of the Bache-Denman syndicate, or they would have struck work out of sympathy with the men who have been laid off in the mines which Franklin Bache has been trying to run nonunion. It is probable that they will go on strike now, as it was attested in the hearing that the alleged purchaser, Walter J. Gilman, a mining engineer, of Philadelphia, Penn., was not then, and never was, the owner of the Kali-Inla properties with which he was credited.

Troops Withdrawing from Colorado

Troop L of the Twelfth U. S. Cavalry has been on patrol duty in the Oak Creek district of Routt County, Colo., since last May. This is a part of Colorado in which not much trouble has been experienced, though some disorder was apparent at times. The town is, roughly, 240 miles in a straight line northwest of Ludlow. The troop will return to Fort Meade, S. D. It is expected that other troops will soon be relieved from service.

The Central West Virginia Coal Operators' Association

On Dec. 29 the Central West Virginia Coal Operators' Association was organized with the following objects:

First, the conservation of coal properties by improved methods for mining coal. Second, the provision of the best, safest and most approved methods of mining coal and the safeguarding of miners and other employees engaged in such pursuit.

The counties represented in the association are: Marion, Harrison, Monongalia, Lewis, Taylor, Barbour, Preston, Braxton, Randolph, Upshur, Mineral, Tucker, and Gilmer. There were 43 companies represented at the meeting. The directors are as follows: Harrison County, A. Lessirurang, J. Edgar Lang and Daniel Howard; Marion County, George T. Watson, C. H. Jenkins and [illegible]. M. Hite; Mineral and Grant Counties, J. G. Boyd; Tucker County, A. W. Calloway; Gilmer, Randolph and Braxton Counties, R. B. Isner; Upshur, Taylor and Barbour Counties, Lee Sandridge, I. B. Brydon and David Williamson; Monongalia and Preston Counties, T. W. Borgman and Davis Elkins.

The officers are: President, Daniel Howard, of Clarksburg; vice-president, C. H. Jenkins, of Fairmont; secretary, A. Lile White, of Clarksburg; treasurer, C. J. Ryan, of Hepzibah. An executive board consisting of five members will be elected from the directors. This will be done at a future meeting of the association to be held soon. A working secretary will be elected to take charge of the central office, which will probably be located at Clarksburg.

Extracts from a Superintendent's Diary

My wife's brother-in-law, a resident of New York City, has been spending a few days with us, incidentally giving us an opportunity to find out what city folk think of coal-mining men. We have had many interesting conversations during his short visit, but probably the most illuminating one occurred last night when we launched out on the subject of mine guards.

Earlier in the evening, one of my foremen had dropped in to discuss the advisability of employing a guard for our creek pumping station, the plant from which all of our water-supply is obtained, and my relative happened to overhear the conversation.

A strike has not been declared against us as yet, but a few incidents have occurred which leave small doubt as to the intentions of the Union, and to leave unguarded a place where one man could easily put our entire plant out of commission with a single stick of dynamite seems too much like tempting fate. Our pumper reported last night that as he was starting for home he saw two strangers watching his movements from a distance. It was that report that brought the mine foreman to my house for a conference.

Some time after the foreman had gone my city visitor led up in a roundabout way to the conversation he had overheard. Because of his evident embarrassment, I pretended not to connect his questions with my foreman's visit, but awaited a favorable opportunity to speak out.

First he wanted to know if I approved of private citizens carrying concealed weapons. I assured him that I did not. "But why?" came next. To which I replied that they were capable of transforming a peaceable citizen into a formidable fire-eater.

Then he became nervous, apparently, fearing that I had connected the question and he wandered far afield, but finally came back with: "Why should an individual or a corporation assume that police powers can be exercised by anyone at will?" By way of answer I asked him to explain why a man suddenly confronted by a bitter enemy carelessly displaying a gun pointed his way, should assume that he had a right to defend himself.

I didn't get a direct answer, but his next question showed that my reply had not been exactly satisfactory.

"Why do mine guards always exasperate the union pickets around them until they feel compelled to give battle?" I was tempted to tell him that they never did, and such stories were generally circulated for a purpose, but I feared that he would consider my testimony as prejudiced, so I suggested that they were probably anxious to commit suicide.

My sarcasm missed fire completely because he immediately wanted to know why the mining companies picked such desperate men for the work when men who valued their lives would avoid such uncalled for clashes. I assured him that men of unquestioned humility were always given the preference when considering applicants, but for some reason men of that type no longer seemed to aspire to such positions.

Again I missed fire for he suggested that newspapers so often intimated that the union men were the aggressors in battles with mine guards and probably a good many people were thus led to believe that union men were quarrelsome and for that reason men of quiet dispositions hesitated about coming in contact with them; or again, they might fear that after accepting positions as mine guards, some of the union men might intimate to them that they were casting their lot with the wrong side and then they would be sorely troubled as to just what course to pursue, since they must choose between scab and traitor.

I have heard of people laughing in their sleeve; now I know that it is quite possible.

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West Virginia's Mining Population

An interesting report, which has just been compiled at the West Virginia Department of Mines, is that giving the nationalities of the coal miners employed in the state, wherein the total mining population of West Virginia is given at 78,041, of which 49,458 are American (white and colored) and 28,583 are foreigners. Of the foreign-born miners the Italians lead with 10,276, while one Dane and one Hebrew are at the bottom of the list. They are classified as follows:

Americans (white).....	36,101	Horwat (Croatians)....	430
Americans (colored)...	13,357	Syrians	115
Italian	10,276	Croatians	115
Hungarian	4,761	Bohemians	89
Polish	3,136	Servians	60
Slavish	2,229	French	46
Russian	1,737	Turks	45
Austrian	1,472	Swedes	21
German	577	Bulgarians	12
Greek	571	Welsh	11
English	557	Montenegrins	10
Roumanian	510	Belgians	8
Granish	149	Danish	1
Lithuanians	414	Hebrew	1
Litvitch	389	Unknown	188
Scotch	221		
Irish	202		78,041
Spanish	230		

It is interesting to note that the four counties of McDowell, Fayette, Mercer and Raleigh, in which the smokeless fields are located, have a mining population of 38,279, or nearly half of the entire mining population of the state. McDowell leads with 16,558, of which 10,487 are Americans and 6071 foreigners; Fayette with 12,651—9257 Americans and 3394 foreigners; Raleigh with 5644—3787 Americans and 1857 foreigners; Mercer with 3426—2651 Americans and 775 foreigners. Other counties with large mining populations are Kanawha, with a total of 7460—6252 Americans and 1208 foreigners; Harrison with 5288—2136 Americans and 3152 foreigners; Marion with 5702—1902 Americans and 3800 foreigners; and Logan with 4820—2960 Americans and 1860 foreigners.

The remaining 16,492 of the mining population are divided among the counties of Tucker, Barbour, Boone, Braxton, Brooke, Clay, Gilmer, Grant, Greenbrier, Lewis, Lincoln, Marshall, Mason, Mineral, Mingo, Monongalia, Nicholas, Ohio, Preston, Putnam, Randolph, Taylor, Upshur, Wyoming and Wayne.

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The Development of the Coke Industry

The Iron Trade Review has compiled the following interesting history of the coke industry:

100 B. C.—It appears that the Chinese used coke as an article of commerce some two thousand years ago, and in the middle ages it was manufactured for use in the arts and for domestic purposes.

1620 A. D.—This is the earliest record that we have of coking coal in a regular oven, when a patent was granted to Sir William St. John, in England, for making coke in a beehive form of oven.

1700—J. Becher, a German chemist, took out a patent to save tar from coking coal, and to utilize it for preserving ropes and wood.

1737—Clayton, of England, appears to have been the first to notice that in addition to coal tar and oils, a combustible gas was formed when coking coal.

1781—A patent was issued to the Earl of Dundonald for making coke in beehive ovens, and also for producing "tar, pitch, essential oils, volatile alkali, mineral salts, etc." which appears to be one of the early, fairly successful attempts at saving the byproducts.

1792—William Murdock, a Scotchman, who was a mechanical engineer, associated with James Watt in steam-engine building, is recorded as being one of the first to experiment successfully with making gas from coal, in retorts.

1812—The streets of London were first lighted by gas, presumably an outcome of Murdock's experiments.

1826—We find the first definite records of beehive coke being manufactured in England on a fairly large scale for metallurgical purposes.

1830—The first records of the rectangular, or retort, oven are found in Germany, having open walls, forming a rectangular space which contained the charge. The walls were pierced by horizontal and vertical flues.

1834—The first gas from retorts in the United States was made, together with gas coke, and William Firmstone, in 1835, made good gray forge iron at the Mary Ann furnace, in Huntington County, Penn., from Broad Top coal.

1841—The first Connellsville coke ovens are said to have been erected and the coke shipped to Cincinnati, Ohio, by water.

1857—In this year Appolt built his first ovens in the shape of vertical and later horizontal retorts. He utilized his gas only for heating his oven through horizontal flues. This represents practically the first type of closed retort coke oven, utilizing the gas for its own heating.

1861—Coppee built the first of his Belgian type of ovens, and was the first to demand the use of crushed coal.

1893—The first battery of byproduct ovens in the United States was built at Syracuse, N. Y.

Statistics of the byproduct coke production from 1893 to date are as follows:

Year	No. of Ovens		Coal Used Short Tons	Coke Produced, Short Tons	Yield of Coal in Coke Per Cent.
	Built	Building			
1893	12	....	....	12,850	....
1894	12	60	....	16,500	....
1895	72	60	....	18,521	....
1896	160	120	....	83,038	....
1897	280	240	....	261,912	....
1898	520	500	....	294,445	....
1899	1020	65	....	906,534	....
1900	1085	1096	....	1,075,727	....
1901	1165	1533	....	1,179,900	....
1902	1663	1346	....	1,403,588	....
1903	1956	1335	....	1,882,394	....
1904	2910	832	3,572,916	2,608,229	73
1905	3103	417	4,628,891	3,462,348	74.8
1906	3547	112	6,193,107	4,558,127	73.6
1907	3684	330	7,506,174	5,607,899	75
1908	3799	240	5,699,058	4,201,226	73.7
1909	3989	949	8,390,129	6,254,644	74.5
1910	4078	1200	9,529,042	7,138,734	74.9
1911	4624	698	10,446,584	7,847,845	75.1
1912	5061	1000	14,731,310	11,048,489	75.0
1913	6781	536	16,952,533	12,714,700	75.0

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Kentucky Compensation Invalid

By a vote of four to three, the justices of the Court of Appeals of Kentucky have decided that the Workmen's Compensation Act, which would have become effective Jan. 1, 1915, violates the Constitution of that state, and is void so far as it may be interpreted as coercing employers and employees into coming under it. The Court of Appeals approves a proper form of Compensation, but holds that, since employers and employees would be virtually compelled to be governed by the provisions of the Kentucky Act, as framed by the last legislature of that state, it is void. The court finds two principal objections to the law: (1) It limits the amount recoverable for injuries due to negligence of an employer, and (2) it takes from the estate of a workman killed in the course of employment, if he leaves no dependent relatives, part of the award payable for the accident, and provides for the payment thereof into a fund from which other employees injured may draw. The Court of Appeals intimates that an employment contract might validly provide for a limitation of the amount recoverable against the employer in case of accident, but finds that the proposed compensation law would have unconstitutionally coerced employees into accepting less compensation for their injuries than the damage actually sustained.

The effect of this decision will doubtless be to defer, if not totally defeat, the final adoption of an enforceable compensation law in Kentucky. In other states, the action of the Court of Appeals will afford a strong precedent for the overthrow of similar laws which have not yet been submitted to the judicial test.

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Decrease in Shipments over the Virginian Railway

A statement of the Virginian Ry. tonnage for the 10 months of 1914, compared with 10 months last year, shows a decrease of 371,500 tons, or nearly 10 per cent. The shipments for the last two years by months were as follows:

Month	1913	1914
January	453,886	407,109
February	399,267	259,756
March	380,091	336,952
April	345,039	342,843
May	318,720	359,929
June	304,030	321,181
July	321 626	286,354
August	376,083	361,900
September	393,190	379,113
October	476,482	341,703
Total	3,768,424	3,396,840

Dumpings over the pier at Sewalls Point during October decreased 65,865 tons, or 18.3 per cent., while for the 10 months of 1914 there was a decrease of 273,665 tons, or 10.2 per cent., compared with same period of 1913.

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Government Indorses Electric Shotfiring Systems

F. R. Lane, the Secretary of the Interior Department, on the recommendation of the Commissioner of Indian Affairs and of the Director of the Bureau of Mines, has affirmed the order of May 4, 1914. This order required the use of permissible explosives in coal and asphalt mines on the segregated lands of the Choctaw and Chickasha Nations in Oklahoma, but it granted that if electric shotfiring systems were installed, operated from without the mine, nonpermissible explosives might be used. The date set for the order to go into effect was Jan. 1, 1915.

The department issued the following statement:

> This order was issued with the two-fold purpose of increasing the health and safety of miners, and protecting the property interests of the Indian lessors against damages by mine explosions or mine fires, and by the terms thereof, was made effective Aug. 1, 1914. The order was later suspended until Jan. 1, 1915, so as to afford opportunity for demonstrations of permissible explosives in Oklahoma by engineers of the Bureau of Mines and for investigations into the use of electric shotfiring systems with especial reference to the conditions in Oklahoma.
>
> In the interval between Aug. 1, and the present date, the Bureau of Mines conducted demonstrations in some 12 typical coal-mining operations out of the 44 coal mines on segregated lands, and made an exhaustive study of electric shotfiring systems. At the conclusion of these field demonstrations, a conference was called at Pittsburgh, Penn., on Nov. 30, for the purpose of permitting the miners and operators to present concretely such objections as they might have to the enforce-

ment of the order. The matter was quite fully discussed at that time, but as both the operators and miners failed to submit the facts upon which their objections were based, they were given until Dec. 15, in which to submit their views in writing. These statements have now been received and have been carefully examined.

After a thorough consideration of this order in all its bearings, as regards miners, operators and Indian lessors, it is ordered that the same be made effective Jan. 1, 1915, and that the representatives of both operators and miners be advised at once that the Bureau of Mines, through its local representative at McAlester, Okla., will receive and act upon individual applications from the operators, for an extension of time within which to take steps to comply with the terms of such order. A liberal time will be allowed for this purpose so that no undue hardship will be imposed.

REASON FOR GRANTING OPERATORS FURTHER TIME TO COMPLY

This recommendation is based upon the following considerations:

(1) The depressed financial condition makes it difficult for the coal companies to raise any large amount of money at the present time for the purpose of installing mining machines, such installation being necessary if permissible explosives are to be used to the best advantage.

(2) Electric power is not available at present to many of the operators and it will necessarily take some time before suitable arrangements to this end can be made.

(3) The operators on segregated lands are subject to keen competition with the coal produced in the nonunion mines of Arkansas and Colorado, where mining costs are lower, and also with the coal mines in Oklahoma on the nonsegregated lands which are peculiarly favored in respect to absence of gas and better working conditions. The market for the coal produced from the segregated land is also much restricted by reason of great increases in the production of oil and natural gas in Oklahoma, with which, on the score of cheapness and efficiency in use, coal cannot compete.

(4) The change in explosives will probably compel a readjustment of the understanding with the miners with reference to working conditions, and a reasonable time would be permitted for the working out of satisfactory arrangements, in order that undue hardship may not be caused to either side, and that the royalty returns to the Indians may not be reduced.

A Safety Organization in the South

The coal companies of the South have shown a strong tendency to come together and promote better conditions in the mining camps, while in sanitary improvement Alabama has been a leader. There is now an effort to put the safety campaign on an equally satisfactory footing.

Ninety-eight operators, superintendents, physicians, and others met in Birmingham, Ala., and formed a safety association with E. B. Sutton, a mining engineer of the Bureau of Mines in Birmingham, Ala., as president, Jones G. Moore, manager of mines, Sloss-Sheffield Steel & Iron Co., as first vice-president and Dr. M. W. Glasgow, as secretary. It has not been decided yet whether affiliation will be sought with the American Mine Safety Association, though such an alliance would be of mutual benefit.

The Human Element

Written Expressly for
COAL AGE

By MICHAEL BERNARD

WILL meander in with a silly grin.

YOU may spend your cash by the hundreds.

THIS safety scheme is a wonder
  For the sparing of pain and hurt
To the men who pick where the gloom lies thick
  On the walls of coal and dirt;
But the thing is a piece of rubbish
  And a standing joke, besides,
If the chaps who read will refuse to heed
  The rules that the plan provides.

IF you furnish signs by the dozen,
  And you plaster them all about,
Telling plain and clear that there's "*Danger Here!*"
  With the warning words "KEEP OUT!"
Yet some boob with an upper story
  Like a cue-ball fringed with hair,
Will meander in with a silly grin
  To discover why they're there.

YOU can purchase countless devices
  Of the automatic kind,
As the spring and pawl to prevent the fall
  Of a cage in an overwind,
But they're put at a disadvantage,
  And their service is often vain,
For there's little hope when they have to cope
  With a man with a two-ounce brain.

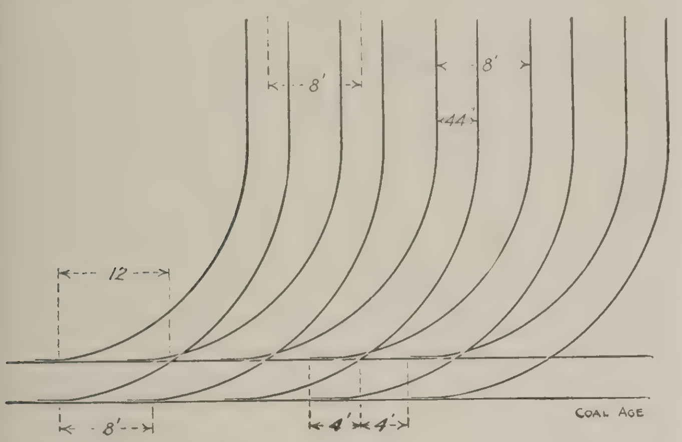
YOU can spend your cash by the hundreds
  For the saving of life and limb,
Putting shields of steel over gear and wheel,
  And a guard at the pit-mouth's rim;
Yet in spite of your strict precautions,
  And spite of your utmost care,
Some befuddled bum with a load of rum
  Will fall into trouble there.

° ° °

SO it's not a matter of posters to admonish or to remind,
  Nor of safety tools, nor of books of rules, but it's all of these things combined.
It's a matter of education by picture and printer's ink,
  And the only way is to work and pray till the toilers have learned to think.

An Economical Switch Arrangement

The accompanying illustration shows how a number of switches may be laid to secure a maximum economy of space. In the figure it will be noted that five complete switches, with a track gage of 44 in., and each having a lead of 12 ft., take up an entire distance of only 48 ft., where ordinarily 72 ft. would be required.



Plan Showing Switches

The arrangement as here shown is used by the Preston County Coke Co., at Cascade, W. Va., and is employed for the purpose of running locomotives into the motor barn. This building may, therefore, be constructed with a minimum of length and breadth.

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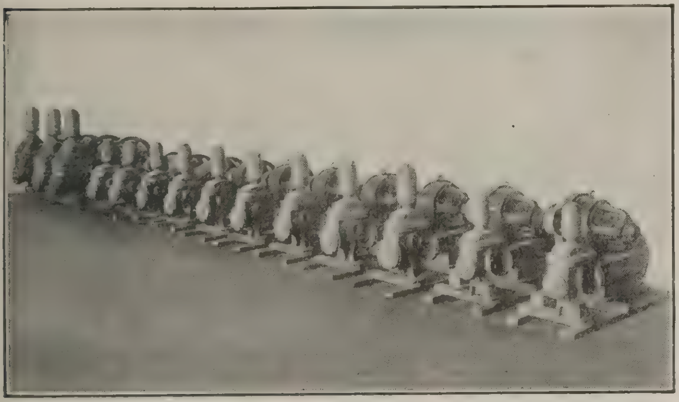
A Motor-Driven Mine Pump

The accompanying illustration shows a group of motor-driven pumps developed specially for sump and gathering service in coal mines.

These pumps, which were built by the Weinman Pump Manufacturing Co. of Columbus, Ohio, have brass-lined water cylinders, with bronze piston rods, bronze valve seats, stems, springs, stuffing-box caps and glands, and bronze adjustable cross-head shoes, so that they are thoroughly protected against the action of mine water.



One Shipment of Weinman Pumps

The motors are direct-current Westinghouse machines and are mounted on top of the pump, where they are kept out of the water. They are supplied with impregnated windings, which afford protection from dampness. A special feature is the use of automatic control by which the pump can be started and stopped from any convenient point.

The unit formed by motor and pump is very compact and is readily mounted on a truck so that it can be easily transported from place to place as needed. The group shown is a lot ready for shipment one week after receipt of order.

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A New Form of Concrete Timbering

Mr. H. Otten, Essen, Germany, describes in *Gluckauf*, Sept. 5, 1914, some successful trials of reinforced-concrete timbering made by the Frankfort Concrete Construction Co., Ltd., which overcomes the obvious objections to concrete supports made in the gallery itself. The first trial was made in 1909, in the Kronprinz pit at Ensdorf, Saar district, the gallery lined being about 75 ft. long. Although the results were satisfactory in every respect, so far as concerned the stability of the structure, there was scaling at the joints when the structure was pushed sideways by the earth pressure. Like efforts were shown in a crosscutting, about 100 ft. long, lined in 1910. After a lapse of four years, it was found that the structures showed weakness at the joints only.

This experience suggested a change in the design. The caps were recessed to receive the rounded ends of the props, making a knuckle joint, and a cork inlay about an inch thick was set between the two surfaces, to distribute the pressure evenly, and so that the concrete surfaces should not bear one on the other. This new construction allows side movement without weakening the stability of the structure.

In January, 1910, a gallery about 50 ft. long was provided with this latter form of timbering, which was set on cement blocks, and the work turned out very well. The timbering yielded sufficiently to the rock pressure without a sign of crumbling at the bearing. A brick lining laid in this gallery at the same time was badly crushed.

Following this trial, a gallery in the Dudweiler pit, which was subject to the greatest pressure to be found, was timbered with 220 of these frames, with entire satisfaction to the owners.

Further experiments were made in the pit Preussen II, of the Harpen Mining Co., in the lowest level, where there was unusual pressure accompanied by springs in the seams. Both uprights and cross pieces in this mine have withstood the pressure after two years' exposure Previously this gangway had been lined several times with iron frames, which had quickly given way by the contraction of the cross-section.

These experiments show that this method of timbering is thoroughly practical, and in addition is fireproof.

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Status of Mine Examiners as Employees—Under the provision of the Illinois constitution which requires the legislature to provide for the safety of "operative miners," and under the laws of that state which require crosscuts to be closed in certain cases, an assistant mine examiner, who was injured by explosion of accumulated gases in a mine which he was examining, cannot recover on the theory of a violation of the laws by the operator. Any common law right of recovery was absent in this case on account of a showing on the part of the operator that plaintiff was inexcusably careless in making the examination of the mine with an open lamp. (Havron vs. Shoal Creek Coal Co., 184 Illinois Appellate Court Reports 117.)

Editorials

When Should Rescue Work Be Abandoned?

There has been some discussion recently relative to the extent or duration of rescue work following a serious mine accident. One engineer calls attention to the numerous instances where more men have been lost in the subsequent rescue operations than perished in the initial disaster. The Cadeby explosion in England was an example of such a case.

On the other hand, there are many instances of accidents where men were given up for lost, and yet have been rescued. Not long ago, after a serious mine accident, the local mine inspector stated definitely that no more men could be alive in the workings, however, his assumption was proved false for one of the entombed miners was able to drag himself to the shaft and thereby bring about the rescue of his comrades. Just think what would have happened in such a case if the mine had been closed down.

In this kind of problem, each individual holocust must be accepted as its own guide. There is plenty of room for the exercise of extreme caution, however, it would be unfortunate to induce a state of mind making it possible for the acknowledged bravery of the mining community to go out of fashion.

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An Industry Renewed

A subtle change has come over all our methods of reasoning on social problems—and it has come to stay. It has its origin in new conditions, but they are so permanent in character that we cannot look for any changes for two or three generations.

Years ago the people in any American village were very much alike. None were extremely rich; all spoke English fluently though some were perhaps foreign and spoke with a brogue. They all lived as one community, took part in the same celebrations, attended the same church, eschewed or were enslaved by the same vices.

If there were differences among them, the "different" people moved away, and the bond among those remaining was rendered still stronger. The people, thus bonded together, had no disagreements and grew remarkably in culture. The better educated and the richer did not move away. Their aspirations and their living refinements penetrated through the communities; their private lives were matters of daily discussion.

But the entrance of non-English-speaking foreigners, the growth of wealth, the lure of the cities, soon broke up the unity of village life, especially in those hamlets built like mining towns to order. No longer could there be a hope of rising culture. In fact, as the early Anglo-Saxon element in Tennessee has been subdued by the mountains, so, in too many cases, have our American people been pushed into squalor by an over-close association with southern Europeans, who came to America, not to live with us a life in accordance with their ideals, but to barely exist with us, that they might secure for themselves their ideal life in the village from which they came.

It was evident that mining life rose in the scale of culture but slowly and perhaps tended to retrograde What was good in the early camp was being fast driven out. The young men—the sons of the miners of former days—were leaving. As the towns became unattractive, drunkenness and lawlessness increased and reacted one on the other.

And, as a result, the mining industry has been blamed and a change has come at last. We no longer think we are exonerated if large wages are paid and but small profits are secured. It would be better to pay less wages if a little better mode of life could be assured, if the saloon and the game of poker could be despoiled of some of their ill-gotten gains, and a little more could be put into home comforts and health, wholesome food and decent clothing, a garden, a playground and a better school.

It is useless to say that this country recognizes the individual, gives him a vote and looks to *him* to provide for his betterment, seeing that it has been abundantly shown that it is not true that he seeks to improve his condition. It has been proved again and again that, given ordinary conditions, the citizens of a mining town with a large percentage of southeastern Europeans, unless there is some system of segregation or some attempt at supervision, or some encouragement toward betterment, will not improve at all from year to year, and may notably decline in culture as years go by.

It is increasingly clear, also, that the more enterprising people, even those connected with the mines in an official capacity, are tending to leave the mining town and live outside. So there can be no solution in *laissez faire*. We must act definitely if we would keep conditions even at their present level.

But it does not follow that we need imitate foreign models, or at least not those in favor on the Continent of Europe. There is no reason why we cannot seek to build up our communities on the basis of individual thrift and sobriety. Every man can own his own house and have his own lot, can have his share in a bank, his bank account, his certificates of stock, and can contribute to the cost of local movements, filling also political offices of various kinds. All that is needed is the inculcation of ideas and the provision of opportunities.

Coöperative stores are proving successful in Illinois. Many of the towns in that state are filled with the residences of miners, privately owned. The sidewalks are usually of concrete. The lots are kept scrupulously clean, and the lawns are carefully kept. There is every evidence of thrift. Many of the Young Mens' Christian Associations and similar institutions even in proprietary towns are already being directed by the miners with marked success.

There is no reason why greater strides are not possible. But some coal companies are so indifferent that even their own offices are dirty and disreputable in appearnce; the mine surroundings and the railroad tracks ave a demoralized look; the streets have never been graded or crowned, and the alighting place, called a tation, is of repellant appearance.

Some of the operators who disdain the careless *ménage* of their workmen and tenants are themselves equally regardless of the appearance of their own works, and the untidy interiors of their power and boiler houses make it impossible for them to find fault with their workingmen.

Who Gets the Promotion?

Replies to the Cartoon problem printed in Coal Age Dec. 26, and entitled, "Who Gets the Promotion?" have been received in such number that we will be obliged to publish them in abstract. A few of the answers—those selected by the judges as of greatest value—will be printed in full.

Because of the unusual and widespread interest this question has aroused, we have decided to submit the replies of our readers to five competent judges. Each of the three men in the cartoon has his advocates, and it is remarkable how different are the opinions.

Many of those who have answered the question as to what they would do if they were the boss, are really bosses themselves, and we wonder how many of these men have actually had to decide a similar case in real life.

At any rate, the problem is an interesting one, for it will tend to bring out strongly the essentials in character that are likely to be of value to an individual in advancing his sphere of usefulness. Every miner, fireboss and foreman should set aside time to read this discussion when it appears (probably next week), and the more successful men filling higher positions may with advantage read the opinions of others on this subject.

As stated at the time the cartoon was published, the discussion will close Jan. 9, and any letters received thereafter will not be entered in the contest. In all cases where we have not been requested to withhold the writer's name, same will be published with his answer.

The Eastern Ohio Strike

We trust that the strike in eastern Ohio, which has already lasted nine months, will not be extended for many weeks into the new year. We would like to see the miners *win* in a real sense and obtain annual wages equal almost to those in other states in the Union. It does not follow, though, that better wages will be obtained if the rate for machine-mined run-of-mine coal becomes 47c. per ton. The number of days worked in the year will alone determine whether that, or any other wage thereabout, will afford a good annual compensation.

In the State of Indiana is an instance of this fact. The beds of "block coal" and those the Indiana people persist in calling "bituminous"—as if the "block" were not also comprehended in the same title—are alike comparatively flat. There is perhaps little other than more careful handling to make the labor cost of block coal $1.55 a ton, while that of bituminous coal is only 89c. The difference is in the wage scale.

Yet the annual wage of a block-coal employee was only $476.09, while that of the "bituminous" worker was $691.47—so large a factor is the number of days worked in determining wages.

It will be found by referring to E. W. Parker's interesting figures that in Ohio the average number of days worked per year from 1908-1913, inclusive, was 190. In the same period the Pennsylvania worker secured 238 days, or 25 per cent. more time. We do not believe in dividing wages by three to secure a half more working time, but it does seem that to attain 25 per cent. more day's labor, it is worth while to concede a little on the wage rate, when every evidence shows that the prevailing rate is now so high as to exclude the coal from the market.

Certainly, seeing that in that state there is already such an irregularity of work, it is ill-advised for any of the Ohio miners to ask an increase in wage rate. It is disingenuous for the eastern Ohio employees to declare that they are seeking only for last year's equivalent. They know quite well they are not, and that the operators in the southern part of the state conceded to the demands of the miners promptly, because the proposition made was a decrease in the mining rate of their region and an increase in the rate formerly ruling in the districts of their rivals.

Let the miners think twice. A doctor or a lawyer can set his rates as high as he pleases. However, if he sets them too high, he will get no practice. The "practice" of the eastern Ohio miners is similarly forfeited by their determination to secure a higher rate of pay than the market is able to concede.

The War Toll in the Staff of European Coal-Mining Companies

The coal industry in Germany, Austria, Belgium and France would seem to be suffering a disproportionately heavy death loss among its professional members.

At the recent annual meeting of an important German coal company, a letter was read from the general manager, regretting that as he had been called to the front, he would not be able to preside as chairman. The notice of this meeting concluded with the statement that in spite of the fact that the war "had torn great holes in the management," so far none of the company officials had been killed.

In Germany and Austria, the mining engineer is a government officer. His studies are made in government schools. He must stand official examinations, and rank and title are given to him, defining accurately each step as he advances in his career. The system is military in general form. Quite naturally, then, the government takes from these ranks the officers for the reserve army, which is called into existence by the declaration of war.

In the first weeks of the war, before the losses had reached the present appalling figures, there were numerous private death notices in the German dailies, and it was surprising how many had fallen who had been connected with the staff of the coal-mining industry. Latterly, these notices have become less frequent, but even among these there are indications of the heavy loss borne by the coal corporations. For instance, a Rhenish coal company announces in a single notice the loss of three members of its official staff.

A long continued conflict will certainly place a heavy handicap on the warring nations through this enormous loss of men engaged in the engineering professions.

Legal Department

Termination of Coal Leases

By A. L. H. Street*

Several interesting and important legal phases bearing upon a coal-mine lessee's liability for minimum royalties were involved in the recent case of Ellis vs. Cricket Coal Co., 148 Southwestern Reporter 887, which was passed upon by the Iowa Supreme Court. The lease in this case bound defendant to continue operations "for a period of 20 years or until all the merchantable and minable coal in said mine has been exhausted," and provided for the payment of a minimum monthly royalty during the life of the contract. Operations and payment of the royalties having been suspended, plaintiff, the lessor, brought suit to recover payments claimed by him to be due, and defendant interposed a defense that all the "merchantable and minable" coal had been removed. In sustaining this defense, the Supreme Court decided these points:

The burden was on the lessor to show that merchantable and minable coal remained in place, and not upon the lessee to disprove that fact.

Coal in place is "merchantable" within such a lease when it is of such quality as to be salable on the market, and it is "minable" when it is so situated that it can be removed at a reasonable profit. "As bearing on the minable character of coal, its accessibility, the condition of the earth over it, the interference by water, whether free from or mixed with other substances, must be taken into account and where removal as an article of commerce is contemplated, the cost of mining and bringing the coal to the surface is a controlling consideration." The cost of excavating the places of refuge along the haulageways, required by statute, is properly considered in determining whether the coal is minable at a reasonable profit.

In this case it appeared that a railway company afforded the only market for the coal that might be produced from the mine. Therefore, the question whether the coal could be produced at such profit as to be "minable" must be determined by the prices paid by this railway company, and not by general market values.

Recent Judicial Decisions

Discrimination in Switching Charges—The Interstate Commerce Commission has power to prohibit two railway companies from continuing a practice at a given point in switching cars of coal between their lines at a low rate, while imposing a prohibitive rate for switching cars to and from the line of a third company. (United States District Court for the Middle District of Tennessee, Louisville & Nashville R.R., Co. vs. United States, 216 Federal Reporter 672.)

Operator's Liability for Defective Cutting Machine—The provisions of the Pennsylvania Mine Foreman Law do not relieve an operator from liability for injury to an employee, due to a defective condition of an electric cutting machine which had been negligently permitted to remain in a dangerous condition after the mine boss had notice thereof, it appearing that the mine foreman had nothing to do with the machine. (Rau vs. Pittsburg-Buffalo Co., 54 Pennsylvania Superior Court Reports 579.)

Burden of Proof in Personal Injury Cases—In a suit by an employee against a coal operator for injury, resulting from a defect in an appliance, the burden is on the former to show that a defect was negligently permitted to exist and that it was the direct cause of the accident. An employer cannot be held responsible for injury received by a worker at a defective machine, unless it appears that the employer or his representative had actual or constructive knowledge of the defect. (West Virginia Supreme Court of Appeals, Vance vs. Virginia Pocahontas Coal Co., 82 Southeastern Reporter 1081.)

Employment of Minors—The statutes of Pennsylvania forbid employment of boys under fifteen years of age in oiling machinery, regardless of whether the machinery is in motion or not. Where a certificate for the employment of a minor mis-stated his age as being less than fifteen, and the father's signature thereto was forged, the father and the boy could recover damages for injuries sustained by the boy while oiling machinery, it appearing that the father had no knowledge as to the nature of the employment. (Hrabchak vs. Delaware & Hudson Co., 54 Pennsylvania Superior Court Reports 626.)

Engineer as Fellow Servant of Miner—For the purpose of applying the rule of law that an employer is not liable for injury to an employee caused by negligence of a "fellow servant," an engineer of a hoist engine of a colliery is the fellow servant of a miner, exonerating the employing operator from liability for injury to the latter caused by negligence of the former in controlling the movement of a cage; the engineer being bound to conform to the signals given him and having no powers of superintendence. (Golien vs. Susquehanna Coal Co., 54 Pennsylvania Superior Court Reports 299.)

Operator's Duty to Timberman—Damages not Excessive—An Illinois mine operator's statutory duty to examine mine roofs, mark dangerous places and make entry thereof in books, is not obviated by the fact that the mine manager, a licensed mine examiner, informs a timberman of dangerous places in the mine, and directs the latter to make them safe. $4500 was not excessive recovery for injury to a timberman, caused by fall of rock from a roof, where he was confined to his home for several weeks, and was severely injured about the hips, abdomen and kidneys, and was unable to work. (Wilson vs. Danville Collieries Coal Co., 184 Illinois Appellate Court Reports 180.)

Operator's Liability for Neglecting Mine Ventilation—In a suit against a coal operator in which an employee recovered $1000 for injury to his health which he claimed was caused by the operator's failure to ventilate the mine as required by state law, it is held that the miner cannot be deemed to have assumed the risk incident to remaining at work in a badly ventilated place, unless the danger was so imminent that a reasonably prudent miner would not have continued work there. It is further decided that the fact that plaintiff may have driven a shaft ahead of the airway was no bar to his recovery; the management of the mine being under the operator's and not plaintiff's control. (Kentucky Court of Appeals, Log Mountain Coal Co. vs. Crunkleton, 169 Southwestern Reporter 692.)

Exchange of Corporate Shares for Property—Under the laws of Missouri where a domestic coal corporation issues stock in payment for property, the property must be fairly equal in value to the par value of the stock issued therefor; otherwise the stockholders receiving such shares will be held liable for the excess of the par value of the stock above the value of the property to creditors of the corporation who in good faith relied on an assumption that full value was paid for the stock in assets held by the company. And, on this point, it is immaterial whether the exchange of stock for property worth less than the value of the stock was free from actual fraud on the part of the stockholders. Creditors of a corporation, in the absence of information to the contrary, are entitled to rely upon the company having the full amount of its capital stock in money, or its equivalent value. (United States District Court, Southern District of New York; Babbitt vs. Read; 215 Federal Reporter 395.)

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*Attorney-at-law, St. Paul, Minn.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 18—Referring to Letter No. 11, **Coal Age**, Dec. 19, p. 996, permit me to say that "Wesvania" evidently did not read my letter thoroughly or grasp my ideas on lobbying. It was my purpose, in my previous letter, to explain the necessity of having representatives before Congress or state legislatures, not for the purpose of exerting an undue influence, but to have these representatives explain to the legislators the status of the coal business and the needs of the industry, in an intelligent manner.

I am glad to learn of the satisfactory working of the West Virginia Compensation Act, as I believe that a collective plan of compensation is far preferable to the carrying of insurance by individuals; provided, of course, that all companies are obliged to maintain a certain standard in their mining operations. If such a standard is not insisted upon, a careless operator will profit by the expenditures of those complying with the law.

Carl Scholz, President,
Coal Valley Mining Co.

Chicago, Ill.

Letter No. 19—No one who is familiar with mines and mining can doubt that glaring errors have been made in drafting the laws of the different states. Nor can there be any doubt regarding the fact that legislators are generally unfamiliar with the industries which the laws they make will govern.

Mining men as a rule do not take an active interest in the enactment of the laws that are to govern the industry. Why this is so would be hard to explain, but it has been the writer's privilege to remark this indifference in many cases. The making of laws is something that the miner and every official, from fireboss to general manager, is often willing to let the outsiders manage.

At this point, I would ask, is there any industry under the sun that an outsider, as a rule—the men who make laws and the general public—know so little about? The ordinary industrial worker takes even less interest in the means whereby he is kept warm and his factory wheels kept moving, than mining men take in mining laws. They, perhaps, know more than the young lady who when visiting a mining camp and hearing the owner of the mine order a few bales of hay to be sent down, asked if that was for the miners to eat.

To the average outsider the details of a mine, if not repellent, are at least not fascinating. Visitors are frequently met in the steel mills, factories and other working places, and naturally become more or less familiar with the general aspects of the industries they visit, including the conditions under which the men work. But, except in such cases as the wholesale slaughter of a mine full of men, or such a condition as has occurred recently in West Virginia and Colorado, the public evinces little or no interest in the miner or his work.

This lack of interest creates a dearth of definite and accurate information that shows itself in our mine laws, which are too often vague in meaning and practically useless for the purpose intended. As stated in a well written article by "Mining Engineer," **Coal Age**, Dec. 12, p. 958, "In many cases, the law has worked an unjust burden on the operator." Recalling what the mine-run law, enacted in a neighboring state some time ago, has done for the miners and their families, owing to the utter impossibility for mine operators to operate under its conditions, I would add to this statement—an unnecessary burden on the miners as well.

But after all is said and done, what we need in and about the mines today—and this applies to several different mining states—is a spirit of obedience to the law as it exists, rather than additional laws. Let us manifest a genuine desire to carry on our work in accordance with the laws' intent. During the past three years, my work has taken me into nine or ten different states where mining of one sort or another is carried on, and into a great many mines in each of these states. This work being particularly the seeking out of danger to life and property, experience has taught me that no matter whether it be in the coal mines of West Virginia, Pennsylvania or Ohio, or in the iron-ore mines of the Northwest or any other field, the mines that are operated in the safest manner are those where the management is more concerned with taking all reasonable precautions, and adopts the safe course even if it be a little more troublesome, instead of hunting for loopholes to avoid the law, or lamenting the existence of a law which, in the manager's opinion, is an injustice and an unnecessary burden; where the management, in short, goes ahead with a determination to not only conform with the law but to "play safe," whether the law says so or not. I am glad to say that this spirit is found not only in the conduct of the larger corporations, but in less pretentious operations as well.

Were our state mining laws as extended and voluminous as a "Webster's Unabridged," I venture to say each of us could find something that had thoughtlessly been omitted. And, regardless of the complete detail of the mining laws, the management of each mine would still require individual rules of their own that would need to be enforced quite as rigorously as the general code, if the mine is to be operated as safely as possible.

My own personal experience forces me to conclude that the degree of safety, at any mine, depends to a large extent on the attitude of the management toward the idea of safety above all other considerations. Such an attitude thoroughly impregnated in the daily work of the superintendent and the foreman means more than is generally understood. Given my choice between a mine with good natural conditions in respect to roof, gas, etc., but a management indifferent toward safety details in its operation; and a mine where the natural conditions were adverse, but the superintendent and foreman willing and anxious to "play safe," I would take my chances, as a workman, in the latter mine.

In the letter to which I have referred, "Mining Engineer" takes exception to the law requiring boreholes to be kept in advance of the work in virgin coal. Perhaps the wording of this law should have been more explicit, or authority have been given to state mine inspectors to use discretion in its application, as it would seem a needless expense to drive holes in advance of an entry that has been cut around by other work; yet, we who have had to do with the driving of narrow work, in the solid part of the gaseous Pittsburgh seam, know full well that many serious accidents, costly fires and explosions have been avoided by the very fact deplored by "Mining Engineer." The drilling ahead of the work to locate gassy clay veins and thereby tap and drain off the gas gradually is the safe method to adopt in such formations.

Sim C. Reynolds, Safety Inspector,
Aetna Life Insurance Co.

Houston, Penn.

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The Verner Counter-Current Theory

Letter No. 14—I cannot refrain from commenting on Mr. Verner's last letter, No. 12, Coal Age, Nov. 7, p. 761, in which he states: "I have faith to believe, however, that eventually the theory of the counter current will win out and be shown to have a practical value in respect to the prevention of explosions."

The most notable feature, in this letter, is that Mr. Verner has, himself, entirely failed to show how such "prevention of explosions" can be brought about, in the practical application of his theory, which is, after all, but a restatement of what has always been understood as the natural result of the cooling of the heated gases of the explosion and the condensation of vapors.

The quotation from Dr. Wheeler's letter, on the same page, by "An Interested Reader," shows that there was no inrush of air when the gallery in which the explosion took place was opened at both ends. This is the case in the Bruceton experimental mine; and it is probably due to that fact that those in charge of the Bruceton experiments gave no attention to the counter-current theory.

The inrush of air, such as was in evidence in the experiment performed by Dr. Wheeler for Mr. Dean, can only be obtained in an entry where there is a dead-end; as, for example, in a rock tunnel. In such cases the dust conditions are not present wherever, as in usual mining practice, there is an intake and return airway, and the conditions required by the Verner theory are not possible. It was owing to this fact, as noted in my last letter, the cinematographs taken during the entire time occupied by an experimental coal-dust explosion, at Altofts, showed that no counter-current occurred, in that case, until the explosion was complete and the blast had exhausted itself and condensation had set in, causing the well known vacuum stage.

The point I wish to emphasize is that, in dealing with the danger of a coal-dust explosion, we must consider the initial moment when the explosion takes place. At this initial moment, there is no possibility of a counter-current being present. If this is true, the counter-current theory does not furnish the desired solution of the dust explosion, as Mr. Verner claims.

I would suggest, in closing, that it would be well if Mr. Verner would make a close study of the Mt. Kembla explosion, which occurred in New South Wales, in 1902. He will find there more evidence of what he is pleased to style "counter-current," than in any other disaster with which I am acquainted. I would add that the term "counter-current," as used by Mr. Verner, is only another expression for "vacuum effect," as applied to mine explosions. The one cannot occur without the other being present; and it follows logically that the vacuum theory, in respect to mine explosions, is the correct expression and not counter-current.

James Ashworth,
Consulting Mining Engineer.

Vancouver, B. C., Canada.

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Ignition of Coal in Storage

Referring to Mr. Hyde's inquiry, Coal Age, Nov. 14, p. 802, it might be of interest to him to know that the Federal Bureau of Mines has recently issued a bulletin dealing with the subject of the spontaneous combustion of coal. As has already been explained, in the answer to this inquiry, on the same page, and as shown by the experiments referred to in the Bureau of Mines bulletin, spontaneous combustion is readily caused by oxidation, which is greatly increased by the absorption of the oxygen of the air by the coal.

The rate of oxidation naturally increases with the rising temperature of the coal, and the most readily oxidized coals seem to be the most inflammable. Although the idea would not be accepted by many, careful tests and experiments have shown that the tendency to ignite spontaneously does not depend so much on the quantity of volatile matter contained in the coal as on the quality of the coal itself.

Some coals have the property of disintegrating more rapidly than others, which renders them more subject to oxidation by the constant exposure of fresh surfaces to the air. This fact was clearly demonstrated while work on the Panama Canal was in progress, by the observed tendency of the coal to fire spontaneously in the storage bins. The coal, in that case, contained only 17 or 18 per cent. of volatile combustible matter. Strange as it may seem, there are cases on record of much trouble and property loss resulting from the spontaneous combustion of cinders stored under buildings, in close proximity to some sort of external heat.

In order to reduce the tendency of coals to fire spontaneously, in storage, it has been suggested to store large quantities of coal under water. This method of storage was adopted a few years ago, by the Western Electric Co. at their Hawthorne plant, in Illinois, where they built a storage pit of concrete, 15 ft. deep, which covered nearly an acre of ground and had a capacity of 10,000 tons of coal that could be covered with water by flooding the pit. In general, however, the plan of storing coal under water is not practicable. The Federal Bureau of Mines offers the following suggestions for storing large quantities of coal. Some of these suggestions are admittedly impracticable. They are as follows:

1. Do not store in piles over 12 ft. deep, nor so that any point in the interior will be over 10 ft. from an air-cooled surface.
2. If possible, store only screen coal, as slack presents a much larger surface to the air.
3. Keep out dust as much as possible.
4. Pile so that the lump and fine coal are distributed as evenly as possible, not allowing the lumps to roll down the sides of the pile and form air passages at the bottom.

5. Rehandle and screen, after two months, if possible.
6. Do not store near an external source of heat even though that be moderate. Some coals will absorb from 12 to 13 times as much oxygen at a temperature of 100 deg. C., as at 40 deg. C.
7. Allow six weeks for seasoning, after mining, before storing.
8. Avoid alternate wetting and drying.
9. Avoid admission of air to interior of piles, through interstices around foreign objects, such as timbers, brickwork, etc.; or through porous bottoms, such as coarse cinder.
10. Do not try to ventilate by pipes, or more harm than good may be done.

CHEMIST.

————, W. Va.

*

Method of Working Underlying Coal Seam

Letter No. 6—It seems to me that the letters that have discussed Mr. Lyman's proposition of working an underlying seam of coal, COAL AGE, Aug. 29, p. 357, have ignored the fact that there was an abandoned seam of coal 40 ft. above the one it is proposed to work.

Mr. Lyman explains that there were frequent caves in the upper seam. Where this is the case, experience has taught me that large blocks of coal, and sometimes whole sections of pillars are abandoned and lost. It may be inferred from Mr. Lyman's statement that such is the case in the overlying seam, which makes it more difficult to contend with successfully.

However, the mining laws of most coal-producing states require all mine owners, agents, superintendents and operators to furnish an accurate map of the workings of the mine, to be filed with the state department. If such a map, in this case, is available and uptodate, it should show the correct condition in the overlying seam. In opening and developing this seam, I would locate all entries, crosscuts, room pillars and stumps directly underneath those in the seam above, as shown by the map. I consider this to be necessary in working all such underlying seams.

The plan suggested by Mr. Lyman of driving the entries to the boundary, and mining out the coal on the retreating system is good. But, I would suggest that there are few properties where it is not possible to mine some coal while driving entries to the boundary line. This plan would help to reduce the expense sheet, while developing the mine. In some cases, the plan is adopted of working a portion of the mine on the advancing system, while another portion is worked on the retreating system, in long wall. In that case, the advancing section is usually driven to the rise and the retreating section to the dip of the seam.

Should there be much gas or water in the upper seam, I would sink boreholes from the surface to drain off the gas. The water could be drained into the lower seam, if necessary, by drilling holes up, in the roof, to tap the water in the overlying seam, which could then be conducted to the main sump and pumped to the surface.

There are many instances on record where mines have been ruined and, in some cases, lives lost, by a haphazard method of mining seams of coal underlying worked out and abandoned mines. An instance occurred recently in West Virginia, where it cost the owners over $100,000 to put the mine in a fairly safe condition for work again. This could all be avoided by carefully planning the mine so that the pillars in the lower seam will come directly under those in the upper seam.

MINE FOREMAN.

Rock Forge, W. Va.

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Methods of Working in Indiana

Letter No. 2—I desire to reply to the letter of Theodore Brent, COAL AGE, Nov. 14, p. 800. Mr. Brent says that I "failed to understand" the conditions with which they and other Indiana operators must contend. I venture to point out that he does not reply to the statements made in my article entitled "Storage-Battery Locomotives at the Grant Mine" (COAL AGE, Oct. 10, p. 576), but seems to criticize the mental attitude with which he unjustly credits me.

I fully realize that, as he says, it is unfair to criticize the present management of mines for improper mining, seeing that the Union, the legislature, the market and the forbears of the present operators are all partly to blame. In fact, my article put undue stress on the first two. The early operators who habituated their men to undesirable methods of mining are equally to blame. But I cannot hope to curry favor with the living by abusing their ancestors.

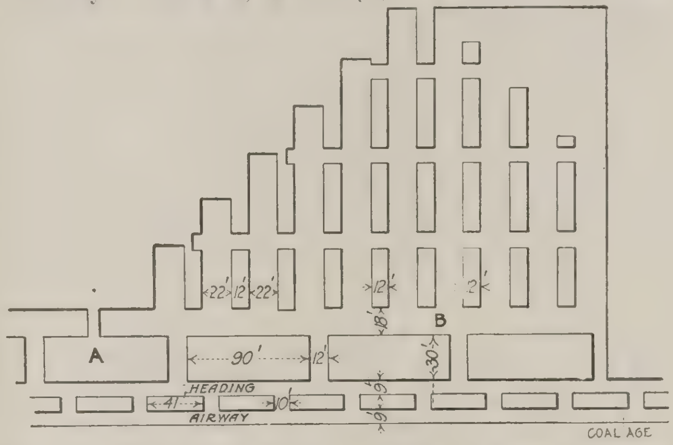


FIG. 1. SUGGESTED MINING PLAN TO MEET INDIANA SCALE CONDITIONS

If Mr. Brent will read the article carefully he will find my remarks were really addressed to those who believe Indiana afflicted with a roof of inordinately pernicious qualities. I said these difficulties could be met if the remedies applied elsewhere were introduced in Indiana; but I was careful not to assert that adequate changes should be made without large modifications in the economic situation. To say that a structural condition can only be met by the adoption of such and such a method is quite different from saying that such a method will pay.

I presume that it is useless to argue in favor of a narrower room and wider pillar in Indiana mines. Breakthroughs must be paid for at entry prices, and, to comply with the Indiana law, they must be made every 45 ft. If made 18 ft. wide they weaken the room materially. I have, however, increased the thickness of the room pillars from 9 to 12 ft. in the accompanying plan (Fig. 1), which I recommend. Moreover, it is not safe to advocate a long roomneck unless a compensation for the increased cost it causes is suggested. Unfortunately, the Union's scale says, with willful plainness, that roomnecks are to be 12 ft. long, and any distance in excess shall be paid for proportionately, but no roomneck shall exceed 15 ft. in length. Consequently, the only recourse is to pay crosscut rates for roomnecks and make them a safe length and save money by reducing their number and by economies in the length of the chain-pillar breakthroughs, as conditions may permit.

To accomplish this, I suggest an arrangement (Fig. 1), which gives one roomneck to three rooms and unbroken flanking pillars 30x90 ft. in size. The chain-pillars are small; but with due care in driving they will serve the main purpose, which is that of ventilation, and not support. The roadway *B* (Fig. 1) is driven about 18 ft. wide and, to meet the excessive demands of the law relative to ventilation, it is driven both ways to meet, as shown at *A*.

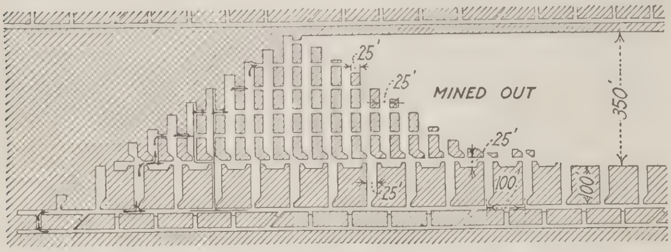


FIG. 2. SECTION OF MINE ILLUSTRATING THE "MAIN LINE" OR "ALTOONA" SYSTEM

This follows the scheme (Fig. 2) known as the "Main Line" (of the Pennsylvania R.R.) or the "Altoona" system. However, the ribs here are weaker than it is customary to allow around Altoona, where the flanking pillars are about 100 ft. square and where the roomnecks are themselves practically rooms, and even the haulage way *B* is narrowed at suitable places. To make this more clear, I have reproduced the system as illustrated by W. A. Silliman, at the Indiana (Penn.) meeting of the Coal Mining Institute of America, in 1911.

Finally, I do not wish to infer that the suggested plan will adequately meet the situation. It looks to me far more likely to be safe than that now in use, but perhaps it may have to be improved by a strengthening of the flanking pillars and possibly by a lengthening of the rooms so as to provide a better break than is afforded by short rooms.

Mr. Brent's remarks on the storage-battery locomotive require no answer. If he will read my article again, without inherent animus, he will conclude that my attitude toward the new form of tractive power is no less favorable than his own.

R. DAWSON HALL.

New York City.

* * *

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

Size of Discharge Pipe—In order to avoid excessive frictional loss due to high velocity of water in the discharge pipe, it is customary, in mining practice, to estimate the necessary diameter (d_c) of the column pipe, for any given discharge (G), in gallons per minute, by assuming a velocity of 400 ft. per min., which gives the formula

$$d_c = \sqrt{\frac{231\,G}{0.7854\,(400 \times 12)}} = 0.25\sqrt{G}$$

Size of Suction Pipe—For the same reason as stated in regard to the discharge pipe, it is customary to estimate the necessary diameter (d_s) of the suction pipe, in inches, for any given discharge (G), in gallons per minute, and a velocity of 200 ft. per min., which gives the formula

$$d_s = \sqrt{\frac{231\,G}{0.7854\,(200 \times 12)}} = 0.35\sqrt{G}$$

Example—In order to avoid excessive frictional losses in the discharge and suction pipes of a pump, what should be the minimum diameter of these pipes, respectively, if the pump has a capacity of 250 gal. per min.?

Solution—The minimum diameter of the discharge or column pipe for this pump should be

$$d_c = 0.25\sqrt{G} = 0.25\sqrt{250} = say\ 4\ in.$$

Likewise, the minimum diameter of the suction pipe should be

$$d_s = 0.35\sqrt{G} = 0.35\sqrt{250} = 5.5,\ say\ 6\ in.$$

Sizes of Pipes—The sizes of pipes are designated by their diameters, which, however, are only nominal, as they do not indicate the exact diameter of the bore. For example, the inner diameter of a 1½-in. pipe is 1.61 in.; that of a 2-in. pipe, 2.067, etc. The outer diameters are always greater by twice the thickness of the pipe. Some of the larger sizes of pipe are made in different weights of metal, thereby providing a greater or less thickness of wall, for the same bore. Pipe sizes above five inches vary by inches and above 16 in. by two inches.

Standard Pipe—What is known as the "Briggs standard" is a list of pipe sizes, giving the thickness of pipe for different internal diameters. This original standard has since been modified by pipe manufacturers to suit varying demands. The term "standard" therefore has a significance determined by trade agreements.

Dimensions, Weight and Capacity of Pipes—The table on the following page is compiled and carefully calculated from the data given in the National Tube Co.'s Handbook, 1913. It shows the nominal inner diameter, or trade sizes of pipes, together with the actual inside and outside diameters; sectional area of bore; inner rubbing surface and external surface of pipe, per 100 lin.ft.; weight per foot, plain ends; and capacity of pipe, per 100 ft. per min. velocity. The capacity for any other velocity than 100 ft. per min. can be estimated from that given in the table by multiplying by the given velocity expressed as percentage.

The Coal Age Pocket Book

TABLE SHOWING DIMENSIONS, WEIGHT AND CAPACITY OF STANDARD PIPES

Nominal Inside Diameter.	Actual Inside Diameter.	Actual Outside Diameter.	Actual Area of Bore.	Inner Surface per 100 Ft. of Pipe.	Outer Surface per 100 Ft. of Pipe.	Weight of Pipe per Ft.	Capacity of Pipe for Velocity of 100 Ft. per Min.
(In.)	(In.)	(In.)	(Sq.In.)	(Sq Ft.)	(Sq.Ft.)	(Lb.)	(G.p.M.)
⅛	0.269	0.405	0.0568	7.042	10.60	0.244	0.295
¼	0.364	0.540	0.1041	9.530	14.14	0.424	0.541
⅜	0.493	0.675	0.1909	12.907	17.67	0.567	0.992
½	0.622	0.840	0.3039	16.284	21.99	0.850	1.579
¾	0.824	1.050	0.5333	21.572	27.49	1.130	2.770
1	1.049	1.315	0.8643	27.463	34.43	1.678	4.490
1¼	1.380	1.660	1.496	36.128	43.46	2.272	7.771
1½	1.610	1.9	2.036	42.150	49.74	2.717	10.577
2	2.067	2.375	3.356	54.114	62.18	3.652	17.434
2½	2.469	2.875	4.780	64.639	75.27	5.793	24.831
3	3.068	3.5	7.383	80.322	91.63	7.575	38.353
3½	3.548	4.0	9.887	92.886	104.72	9.109	51.360
4	4.026	4.5	12.730	105.400	117.81	10.790	66.130
4½	4.506	5.0	15.961	117.968	130.90	12.538	82.914
5	5.047	5.563	19.986	132.130	145.64	14.617	103.82
6	6.065	6.625	28.890	158.781	173.44	18.974	150.08
7	7.023	7.625	38.738	183.861	199.62	23.544	201.24
8	7.981	8.625	50.027	208.943	225.80	28.554	259.88
9	8.941	9.625	62.730	233.968	251.98	33.907	325.88
10	10.020	10.75	78.823	262.271	281.44	40.483	409.48
11	11.0	11.75	95.033	287.980	307.61	45.557	493.69
12	12.0	12.75	113.098	314.160	333.79	49.562	587.51
13	13.25	14.0	137.887	346.885	366.52	54.568	716.3
14	14.25	15.0	159.485	373.065	392.70	58.573	828.5
15	15.25	16.0	182.665	399.245	418.88	62.579	948.9
...	17.25	18.0	239.706	451.605	471.23	70.0	1245.2
...	19.25	20.0	291.040	503.965	523.60	78.0	1511.9
...	21.25	22.0	354.657	556.325	575.96	85.0	1842.4
...	23.25	24.0	424.558	608.685	628.31	93.0	2205.5

Inquiries of General Interest

Developing a Gaseous Mine

Will you kindly explain, in Coal Age, how you would develop, arrange, equip, officer and manage a gaseous and dusty mine, in order to insure freedom from accumulations of dust and avoid the danger incident thereto, while having due regard to safety and economy of operation?

Writer.

Greensburg, Penn.

Before starting to open a mine the property should be thoroughly prospected to ascertain the extent, thickness and inclination of the coal beds and the thickness and nature of the overlying strata, amount of water to be encountered, and other data of interest as affecting the extraction of the coal.

Having obtained this information, the next step is to choose a suitable location for the shaft and surface plant. In making this choice, due regard must be had to the proper drainage and ventilation of the mine and the haulage of the coal underground, as well as the shipping facilities on the surface and the arrangement of the necessary buildings and other equipment. An accurate map should be made of the property, showing the location of all surface tracks and buildings, together with the proposed plan of the underground workings.

In deciding on the general plan of the mine, much will depend on the nature of the roof, floor and coal and the depth and inclination of the seam, which must determine the method best adapted to the conditions found to exist in the strata, in order to insure the greatest safety and economy of operation. In the mining of deep-lying seams or thin seams, where complete extraction of the coal is necessary, the longwall method of mining will generally prove most advantageous.

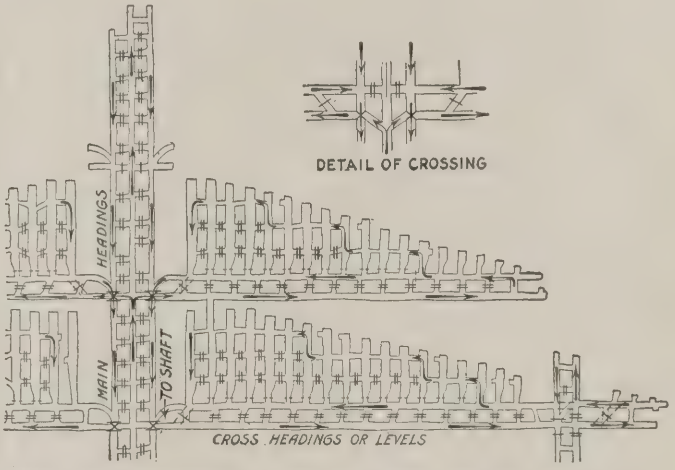
With a fairly good roof and floor and a seam of moderate thickness not lying too deep, some form of room-and-pillar method is generally applicable. But where gas or dust, in dangerous quantities, is present, it is often necessary to arrange the workings in districts or panels that can be ventilated by separate air splits.

The accompanying figure shows the plan of a mine opened on the room-and-pillar method, in a seam of moderate inclination. The main headings, in this mine, are driven up the pitch, on the triple-entry system. The center one of the three entries is made the intake and haulage road, while the two side entries are made the return for each side of the mine, respectively. As shown in the figure, levels are driven to the right and left of the main entries, at distances apart varying from 75 to 100 yd., depending on the distance the rooms can be driven up before the pillars must be drawn back. The length of these rooms will be determined by the nature of the roof, floor and coal and the thickness and inclination of the seam.

Owing to the inclination of the seam, in this case, the rooms are driven to the rise only of each pair of levels or crossheadings, and each pair is ventilated by a separate air split that is conducted to the face of the heading and returned through the crosscuts along the faces of the rooms, as shown by the arrows in the figure.

The surface equipment should consist of the usual steel headframe, tipple, screens. engine and boiler houses, hoisting engines, boilers, ventilating fans and engines, pumps, blacksmith and repair shops, storehouses, etc., required for the successful operation of the mine.

The officers of a mine producing, say 1000 tons of coal a day, should be a mine superintendent, a mine foreman, with as many assistant foremen as the conditions in the mine may require in order to provide for the thorough inspection and supervision of the work underground. There should be as many firebosses as may be necessary to thoroughly examine every working place, within three hours before the time for the men to enter the mine for work; and to thoroughly inspect the workings during the working hours.



Plan of Working a Gaseous Mine by the Room-and-Pillar System

The mine foreman should give his entire time to the management and supervision of the underground work; and each assistant foreman and fireboss should report to him daily, in respect to the safety and condition of the particular section of mine in his charge. All dangers should be promptly removed when discovered, or the men withdrawn from that place or section, until the same can be made safe for work. No accumulations of gas or dust should be permitted in any portion of the mine. The roads and air courses should be cleaned regularly; and, if necessary, a pipe line should be installed in the entries, to provide a suitable watering or spraying system, in order to prevent the drying out of the mine and thereby reduce the danger from dust.

In respect to the necessity for making suitable provision for sprinkling a dusty mine or for humidifying the air in a dry and dusty or gaseous mine, we would draw attention to the answer given last week in Coal Age, p. 29, which shows the enormous drying effect of the ventilating current in a mine, in winter.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—If 2 hp. will produce 10,000 cu.ft. of air per min. in one airway, 10x10 ft. in cross-section, how many horsepower will it take to produce the same quantity of air in three airways, 6x5.5 ft. each, in cross-section, the length of all the airways being the same?

Ans.—For the same quantity of air in circulation and the same length of airway, the power on the air varies directly as the perimeter of the airway and inversely as the cube of the sectional area. In the case of three airways in parallel, both the perimeter and the sectional area of the airways must be multiplied by 3 to obtain the total perimeter and sectional area. The perimeters and areas in these two cases are as follows:

One airway, 10x10 ft.: $o = 4 \times 10 = 40$ ft.; $a = 10 \times 10 = 100$ sq.ft.

Three airways, each 6x5.5 ft.: $o = 3 \times 2\ (6 + 5.5) = 69$ ft.; $a = 3\ (6 \times 5.5) = 99$ sq.ft.

In comparing these circulations, the power ratio is equal to the perimeter ratio times the cube of the inverse area ratio, thus,

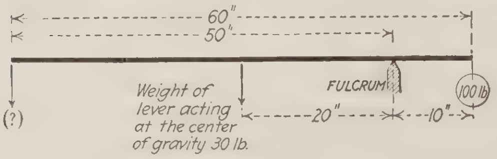
$$\frac{u_2}{u_1} = \frac{o_2}{o_1}\left(\frac{a_1}{a_2}\right)^3 = \frac{69}{40}\left(\frac{100}{99}\right)^3 = 1.77$$

Then, since the power on the air, in the first case, is $u_1 = 2$ hp., the power required in the second case is

$$u_2 = 2 \times 1.77 = 3.54\ hp.$$

Ques.—A lever of uniform cross-section and 5 ft. long weighs 30 lb. The fulcrum is 10 in. from one end of the lever where a weight of 100 lb. is suspended. What weight or force must be applied to the other end of the lever to produce equilibrium?

Ans.—Referring to the accompanying figure, the 100-lb. weight suspended from the short end of the bar has a lever arm of 10 in. The moment of this weight is opposed by the moment of the weight of the lever itself, acting through its center of gravity with a lever arm of 20 in.; and the force (F) applied at the other end of the bar with a lever arm of 50 in. The conditions of equilibrium require that the moment of the 100-lb. weight referred to the fulcrum as a center shall be equal to the sum of the moments on the other side of the fulcrum. This gives the following equation:



$$50\ F + 30 \times 20 = 100 \times 10$$

The force (F) that must be applied to the other end of the lever is then

$$F = \frac{(100 \times 10) - (30 \times 20)}{50} = 8\ lb.$$

Ques.—What load will break a white-oak timber, 10x12 in. in section and 15 ft. between supports, the load being equally distributed along the length of the beam?

Ans.—The breaking load of a beam supported at th two ends and uniformly loaded is found by multiplyin the moment of inertia of the beam by 16 times the fibe stress in pounds per square inch, and dividing this resul by the product of the length of the beam and its dept both expressed in inches. The moment of inertia of rectangular beam is

$$I = \frac{bd^3}{12} = \frac{10 \times 12^3}{12} = 1440$$

Then, taking the ultimate-fiber stress of white oak a $f = 10{,}000$ lb. per sq.in., the breaking load of this beam under the assumed conditions, is

$$L = \frac{16\ fI}{ld} = \frac{16 \times 10{,}000 \times 1440}{(15 \times 12)\ 12} = 53\tfrac{1}{3}\ tons$$

Ques.—The air traveling in a mine is divided between two airways or splits. In the first split, the cross-section of the airway is 5x8 ft.; and, in the second split, it is 5x6 ft. The first split being 1000 ft. long, if the ai divides equally between the two splits, what is the length of the second split?

Ans.—When an air current is split in a mine, it is assumed that the pressure is the same for each split Therefore, the pressure and quantity of air in circulation being the same in each split, the lengths of the airways will vary inversely as the expression o/a^3, or directly as the expression a^3/o. Hence, the length ratio for the two airways is equal to the cube of the area ratio times the inverse perimeter ratio. The perimeters and areas of these two airways are as follows:

First airway, 5x8 ft.: $a = 5 \times 8 = 40$ sq.ft.; $o = 2\ (5 + 8) = 26$ ft.

Second airway, 5x6 ft.: $a = 5 \times 6 = 30$ sq.ft.; $o = 2\ (5 + 6) = 22$ ft.

Applying the above rule and using these values,

$$\frac{l_2}{l_1} = \left(\frac{a_2}{a_1}\right)^3 \frac{o_1}{o_2} = \left(\frac{30}{40}\right)^3 \frac{26}{22} = \frac{27 \times 26}{64 \times 22} = 0.498$$

The length of the second airway is, therefore, $l_2 = 1000 \times 0.498 = 498$ ft. or, say, one-half the length of the first airway, for an equal distribution of the air.

Ques.—In order to insure a circulation of 70,000 cu.ft. of air per min. in the future development of a mine when the airways have been extended to a length of 4800 ft. and without increasing the power on the air, what will the same power produce at the present time, the present length of the airways being 1875 ft.?

Ans.—For a constant power on the air and the same size of airways, the quantity of air in circulation varies inversely as the cube root of the length of the airways. In other words, the quantity ratio is equal to the cube root of the inverse length ratio, which gives in this case

$$\frac{q_1}{q_2} = \sqrt[3]{\frac{l_2}{l_1}} = \sqrt[3]{\frac{4800}{1875}} = \sqrt[3]{2.56} = 1.368$$

The quantity of air circulated by the same power, at the present time, would then be

$$q_1 = 70{,}000 \times 1.368 = 95{,}760\ cu.ft.\ per\ min.$$

Coal and Coke News

Pennsylvania

Anthracite

Edwardsville—Adolph Rushnek, a miner's laborer, who lost his way in the big Woodward colliery of the Delaware, Lackawanna & Western Coal Co. was found by a rescuing party on New Year's day. He had been lost since Dec. 28. He was weak from lack of food and nerve-racked by his experience, but otherwise suffers no ill effects. He was only a half mile from where he became separated from his companions.

East Plymouth—A squeeze in the workings of the Delaware & Hudson Co.'s mine here has affected a wide area and a score of buildings have been more or less damaged while the settling is continuing. The main roadway is cracked in many places. Fences are distorted and foundation walls of buildings broken and the buildings themselves are somewhat out of plumb.

Hazleton—The Lehigh coal fields are receiving an influx of men from the bituminous regions of Pennsylvania, Ohio, West Virginia and Kentucky. Many claim to have walked most of the distance to seek employment in the anthracite operations.

Pittston—The first of a series of periodic conferences between the foremen, assistant foremen and officials of the Pennsylvania Coal Co. was held at Pittston on Jan. 2. General Superintendent W. P. Jennings led in a discussion of "Safety First."

Not a sigle fatal accident involving the loss of more than one life occurred in the lower division of the Pennsylvania Coal Co. during 1914.

Wyoming—The Schooley shaft of the Pennsylvania Coal Co., at Wyoming, for years filled with water, has been pumped out and is being cleared for operation, which will be begun as soon as the new Ewen breaker is ready to receive the output, which will be shifted under the Susquehanna River by a tunnel, already completed.

Scranton—On Jan. 4 a second reduction of 25c. per ton on pea coal sold in the local markets was advertised by the Peoples Coal Co. This makes the price $2.75 at the breaker, or $3.25 delivered. It was formerly $3.75 delivered. Other companies made similar reductions.

Bituminous

Arden—A fire of unknown origin occurring in the tipple of the Meadowland Coal Co., at Arden, four miles east of Washington, on the Pennsylvania R.R., recently entirely destroyed the structure, as well as 14 cars loaded with coal. The fire also spread to the mine itself and 14 men working on night shift were rescued with considerable difficulty. The loss is estimated at $50,000, and the mine will be out of commission for at least two months, throwing 500 men out of employment in the middle of the winter season.

Connellsville—The Connellsville coke production was somewhat better during the past few days, while prospects are more encouraging than for some months. Ordinarily, there is a marked recession in the coke trade during holiday week; but that was not the case this time. Merchant operators have put over 500 ovens into blast to meet increased demands for coke.

Windber—Options have been secured on between 700 and 1000 acres of coal land in Milford Township of Somerset County by John Lockrie, who, it is understood, has associated with him in the purchase a number of men active in the New England coal supply. Diamond drill tests will be made.

WEST VIRGINIA

Clarksburg—The Central West Virginia Coal Operators' Association was recently organized with Daniel Howard, of Clarksburg, as president; C. H. Jenkins, of Fairmount, vice-president; A. L. White, of Clarksburg, secretary, while J. C. Ryan, of Hepzibah, is treasurer. The objects of the Association are the conservation of coal properties by improved methods of production, and the safeguarding of miners and other employees.

Bluefield—The Big Vein Pocahontas Coal Co.'s mines were sold recently by receivers, the purchase price being $356,600, the property going to the bond holders. The plant has been in the hands of receivers since Oct. 29, 1910. The mines were purchased some years ago by T. T. Boswell, of Baltimore, but were only operated a short time before going into the hands of receivers, since which time it is said the receivers have made profits, it being stated that almost $200,000 have been earned since the receivership began. It is believed that the plants will be operated in future under the same management as at present.

Elkins—What is believed to be a record number of prosecutions by any of the mine inspectors of the state was made by W. B. Plaster at Thomas, W. Va., Dec. 23 last, when he made information against 14 miners and one motorman for violation of sections 15 and 16 of the West Virginia mining law. The miners were prosecuted and convicted for using short fuse, or what is termed "skin 'em backs," that is, attaching a short piece of fuse to a stick of high explosive in a drill hole, lighting the fuse and shoving back the explosive to the end of the hole, permitting it to detonate without tamping. The motorman was found guilty of operating trips of coal cars without a tail light on the rear end. He was fined $25 and costs, while the miners were fined $10 and costs each.

MARYLAND

Beryl—The Davis Coal & Coke Co. has resumed operations at mines Nos. 50 and 51. Superintendent Tibbetts, who was in Florida, was hurriedly recalled to resume charge. As a result of increased orders for coal for the Egyptian railways the Consolidation Coal Co. is reported to have increased the activity of several plants in West Virginia.

ALABAMA

Birmingham—Report of the chief state mine inspector, C. H. Nesbitt, to the legislature next month will not only narrate transactions of the past four years, but will make a number of recommendations as to amendments to the laws governing mining operations. The last legislature enacted many mining laws, but conditions have since arisen which call for drastic changes, especially along the lines of safety. It is probable that the recommendations made by Mr. Nesbitt will be passed by the legislature.

TENNESSEE

Knoxville—A special meeting of coal operators of the Tennessee-Kentucky field and members of the Southern Appalachian Coal Operators' Association is to be called here early this month to discuss the general coal-market situation. Certain routine business may also be transacted. Local operators state that though business is not as satisfactory as it might be it has improved to a considerable extent.

KENTUCKY

Sebree—After having been closed down for a considerable time on account of litigation, the Sebree coal mines are to be reopened at once by Lint & Watkins, of Birmingham, Ala., who have leased the property for a term of several years. H. A. Lint, senior member of the firm and a mining and civil engineer, is on the ground with new pumps which have been put to work. Mining operations will begin as soon as the water is out of the workings.

Greenville—Three men were killed and five injured in the Powderly mine of the Greenville Coal Co. recently when a large slab of slate fell from the roof of one of the main entries upon the car in which they rode. The mule drawing the car was killed but his driver escaped unhurt. W. A. Wickliffe, of Greenville, is president of the company which operates mines at Powderly and Martwick and employs a large number of men.

Rockport—Revival of the mining industry in this section is promised by the operators who own mines where work has been slack for several months. Large orders for both steam and domestic coals are beginning to come in, it is said, and within a month it is announced that the mines will be working six days a week.

Barbourville — Southeastern Kentucky and northeastern Tennessee coal mining operations are reported to be receiving large orders after passing a period of serious depression. The demand for both steam and domestic fuel was heavier during the past month than any other month last year. Additional miners are being employed and several thousands who were idle are now receiving steady employment. It is reported that the Southern Ry. has placed heavy orders with operators in the Mingo Hollow field of Claiborne County, Tennessee. Several plants have taken advantage of the recent dull period to install washers, which give a better grade of coal, obtaining a wider sale and better prices.

OHIO

Cleveland—It was the opinion of many operators who attended the meeting of the operator's association recently held here that it was useless to make further efforts to negotiate a settlement of the strike which has been in progress since April 1 last. Furthermore, many operators favor going on record as opposed to any future recognition of the United Mine Workers organization. A number of companies plan to abandon the Ohio field, some having gone so far as to purchase property in an adjourning state. Others are negotiating for property in either West Virginia or Kentucky preparatory to abandoning their Ohio holdings.

Bellaire—At some mines notices of eviction to the striking miners have already been posted. It is stated, however, that union officials will appeal to the courts. The report that the companies serving eviction notices intend to import strike breakers is unconfirmed.

Martins Ferry—It is said that representative W. B. Francis, has received so many letters asking for an investigation of the eastern Ohio mine strike that he has decided to request such a proceeding, and will ask the Department of Labor to investigate the strike.

Columbus—The Sunday Creek Co., of Columbus, which was taken over several weeks ago by J. S. Jones, a well known coal man of Granville, Ohio, and Chicago, has been completely reorganized. Mr. Jones purchased the outstanding stock of the company through the federal court at Cincinnati and has just completed the transfer. This action completely separates the company from the control of the Hocking Valley and the Toledo and Ohio Central railroads.

According to Dwight P. Cary, president of the Lorain Coal & Dock Co., that firm has not yet closed leases for a tract of coal land on the Island Creek in West Virginia. It is true that the company has been looking at available coal properties not only in West Virginia but also in Kentucky, and is trying to get some coal lands where labor troubles will not interfere with operations as its Ohio properties have been closed down since Apr. 1, 1914. The tract on Island Creek consists of approximately 14,000 acres.

INDIANA

Terre Haute—While it is admitted that there is a slightly better demand for fuel and some operators say they perceive a decided improvement, the majority of the Indiana coal producers are still waiting to be "shown" that there is a revival of industrial activity such as will make an appreciable increase in the demand for steam coal. Two weeks of continuously freezing weather has not brought appreciably more or larger orders for coal used for heating purposes.

Clinton—Surveyors of the Chicago & Eastern Illinois R.R. have been at work on a proposed coal switch from Newport to the L. J. Place farm, where several test holes have recently been drilled by Clinton mining men. Mine experts have yet to pass on the properties. Drillings in Newport territory in former years showed coal in thin strata or in pockets but recent drillings are deeper and more favorable.

Sullivan—The Consolidated mine at Hymera, the oldest in Sullivan County, has been abandoned, throwing about 220 men out of employment. It was expected the mine would last through the winter.

Petersburg—Hundreds of acres of surface coal land are being leased for stripping purposes between this city and Winslow. In some places the coal lies 20 ft. below the surface.

ILLINOIS

Shiloh—The cage in the Shiloh mine of the Southern Coal, Coke & Mining Co., of St. Louis, in some manner recently turned over when within 15 ft. of the bottom. Nine miners were slightly injured, and another escaped with a crushed foot. The short distance from the bottom was the only thing that prevented a serious accident.

Du Quoin—The first of the year saw several mines in this vicinity resume operations, after a shutdown of from a few weeks to several months. The Little Muddy mine at Tamaroa, north of here, has started up, having been leased to George Galbraith, Elmer Melvin and A. L. Linn. Several other mines that were temporarily suspended have made arrangements to resume operations.

Nokomis—The Nokomis Coal Co. recently established a new hoisting record by taking 1800 tons of coal from the ground in an 8-hour shift. This operation has been paying more attention to extending entries and otherwise looking to the future than in trying to establish hoisting records. The output is being increased continually, however, and a new record is made every few days. About 300 men are now employed.

IOWA

Knoxville—Three men were instantly killed and four injured, two of them probably fatally, by a recent dust explosion in a coal mine at Flagler. This explosion which was caused by a windy shot literally blew the men from the mouth of the entry, and those who escaped death were bruised and burned almost beyond recognition.

MISSOURI

Sedalia—After considerable prospecting, it has been announced by the Sedalia Commercial Club that two beds of coal, running practically together, have been discovered in Pettis County, in the vicinity of Spring Fork. One measure is of a coal similar to cannel and is 4 ft. in thickness. The other is a semi-bituminous 4 ft. thick. It is expected that there will be in the neighborhood of from 1500 to 2000 acres of this coal that is workable. C. S. Quick, a miner from Pennsylvania, has been carrying on the prospecting and will develop the property.

KANSAS

Pittsburg—The Cherokee & Pittsburg Coal & Mining Co.'s mines opened Monday, Jan. 4. The repair work on the mines was completed at that time and the first shots were fired late the previous week. Considerable debris had collected in the shafts and rooms during the past 8 weeks when the mines were idle.

Leavenworth—The cold weather that has prevailed for the past three weeks has caused much work to be done in the mines around the city. Because of the fires in the Home and North shafts only two mines, the Carr and the Riverside, are operating, but they are employing men up to the capacity of their shafts.

ARKANSAS

Fort Smith—According to the decision of Federal Judge Youmans, handed down Jan. 1, each of the 8 subsidiary mining corporations involved in the receivership of the Bache-Denman Co. is insolvent. This decision was given in the case of the Sebastian Coal & Mining Co., lessor of the mining premises which had petitioned the court for the removal of Franklin Bache as receiver of the Hartford Valley mines of the Bache-Nenman Co. A hearing is to be held Jan. 15 to ascertain whether the property shall be placed in bankruptcy or liquidated by a new receiver. United States troops still remain in the district guarding the mine under the federal receivership.

COLORADO

Denver—Troop "L" of the 12th United States Cavalry on patrol duty in the Oak Creek district of Routt County since May last, was recently ordered to return to its home station at Fort Meade, S. D. Orders for the gradual withdrawal of the other federal troops sent into Colorado to quell the imning disorders are in preparation.

FOREIGN NEWS

Newcastle, England — The Swedish State Railways in addition to some other amounts, recently contracted for 25,000 tons of Broomhill steam coal at 12s. per ton f.o.b., the shipments to be made from January to March. Several other contracts calling for about 100,000 tons in all have been closed at 11s. 3d. to 11s. 4½d. per ton f.o.b., shipments to be made during the coming year.

TRADE CATALOGS

Stow Mfg. Co., Binghamton, N. Y. Leaflet of 14 pp.; 3½x 6¼ in.; illustrated.

The Gardner Governor Co., Quincy, Ill. Gardner Duplex Steam Pumps. 8 pp.; 6x9 in.; illustrated.

Riverside Metal Refining Co., Connellsville, Penn. Old Coketown Metals. 36 pp.; 3¾x6½ in.; illustrated.

The Gardner Governor Co., Quincy, Ill. Gardner-Rix Vertical Air Compresors. 16 pp.; 6x9 in.; illustrated.

The Gardner Governor Co., Quincy, Ill. The Gardner Feed Pump and Receiver. 4 pp.; 6x9 in.; illustrated.

Harrison Safety Boiler Works, Philadelphia, Penn. Cochrane Multiport Valves. 72 pp.; 6x9 in.; illustrated.

The T. L. Smith Co., Milwaukee, Wis. Smith Mixerette. Leaflet of 6 pp. describing the mixerette; 4½x7 in.

Prest-O-Lite Co., Inc., Indianapolis, Ind. Presto-O-Lite Welding and Cutting. 22 pp.; 8¾x11¼ in.; illustrated.

The Sylvester Co., Parkersburg, W. Va. Bulletin No. 1. The "Sylat" Timber Puller. 12 pp.; 10x8 in.; illustrated.

S. Flory Mfg. Co., Bangor, Penn. Flory Products Used in Building the Kensico Dam. 14 pp.; 8½x7¾ in.; illustrated.

The Gardner Governor Co., Quincy, Ill. The Gardner Horizontal Single-Cylinder Air Compressors. 14 pp.; 6x9 in.; illustrated.

Asbestos Protected Metal Co., Beaver Falls, Penn. Asbestos Steel for Roofs and Walls. 31 pp.; 8¼x11¼ in.; profusely illustrated.

B. K. Elliott Co., Pittsburgh, Penn. Drawing Materials and Surveying Instruments. Bound volume of 439 pp.; 6x9¼ in.; profusely illustrated.

Electric Carrier Co., New York City. Catalog of 8 pp.; 11x8½ in., illustrating and describing Electric Carrier mine cars and locomotives.

American Boiler Life Co., Boston, Mass. Steam Boilers and Boiler Feed Water. A treatise on their scientific treatment. 3 pp.; 5x8 in.; unillustrated.

Western Electric Co., New York City. Cloth bound volume of 1216 pp.; 6½x9½ in. This is one of the first electrical catalogs published quoting prices upon which uniform discounts are given.

PUBLICATIONS RECEIVED

Canada Department of Mines, Geological Survey. Museum Bulletin No. 4. The Crowsnest Volcanics, by J. D. MacKenzie. 37 pp.; 6½x9¾ in.; illustrated.

Department of the Interior, U. S. Geological Survey. Bulletin 600. The Glacier National Park. A popular guide to its geology and scenery. 54 pp.; 6x9 in.

Canada Department of Mines, Mines Branch. The Production of Coal and Coke in Canada During the Calendar Year 1913, by John McLeish. 40 pp.; 6½x9¾ in.; illustrated.

Department of the Interior, U. S. Geological Survey. Professional Paper 90-H. A Deep Well at Charleston, S. C., by Lloyd William Stephenson. 25 pp.; 9x11½ in.; unillustrated.

Department of the Interior, Bureau of Mines. The Electric Furnace in Metallurgical Work, by Dorsey A. Lyon, Robert M. Keeney and Joseph F. Cullen. 216 pp.; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey. Mineral Products of the United States. Review of Conditions and Output in 1912 and 1913, by Edward W. Parker. 169 pp.; 6x9 in.; numerous tables.

PERSONALS

John Bradfute, formerly mine manager of the Columbus Pocahontas Co., has taken a position as traveling salesman with the Hocking Valley Products Co.

George F. Hart, who has been receiver for the Goshen Coal Co., of New Philadelphia, Ohio, has handed in his resignation and has been succeeded by W. F. MacKay.

John S. Jemison has established an agency for the sale of mine, mill, furnace and electrical machinery supplies, with his office in the Empire Building, Birmingham, Ala.

William F. Marshall has been appointed traveling sales agent of the Seneca Coal Mining Co. of Buffalo, which now adds the selling of anthracite to its regular mining and marketing of bituminous coal.

Mayor Jermyn of Scranton has announced that he has appointed Arthur W. Long, Ralph Barrett and Fred Friend as members of the new mine cave commission recently created by the city council.

F. L. Garrison, formerly of Buffalo, but later a resident of Pittsburgh, has been appointed agent of the Pittsburgh-Westmoreland and Blaine coal companies at Buffalo, succeeding S. C. Van Norman, who lately resigned.

Robert E. Baker and Donald D. Herr have joined with Arthur G. McKee in the incorporation of an engineering and contracting business under the name of Arthur McKee & Co. Offices will be located in Cleveland, Ohio.

Neil Robinson, who has been confined to his home in Charleston, W. Va., for the past month with valvular heart trouble, is again able to be about and is spending a few days at LaFollette, Tenn., for the first time since he was taken ill.

Professor Ivan P. Tashof, of the College of Mines and Metallurgy, Lexington, Ky., and secretary-treasurer of the Kentucky Mining Institute, spent the Christmas vacation visiting the Springfield Mine Rescue Station and the big panel mines at Gillespie, Illinois.

L. M. Bowers has resigned as chairman of the board and treasurer of the Colorado Fuel & Iron Co. No successor has been appointed. Mr. Bowers remains a director of the above company. In future he will give the most of his time to the personal affairs of Mr. Rockefeller.

E. G. Goodwin has been appointed fuel agent of the Southern Ry. with headquarters in Knoxville, Tenn., and subsidiary offices in Birmingham, Ala., and Princeton, Ind. In the past, Mr. Goodwin has been chief fuel inspector of the Southern Ry. with headquarters in Knoxville.

"General" Jacob S. Coxey, of Massillon, Ohio, has hit upon a new plan of aiding suffering humanity. He proposes to lease a tract of coal land, supply the funds, and equip a mine, then invite as many miners as can work in it to become stockholders in the company. In other words, this will become a coöperative operation.

Charles S. Keith, president of the Central Coal & Coke Co., recently delivered two addresses before meetings called to discuss the proposed workmen's compensation act for Missouri, attacking the measure, and declaring that under it liabilities might pile up so rapidly that companies involved could not sell their bonds because of liens.

CONSTRUCTION NEWS

Bluefield, W. Va.—The Alpha Pocahontas Coal Co., recently incorporated with a capital stock of $125,000, with offices at Lynchburg, proposes to develop coal properties in the Pocahontas field soon.

Jenkins, Ky.—The Elkhorn-Shelby Coal Co., at Penny, Ky., on the Baltimore & Ohio R.R., has let contracts for the immediate construction of 300 modern miners' homes for the plant at Penny.

Johnstown, Penn.—The Ebansburg Coal Co. whose mines at Clover are putting out a considerable tonnage, is constructing a new car haul on its tipple, which will facilitate the work of loading railroad cars.

Hazard, Ky.—It is announced that the Hazard Town Coal Co. will let a contract at once for the construction of 200 miners' houses immediately below Hazard. It is stated that mining operations will begin Feb. 15.

Scranton, Penn.—Within a few days the new breaker of the Scranton Anthracite Coal Co. at Oak Hill near Moosic, will be completed and in operation preparing coal for market. The coal is secured by drifting and is of fine quality.

Viper, Ky.—The Viper Coal Co. is being reorganized by Pennsylvania people and will start development work by Feb. 1, as scheduled. They will have an electrically equipped plant, first class in every respect. The old L. F. Brashear coal land tract is to be developed.

Shenandoah, Penn.—Pottsville, Scranton and Pittsburgh capitalists have purchased the Whippooorwill Colliery on Broad Mountain, which was abandoned some years ago Work will be immediately begun in reclaiming the old operations and getting them in shape for production.

Bluefield, W. Va.—Preliminary work of constructing an 88,000-volt transmission line for the Jewell Ridge Coal & Coke Co., from Jewell to Berwind, has been begun by W. R. Doss. This line will be 8 miles in length and the system is to be one of the most modern in the coal field. Mr. Doss was awarded this contract against about half a dozen competitors.

Huntington, W. Va.—The Norfolk & Western R.R. Co. recently started a force of 400 men grading on Pinnacle Creek in Mingo County. It is also reported that it has completed the purchase of rights of way for a connecting line from Widemouth on the main line across Clark's Gap, using the Virginian tunnel down Pinnacle Creek to Guyandotte River and thence down that stream to the mouth of Gilbert's Creek, thence up Gilbert's Creek and up Ben's Creek to the main line at Wharncliff. These developments are regarded as among the most important in years.

NEW INCORPORATIONS

Cleveland, Ohio—Papers have been filed increasing the capital stock of the Pluto Coal Co. from $10,000 to $15,000.

Norris, Ill.—The Genuine Norris Coal Mining Co. has been incorporated here with a capital of $2500, by Joseph Quigley, A. E. Whitehead and Harry Wood.

Mullens, W. Va.—The Miller Pocahontas Coal Co. has been incorporated with a capitalization of $100,000, to mine coal. L. N. Frantz, of Mullens, and others, are interested.

Lincoln, Ind.—The Rose Hill Coal Co. has been organized, with a capital stock of $6000, for the purpose of coal mining. The directors are T. W. Richardson, R. E. Price and Malcolm Reed.

Maben, W. Va.—The Sabine Smokeless Coal Co. has been organized to develop 700 acres of coal land. This firm will install electrical equipment and contemplates a daily output of 1000 tons.

Sullivan, W. Va.—The Amigo Coal Co. has been organized with a capital stock of $100,000, to handle coal and coke. J. A. and Fred G. Wood and W. W. Kolner, of Sullivan, and J. C. Sullivan, of Mullens, are the incorporators.

Ashland, Ky.—A charter of incorporation was recently issued to the Alum Creek Block Coal Co. This firm, which has an authorized capital of $250,000, will have its chief works in Kentucky. The incorporators are S. S. Willis, James B. Servey, K. M. Fitzgerald, M. C. Fossom, and L. S. Wilson, all of Ashland, Ky.

Dover, Del.—Articles of incorporation were recently filed for the McFetridge Coal & Coke Co., of Pittsburgh, Penn. The capital stock is placed at $200,000, and the object of incorporation is to acquire, own and lease lands for the development of coal, iron and other minerals. The incorporators are Charles E. McFetridge, of Creighton, Penn., Charles B. Clark, of Pittsburgh, and James B. Mattes, of Butler, Penn.

Columbus, Ohio—The William J. Hamilton Co. has been incorporated under the laws of Ohio, with a capital of $10,000, to deal in coal in a wholesale manner. The company, which is headed by William J. Hamilton, has been doing business under the same name with a West Virginia charter. The change only means incorporating under Ohio laws. John R. Schwartz has taken a position with the company to travel northern Ohio.

INDUSTRIAL NEWS

Birmingham, Ala.—The Tennessee Coal, Iron & R.R. Co. has just closed a contract with the Louisville & Nashville R.R. for 38,000 tons of rails to be rolled at the Ensley mill, for delivery over the first half of 1915.

Huntington, W. Va.—Although the coal loading business on the Chesapeake & Ohio R.R. has increased lately, December coal loading will not equal that during December of 1913. It is believed, however, by company officials that a considerable increase in business will take place during the present month.

Portsmouth, Ohio—Caught in a gale on the Ohio River near Buena Vista, the tow boat "Val B. Collins," of Huntington, owned by the Island Creek Fuel Co., recently sank with barges containing 25,000 bushels of coal. The gasoline tow boat "Adrian," owned in Buena Vista, was also sunk in the same storm.

Denver, Colo.—Claims aggregating $23,000 were recently filed against the State of Colorado by the government of Austria-Hungary as an indemnity for one Austrian killed and the destruction of property belonging to others in the Ludlow and subsequent incidents in the coal field strike. Similar claims will be filed at Washington.

Charleston, W. Va.—Coal and coke shipments over the lines of the Norfolk & Western Ry. during the month of November show that 1,927,326 tons were handled, being a decrease of 377,478 tons as compared with the same month for 1913. For the eleven months of the year an increase of 348,925 tons is still held over the previous season, 24,776,340 being shipped in 1914.

San Francisco, Calif.—The United States Government recently began suit against the Pacific Mail Steamship Co. for the recovery of $323,695.16 in drawback duties, which it is alleged were paid on false claims. This suit is one of a number instituted by the Government as an aftermath of the criminal prosecution of officials of the Western Fuel Co for alleged false weighing of imported coal.

Washington, D. C.—Aiming at the alleged control of the Pennsylvania coal fields by the Philadelphia & Reading, the Delaware, Lackawanna & Western, and the Lehigh Valley railroads, Representative Adams, of Georgia, recently introduced in the House a bill which will amend the commodities clause of the Interstate Commerce Act so as to restrain railroads from building or controlling coal properties.

Cincinnati, Ohio—General Manager Davis, of the Cincinnati, Hamilton & Dayton R.R., announces that about Jan. 4, 500 shop men of the company were taken back to work at various points on the line, in view of increasing business. About two weeks ago the shops were closed as a measure of retrenchment, but it appears that during the interval the company found business to be increasing to such an extent as to render it necessary to reëmploy many of the men laid off.

Washington, D. C.—It is estimated that the value of the agricultural crops of the State of Pennsylvania approximately equaled the value of the anthracite or the bituminous coal produced. The value of anthracite for 1913 is placed at $195,181,127. The bituminous coal produced in the same year was valued at $193,039,806, while the ten leading agricultural products of Pennsylvania for 1914 is estimated by the department of agriculture to be worth $184,697,395. Other crops not listed will bring the agricultural products of the state approximately up to the figures for the coal.

Rayland, Ohio—The Pluto Coal Co., organized by a number of miners and others, has leased the mine of the Rayland Coal Co., Rayland, Ohio, one of the John H. Jones' interests, paying enough money into the coal company's treasury to avert default on the mortgage. The mine will be put in operation shortly. Hopes are entertained that with similar coöperation on the part of banking interests in Pittsburgh the Four States Coal Co. can be taken out of receivers' hands within 60 or 90 days.

Danville, Ill.—John L. Billiman, a coal miner, was recently awarded $562 in the Circuit Court for disfiguration of his features caused by a premature explosion in the Two Rivers mine last December. It was claimed by the coal company that Billiman's earning capacity was not impaired, and that an impairment of good looks was not grounds for damages. The judge held that this might possibly be the case if the complainant expected to always work as a miner. He held, however, that good looks in many vocations are a real asset. The case will be appealed to the Supreme Court.

Washington, D. C.—On Jan. 1, Secretary Lane issued regulations under which settlers may take for a two-year period 10-acre tracts of Alaska coal land for local and domestic fuel needs. He announced that on account of legal complications caused by existing claims and the fact that there are no settlers in the immediate vicinity, the Bering River and Matanuska fields would not be opened for the present. Considerations are, however, being given to leasing regulations covering the general mining of coal in Alaska, and will be issued as soon as practicable. Under the present action, however, the opening of mines on an extensive scale for exportation is not permitted.

Columbus, Ohio—The movement to build a ship canal connecting the Ohio River with Lake Erie is receiving support in Cleveland, Columbus, Akron, Canton, Zanesville and other cities and towns, especially in the eastern part of the state. Burd S. Patterson, of Pittsburgh, secretary of the Canal Association, recently visited Cleveland for the purpose of organizing a committee of 12 in connection with the project. He claims that rail carriers will benefit by the building of the canal through great increases in population through the territory to be traversed. He is of the opinion that the counties through which the canal is expected to pass should guarantee the bonds to be issued for construction and if such a course is followed the canal can be opened by 1920.

Columbus, Ohio—Powers similar to those possessed by the Interstate Commerce Commission with respect to inter-state traffic are desired by the Ohio Public Utilities Commission with respect to intra-state traffic. As the laws of Ohio now stand, the commission has no authority to suspend a rate or service schedule that may be filed with it. The result of this alleged defect is that often unfair rates are filed and notwithstanding strenuous protests on the part of the commission and the interests they affect adversely, they go into effect and can only be reached by the commission after they have become operative. The commission therefore recommends that it be given authority to suspend or postpone the date for all schedules becoming effective pending investigation. As a corollary of this suggestion is a recommendation that railroads be required to give 20 days' notice of a change in rates unless otherwise ordered by the commission.

Coal Trade Reviews

General Review

Anthracite steady on about a normal basis.. Current bituminous trade quiet but there are distinct indications of a turn for the better. New contracts coming up. Prices firm but no advance is anticipated for the present.

The retail anthracite trade has shown a substantial improvement, due to the recent cold weather, but the activity has not yet been reflected in the mining operations which are still curtailed. Supplies are generally plentiful on all sizes but a continuance of low temperatures will develop a shortage that will necessitate full time operations shortly. Prices are generally firm at the full circular.

Tangible evidence of a turn for the better is apparent in the bituminous market and there is a distinct note of optimism in the trade. On current business there is still a general heaviness in all directions but the severe restrictive measures at the mines have reduced excess tonnages and colder weather has created additional interest in the market. Outside of the movement on contracts, the demand is spotty, with prices very irregular, but on the whole notably steadier than for some time past. New contracts are being discussed and agencies are getting lined up for an aggressive campaign and an improvement in export business is an encouraging feature though ocean rates still continue prohibitive.

As a rule the mines are completely covered on slack and are refusing to quote further; track coal has been cleaned up in all directions and more orders are appearing than for a long time, but it will take hard pushing to advance prices. With inquiries in the market aggregating about a million tons, the Pittsburgh district is assuming a more cheerful tone and indications over the future are regarded as most encouraging. Current production has also improved slightly, though prices are as irregular as ever.

With all the recent constructive developments still in force in Ohio, such as the cold weather, depleted stocks and improved industrial situation, the market is notably firmer. Retailers permitted their stocks to get unusually low during the long period of dullness and many of them are now facing an almost complete exhaustion of supplies, so that urgent orders are coming in. Industrial requirements are still light, the steam business continuing dull though manufacturing appears to be increasing slightly.

The colder weather of the past ten days has brought out many small orders for rush shipments in the Southern market and a continuation of this condition will clean up stocks shortly. The steam demand, however, continues quiet and far below normal.

In the Middle Western market the reduced production over the holidays has thrown the mines behind on their orders and an active trade is anticipated through the balance of the winter. Prices are steady to firm, with a marked tendency upward. It is expected that the improvement in the steam business will be slow but sure.

ATLANTIC SEABOARD

BOSTON

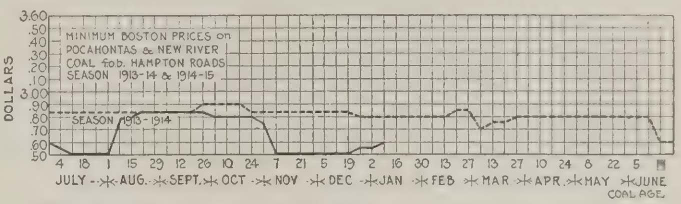
A better tone noticed. Contract demand helped out by cold weather and some off-shore inquiry has developed. Georges Creek shippers have plenty of orders, but Pennsylvania operators' market still restricted. Anthracite looking up.

Bituminous—A slightly stronger tone is noticed in bituminous. The supply of Pocahontas and New River at Hampton Roads is still much in excess of chartered tonnage, but the curtailment continues in force and the prospect for January orders is rather better than was anticipated. The seasonable weather helps out the contract demand and the slower movement of transportation coastwise is also a favorable element.

There is already talk about season contracts, prices, etc., although it is generally felt that this is premature. A realignment of certain of the New River agencies is rumored, but no announcement has yet been made. Some of the New River interests feel they have not had as large a share of the coastwise trade as they should; for that reason it is likely there will be a stronger effort to place a comprehensive tonnage this coming season.

While $2.85 continues the nominal basis f.o.b. Hampton Roads, it is being freely shaded on what orders come in; 15c. less is nearer the actual figure, and sales are not by any means heavy at that. Meanwhile, the export market shows signs of improvement, and that is perhaps the most encouraging factor to report this week. There is more inquiry offshore than for several weeks past, although suitable carriers are still scarce and command high rates.

Prices on cars for inland delivery are steadier than for several months; $3.68@3.78 is the range, with considerably less spot coal offering. The unfavorable weather along the coast has tended to limit the supply and the market is much better in that respect.



The Georges Creek shippers are in excellent position on orders. There is still a demand on them to get cargoes forward, but shipments are not far behind, and there are enough orders ahead to take care of present output very comfortably.

The market on Pennsylvania grades is not yet out of the narrow limits imposed by conditions some months ago. The restriction in mining continues and outside of contract demand the trade is very spotty. Most of the operations are running on orders only, and there are few shippers now who care to risk demurrage and other losses that go with "coal on the market."

Anthracite—Retail trade is particularly good and compares very favorably with a year ago. December was a good coal-burning month and dealers are keeping close watch of their storage. Orders are in better supply with the anthracite companies, but the movement of barges is disappointingly slow. Stove size is still easy, while egg and chestnut are a drug. If the weather continues cold, wholesale trade will be active by the end of January.

Wholesale quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.00	2.70@3.20	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.60@2.75
Boston†	....	....	....	3.68@3.78
Providence†	....	....	....	3.58@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous somewhat improved due to the restricted output over the holidays. Anthracite retail trade notably stronger though mining operations have not been materially effected as yet.

Bituminous—There is no particular change in the bituminous situation. The holidays, of course, reduced the tonnage mined and the bad weather has also tendered to delay deliveries. This has improved the tone of the market to a certain extent and there is some demand for spot tonnage though it is not heavy.

Most of the operators mined less tonnage last year than in 1913. On a whole, however, the market has maintained a healthy aspect and has been fairly satisfactory. There has been less demurrage coal and consequent sacrifice prices than has been the rule in former years. The better grades find a reasonably steady market and the producers of poorer grades have found that they cannot pay dividends and at the same time sacrifice their coal and pay demurrage to the railroads.

There is considerable optimism displayed in the steel trade. It is reported that the railroad companies are now getting into the market for equipment and there seems to be a general feeling that this will be better during the new year. Prices continue unchanged as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The retail trade reports very active conditions for the past week, due to zero weather. This condition, however, has not been reflected fully in the demand on the operators. The stocks in the hands of the retail dealers and consumers seem to be considerably heavier than they were at the same time last year. But a continuance of the low temperatures is bound to clean up the surpluses and the demand from the wholesalers during the next week or ten days will undoubtedly be heavy.

The movement over the piers in New York Harbor has been much retarded on account of the frozen condition of the coal. At some of the ports boats have waited as much as four or five days for their cargoes with the coal standing at the piers all the while.

Chestnut and pea, especially the latter, are in most demand and shortest supply. Strange as it may seem, stove which ordinarily is the strong size in the East is very easy but there is practically none offering off circular. Egg continues to move at 15 to 20c. below circular. All of the fine sizes, especially in the better grades, are well taken up. The demand on No. 1 buckwheat has increased materially and in some quarters there is a shortage reported on this size. Nos. 2 and 3 buckwheat are also in good demand.

It will be remembered that last year we had practically no winter until well into February, whereas this year it has been much more seasonable. This produces a very healthy condition and with a continuance of the low temperatures, the producing companies may be expected to move off considerable of their stocks in certain sizes.

The market continues quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.25@5.35	5.30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BUFFALO

Stiffness of slack continues the main feature. Factories starting up cause a generally better feeling. Consumption larger, but no important increase anticipated yet. Anthracite doing well.

Bituminous—There is at the present moment a larger demand for slack than can be filled. Those not finding business better ascribe this to the fact that the demand for three-quarter is so light. Shippers are getting letters from various mines, stating that the supply of slack is exhausted and declining to quote on it. The situation has not been so acute for a long time. Any sort of slack is firm at not less than 90c. at the mines.

There is no coal on track and jobbers are now on the watch for cars to divert to new points, which is something new. The steady winter weather has been a big help. Activity in Canada is reported everywhere. Orders from that direction between Christmas and New Years were quite larger than the average of the month and there are many who believe it is going to last. This will firm up prices and do much good.

Stocks in consumers' hands are not so large as they were; railroads especially are short. The price of bituminous is stronger, though quotations have not advanced and continue as before on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley coal is about 25c. lower than Pittsburgh.

Anthracite—There is a good movement of all sizes, though egg is inclined to drag. As there has not been the usual clamor for the smaller sizes the trade is generally quiet though, with a normal movement, which is sure to keep up so long as the present severe weather continues. There is considerable activity in water coal, one company having loaded well toward 100,000 tons into large vessels, which will remain in storage till the Lakes open in the spring. In this way it has been possible to get a large amount of egg out of the way temporarily, though there are still those who believe that the preparation of anthracite will have to be modified before long, so that this size can be broken down into stove and chestnut coal.

The local anthracite trade is good, though the great number of city dealers makes it difficult to get much profit. There has not been much price cutting reported lately. The use of natural gas is so great that the city anthracite trade is not what it should be.

TORONTO, CAN.

Situation materially improved as a result of the cold weather. Supplies plentiful so far.

Steady cold weather having prevailed for some time the market has been active. The demand for steam coal is improving and conditions gradually approaching normal. Rail shipments are coming in steadily but in comparatively small volume, as the market is well stocked. Wholesale prices for bituminous have advanced slightly, quotations being as follows: Retail, anthracite, egg, stove and nut $8; grate $7.75; pea, $6.75. Bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars three-quarter lump, $3.78; screenings, $2.79.

PHILADELPHIA

A moderate weakness still characterizes anthracite trade and curtailment is still necessary. Domestic sizes in fair demand. Better feeling in bituminous circles, with demand slightly increased and prices steady.

Anthracite—With the more seasonable weather of the last two or three weeks, it was expected that the trade would exhibit some of the usual strength of this season of the year, but, on the contrary, there seems to be an apathetic condition prevailing on almost all sizes, with the possible exception of the steam grades. Every domestic size is in easy supply, and the dealers are simply working from hand to mouth in replenishing their stocks. Even stove manifests weakness, and as this was the lever by which the other sizes have been moved most of the current season, the operators find themselves hard pressed to move these.

Pea still shows an inclination to lag; as a rule, stocks of this size are being materially reduced at this time, but the reverse has proved to be the case this year. Prices are still maintained by the large companies, but the individuals are pressing their output on the dealers with very attractive offers. Many are also postponing purchases until some definite action has been taken by the railroad companies in regard to the recent ruling of the State Service Commission. The rule must go into effect on Jan. 12, and as yet no steps have been taken to postpone its operation.

Prices at Tidewater are about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75
Stove	5.00	5.00
Chestnut	5.25	4.90@5.00

Bituminous—There seems to be a slightly better feeling in the bituminous trade. Some contracts are being closed, but at prices that show little advance. Considerable coal is yet moving from Tidewater points, and all the accumulations there are on firm orders, and are simply waiting for water transportation.

BALTIMORE

The new year opens up with a slow but sure improvement. Demand a little stronger and car movement not so good. Cold weather aids anthracite trade.

The New Year has been inaugurated with a slow but sure improvement to the trade in evidence. General industrial and manufacturing conditions are also reported better and there is a distinct feeling of optimism despite the flat state of business as compared with the same month a year ago.

The demand for coal is a little better than last week. Westward the call for slack has improved, and from West Virginia come reports that the screenings are being sold at the mines at around 65 and 70c. Run-of-mine is worth 80c., while three-quarter gas is usually selling for 90c. in numbers of cases, although the demand is none too strong. The higher grade Pennsylvania coals are in better shape also, and the movement is reported as fair but mostly on contracts. Lower grades sell variously at from 95c. to $1.05, medium grades around $1.10, and best coals at about $1.30.

The cold weather continues to aid the anthracite trade. The December consumption of household coals was probably the largest for a number of years, and this is beginning to tell in the matter of supplementary orders. There has for the most part been adequate supplies at all times. Coal for the export piers has been doing the best, and there has been little trouble therewith except as to coal coming to tide badly frozen.

HAMPTON ROADS

Bunker prices for 1915 are $3.30. Stocks somewhat reduced. Shipments for week about fair. Monthly dumpings for December 827,571 tons.

The dumpings for the week were about fair even with the holidays. Bunker vessels still hold up well and are appreciably swelling the dumpings. Some large cargoes have gone to Boston, Portland, Providence, Everett and other coastwise points while the government has taken a small amount of coal and considerable has moved in the export trade.

The bunker price for 1915, effective Jan. 1, is $3.30 per ton plus trimming and covers both American and foreign steamers. The cargo price is still $2.85 to $2.90 but no coal is being sold at the latter price at this time. There appears to be somewhat less coal on the railroad yards than a few weeks back. One or two of the large shippers who had an excess supply on hand early in the month, are practically cleaned out. It is also understood that one or two cargoes have been loaded from the storage plant at Sewalls Point during the week.

As was expected December dumpings have not been as heavy as would have been the case under ordinary conditions. The total dumpings for the month amounted to 827,571 tons of which the Norfolk & Western Ry. moved, 416,099 tons from Lambers Point, the Chesapeake & Ohio Ry., 206,171 tons from Newport News, and the Virginian Ry. 205,301 tons from Sewalls Point.

Clearances for the week ending Jan. 2, were as follows:

Vessel	Destination	Vessel	Destination
Progresso[1]	Georgetown	Haugarland[2]	Genoa
Windemere[1]	Trinidad	Juno[2]	Kingston
L. K. Thurlow[1]	U. S. Gov.	Justin[2]	Para
Sjostad[1]	Unknown	Bellasco[2]	Buenos Aires and Montevideo
Caprera[2]	Dakar	Estelle Kreiger[2]	Puerto Cabello, Venz.

[1] Loaded at Newport News. [2] Loaded at Norfolk.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Chelston	British	Philadelphia	Havana	2389	
Ecaterina Couppa	Greek	Baltimore	Spezia	1774	
Selene	Italian	Baltimore	Spezia	2368	
Earl of Aberdeen	British	Baltimore	Martinique	416	
Sangstad	Norwegian	Baltimore	Port Limon	1459	
Luigi Parodi	Italian	Baltimore or Norfolk	West coast of Italy	2672	$7.20

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN FREIGHTS

Advance in rates still continues, but the market is irregular and occasional reductions are reported.

The freight market continues to advance, and although a few steamers were chartered for export coal at high rates during the past week, none of these fixtures have been reported. Occasionally steamers are proposed for export coal that are willing to accept less than current market rates. Rates quoted below, under present conditions, are bound to be more or less uncertain, and can be bettered.

To	Rate	To	Rate
Havana*	$2.00	Guantanamo	$2.50@2.75
Cardenas or Sagua*	2.50	Demerara*	4.50
Cienfuegos*	2.50	Bermuda	2.40@2.50
Port of Spain, Trinidad	2.75@3.00	Vera Cruz*	2.50
St. Lucia	2.50@3.00	Tampico*	2.50
St. Thomas*	2.50	Rio	6.00@7.20
Barbados	2.75@3.00	Montevideo, Buenos Aires or La Plata*	6.00
Kingston*†	2.50	Mediterranean	9.60
Curacao	2.25@2.50		
Santiago	2.50@2.75		

*About. †Small boats to Kingston $2.50@2.75. W. W. Battie & Co.'s Coal Trade Freight Report.

OHIO VALLEY

PITTSBURGH

Mines running slightly better. Large increase in inquiry on contract. An authority predicts full operations before end of April, and large price advances in August.

A considerable volume of inquiry has come to the trade for contract coal for the calendar year 1915, inquiries now in hand totaling a million tons or more. The major portion of the contracting, however, will be for the twelve-month beginning Apr. 1, as many contracts expire at that time. Coal requirements have experienced a slight further increase in the past week and mine operations continue at fully 50% of capacity, against 40% or less two or three weeks ago.

Prices are as irregular as ever. The usual contract quotation is on the basis of $1.20 for mine-run, with 10c. advance for ¾-in., and slack at 85@90c. The prompt market continues quotable as follows, with not infrequent shading: Slack, $90c.@$1; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per ton at mine, Pittsburgh district.

John H. Jones, one of the receivers and formerly the head of the Pittsburgh-Buffalo Co., authorizes publication of the prediction that coal mine operations will gradually increase until the Pittsburgh district is running practically full by Apr. 20; that prices will continue low, nearly as low as at present, probably, until about Aug. 1, when a phenomenal advance in prices will begin. Mr. Jones' predictions in the past have shown a high percentage of fulfillment.

COLUMBUS

A better market for domestic sizes due to the continued colder weather. Dealers are placing orders for immediate delivery. Steam business is still dull.

The colder weather of the past several weeks has caused a much firmer feeling in the local trade. Prices are more regular and there is a pronounced tendency to advance, especially in domestic grades. On the whole the tone of the market is better and prospects for the future are much brighter.

Because of the semi-annual inventories at this time, dealers' stocks are unusually light and buying for immediate delivery is being done on a large scale. In many cases retailers have been facing a complete exhaustion of supplies. Dealers have been handicapped in making deliveries because of the icy streets. Many of the householders who have been depending on natural gas for heating purposes have been forced to start burning coal again because of the low gas pressure and this has enlarged the market appreciably. Retail prices are firm and there is some talk of an advance after the first of the year.

The steam business is dull and there are few if any signs of improvement. Manufacturing appears to be increasing slightly but the process is slow. Fuel requirements are not large and much of the buying for steam purposes is being done on the open market. A few steam contracts expire at this time and sales managers are devoting their attention toward renewing them.

Production in Ohio fields has been curtailed during the past week because of the New Year's holiday. This cuts into the output one day. The output during the week in the Hocking Valley, Jackson and Massillon fields was about 65% of normal. In the Pomeroy Bend field the output was about 80% of the average.

The market for anthracite shows considerable firmness and the volume of business is gradually increasing.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.60	$1.70	.....
Inch and a quarter	1.50	1.60	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.65	0.70	0.60
Coarse slack	0.55	0.60	0.50

CINCINNATI

Holiday layoff at the mines causes a better tone although there was no real shortage. The demand is about equal on both steam and domestic, for the first time in some months.

The several factors responsible for the improved market in this vicinity, have all continued in force during the past week, and have been accentuated by the curtailed production over the holidays. The slowing up was not as general as usual, however, or there was considerable coal on tracks, as shipments have been steady. An encouraging factor to the trade is the better balance between steam and domestic grades, enabling the mines to market their output to much better advantage. The steam demand shows indications that the long expected industrial revival is beginning to materialize. Prices are generally firm except in case of coal on tracks that has to be sold.

The domestic market is in a better condition than for a year or more, as both dealers and consumers are short of fuel, and are keeping available supplies moving rapidly. This gives every promise of activity during the entire winter, as it is virtually impossible for the production to run ahead of consumption during the cold months.

COKE

CONNELLSVILLE

Market quiet after recent activity. Some real contract foundry quotations being made. Production and shipments increased.

The coke market has been very quiet the past week, as all the contracts under negotiations have been closed and there is hardly any uncovered consumption among furnaces now operating. In foundry coke some definite quotations on contract are being made, the old quotations of $2.35@2.50, in effect when twelve-month contracts were closed six months ago, being practically abandoned. The market is quotable as follows: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2@2.20; contract foundry, $2.15@2.35, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 26 at 208,130 tons, an increase of 9597 tons, and shipments at 207,280 tons, an increase of 19,231 tons.

BUFFALO

There is some idea that coke is improving in demand. Certain members of the trade say it is stronger, but the general impression is that it will stay about where it is till there is more general business doing and especially till the iron trade is on its feet. Coke continues to sell on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.30.

CHICAGO

There is a good demand for domestic sizes of byproduct coke, and many inquiries are being made for furnace and foundry coke on contracts. Prices are as follows: Byproduct, $4.75@5.00; Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.75; gas coke, $4.25@4.50; furnace coke, $4.50@4.75.

STEEL INDUSTRY

New year opens quietly. Considerable buying reported with more being negotiated. Tonnage involved less than last year.

The steel trade has drifted quietly into the new year. December buying in bars, plates and shapes was liberal in comparison with November and the advance to 1.10c. Pittsburgh, which all important producers announced, to be effective Jan. 1, led to a fair amount of covering at lower figures.

Mill operations this week have naturally shown rather better schedules than those of the holidays, but the increase is not pronounced.

Actual and prospective buying by the railroads has had a good deal of publicity, particularly as to rails. A 40,000-ton order has been placed by the Louisville & Nashville with the Tennessee company. The Pere Marquette has bought 10,000 tons and the Reading has placed some business, including 2500 tons at Pittsburgh. The Pennsylvania order is expected to be placed soon and the New York Central is making up its requirements.

Much has been made in current news of the few rail contracts thus far placed, but 170,000 tons was bought by two lines at the opening of 1914.

The Pere Marquette order has been widely advertised as going to a Canadian mill. Its tariff phase is interesting, since $25 at mill, or $26.50 at lower Lake port, was charged for the rails to be delivered in the United States, while $30 was the mill price on the Canadian part of the order. Canada's rail tariff is $7. Another Central Western road, which earlier in the year had a low price from the Ontario mill, but did not buy there, is understood again to have Canadian prices below those of domestic rail mills.

The report of a purchase of 10,000 tons of Canadian rails by an Eastern road lacks definite confirmation.

Probably 250,000 tons of rails are now under consideration as against 300,000 tons referred to in the same way in the market reports of the first week of 1914.—"The Iron Age."

SOUTHERN

BIRMINGHAM

Cold weather helps lump coal slightly. Steam coal still quiet, but with a better tone.

The cold weather of the past ten days has helped lump coal temporarily, bringing out many small orders for rush shipment, though none of the yards are buying heavily. With ten days more of low temperatures, lump coal would see a decided improvement, as this would very nearly clean up all the stocks, and, as the months of January and February are the coldest of the season, the retailers can still expect quite a large tonnage to be called for. Steam coal is still quiet, with the demand far below the capacity of the mines. Many of the mines have not resumed operations since Christmas, waiting for a better market. Blacksmith coal is normal.

LOUISVILLE

Return of milder weather has again set the market back. Prices are about on a summer basis and very irregular.

The return of milder temperatures has again put this market in a bad way. It is impossible to note any regular prices, though generally they are on a spring and summer basis, with the same grades of coal selling at various prices—usually whatever the operators can get. Some companies are asking from $1.90 to $2 for their high-grade Eastern Kentucky block coal and getting it, while others are selling the identical grade at from $1.40 to $1.50.

Steam coals seem to be somewhat firmer, though it is doubtful whether this condition is due to improvement in the demand or to a decrease in the supply. No price changes of any importance have been recorded.

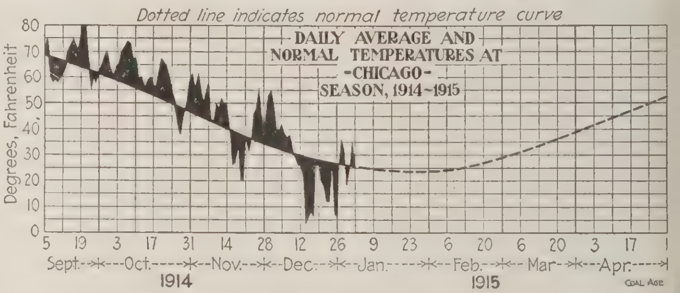
MIDDLE WESTERN

CHICAGO

General market conditions fairly strong, with screenings still buoyant. Anthracite trade active. Prices well maintained during holiday period.

The Indiana and Illinois mines received more orders during the past week than they could fill, due to lessened production over the holidays. Very little coal was mined on the day preceding New Year's, and all of the mines were shut down on New Year's day. This loss in tonnage had a stimulating effect on the market. While there has been no rush of buying, prices in general are holding steadily and the trend is upward. No complaints of car supply are made at the mines, and the movement of coal is fairly good for this time of year. Domestic lump in most cases is being quoted at list prices, and there is a general disposition to maintain these figures.

Considerable anthracite has been moved out of retail yards recently, and there has been marked buying to replace this. Quite a little individual anthracite is being offered in this market below circular prices, and most of it is of good preparation and quality, and consequently well received.



Pocahontas and New River coals are steady at prices previously quoted; Somerset smokeless has a firm tone.

Sullivan County and Clinton coals are in better demand, and the call for screenings has been brisk at high prices.

There has been an increase in circular prices quoted by Franklin County operators; a lively demand for these coals is noted, and the mine owners are looking forward to much activity in January.

Improvement is noted in the volume of sales of domestic coal from the Springfield district as well as in steam sizes. There have also been increased shipments for railroad use from this district.

The market for Hocking coals has been very steady, and it is probable that prices will advance because production seems to be restricted.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.75@2.00	$1.50	$1.75	$1.60	$1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	1.15	....	1.20	....
2½-in. lump.	....	....	1.60	....	....
1¼-in. lump.	....	....	1.35@1.50	....	....
Mine-run...	1.25	1.10	....	1.10	....
Egg........	1.60@1.85	....	....	1.50	....
No.1washed	...	....	....	....	1.75
No.2washed	....	....	....	....	1.75
6x3-in. egg.	....	....	....	....	1.75
Nut.......	....	....	....	1.25	....
No. 1 nut..	1.85	....	....	....	....
No. 2 nut..	1.60	....	....	....	....
Screenings..	0.80@0.90	0.75	0.75@0.85	0.75@0.85	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.75	$1.75@1.95	....	....	....
1¼-in. lump.	....	....	....	....	$1.60
Lump & egg	....	....	$2.25	$2.25	....
Mine-run...	1.20@1.30	....	1.40	1.40	1.25
Egg........	1.60@1.75	1.60@1.75	....	....	....
No. 1 nut..	1.75	....	....	....	....
No. 2 nut..	1.40@1.60	....	....	....	....
Screenings..	0.80@0.90	....	....	....	....

Greene County 5-in. lump, $1.50@1.65; 3-in. lump, $1.40; 5-in. egg, $1.40; 3-in. egg, $1.30; mine-run, $1.10.

INDIANAPOLIS

Continued cold weather and mines are on full time schedules. Prices stiff but no higher except on slack. Indianapolis retail dealers advance prices 25c. a ton.

Continued cold weather has finally put the Indiana coal industry on normal footing. Mines are on full time, as far as railroad service will permit. The Pennsylvania lines are about the only ones giving full service to the operators. Prices are stiff, though no higher except on screenings, for which 85c. may now be quite easily obtained.

Retail dealers of this city raised prices at the beginning of the year 25c. a ton. They reportel cost at the mines stiffening, though not naming any actual advance. Operators say they have made no advances but that retailers can now find no bargain coal on the market and have to pay full prices. The new Indianapoils retail prices are:

Anthracite, chestnut	$8.50	Kanawha, lump forked	$4.75
Anthracite, egg and stove	8.25	Hocking, lump forked	4.75
Anthracite grate	8.00	Hocking, washed egg	5.00
Pocahontas, lump forked	6.25	Luhrig, lump forked	4.75
Pocahontas, lump shoveled	5.75	Luhrig, washed egg	5.00
Pocahontas, mine run	4.75	Linton No. 4, lump forked	3.75
Pocahontas, nut and slack	3.75	Indiana, lump forked	3.50
Blossburg, smithing	5.50	Indiana, lump and egg, screened	3.00
Cannel lump	6.50	Connellville, lump coke	6.50
Jackson (O.) forked	5.50	Indianapolis, by-product coke	6.50

ST. LOUIS

Market somewhat firmer, retail trade especially strong. Good domestic trade expected through the balance of the winter, but no immediate indications of any great improvement in the steam business.

The market is somewhat firmer on both domestic and steam sizes, especially from the outer district. The closing days of December were cold and dreary, causing a large consumption of coal, but it just keeps the market firm. Dealers report many orders, though in nearly every case they are small. The retail trade has no complaint. Coal from Williamson and Franklin County is in good demand, both for local and country use, and inquiries are plentiful. The steam market seems to be picking up in the way of tonnage, and several idle plants expect to resume before the middle of the month.

In the Standard field, steam sizes are still in good demand, and likely to continue so. The domestic market is not as satisfactory as it should be, but it has not weakened any, and indications are that it may get stronger in the next week or 10 days. The current outlook is considerably improved, and will be generally noticeable in the next three or four weeks. Coal operators, however, are not very optimistic of any immediate prosperity. They expect to have a few weeks of good business on account of the cold weather, but do not look forward to a resumption of business in a general way before several months.

Pennsylvania anthracite is moving in fairly good, with several inquiries, but smokeless is quiet.

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	....	....	$1.25	$0.95@1.10	$1.05@1.15
3-in. lump	....	....	1.40	....	....
6-in. lump	$1.40@1.65	....	1.50	1.15@1.25	1.20@1.25
Lump and egg	1.85@2.15	$2.25	....	....	1.35
No. 1 nut	1.35@1.50	....	....	0.90@0.95	....
Screenings	0.50@0.55	....	0.65	0.55@0.65	0.60@0.65
Mine-run	0.95@1.05	....	....	0.85@0.90	...
No. 1 washed nut	1.60@1.75	2.00	1.60	....	..
No. 2 washed nut	1.35@1.40	....	1.45	....	..
No. 3 washed nut	1.10@1.15	....	....	....	....
No. 4 washed nut	1.05@1.10	....	....	....	....
No. 5 washed nut	0.80@0.85	....	....	....	....

Wholesale Pennsylvania anthracite chestnut, $7.55; egg and stove, $7.30; grate, $7.05.

KANSAS CITY

Retail trade is improved, but wholesalers' stocks continue large. Prices will probably remain unchanged all winter.

The fact that practically all the local retailers in Kansas City had large supplies of coal on hand previous to the present cold spell has handicapped the wholesalers and caused their sales to be lighter than the low temperature would warrant. This condition will probably be relieved in the very near future if the present favorable weather continues.

Conditions for the past four months have been very unusual, and most of the dealers, wholesalers especially, are inclined to be slightly discouraged. There is hardly a possibility that there will be any new price lists made during the current month and unless the weather is decidedly colder there will be none during the balance of the winter. Kansas coal is still selling steadily, and Illinois grades are stronger. Franklin County, Ill., coal which sold last week for $1.75 is now selling at $2.

PRODUCTION AND TRANSPORTATION STATISTICS

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for August and the preceding two months of the years 1913 and 1914:

	June		July		August	
State	1913	1914	1913	1914	1913	1914
Missouri	187,723	185,731	198,723	177,093	178,949	201,992
Kansas	412,371	490,561	465,761	513,312	451,968	453,675
Arkansas	145,306	133,350	163,185	117,016	178,904	157,803
Oklahoma	255,481	273,692	272,124	234,638	289,949	244,103
Totals	1,000,881	1,083,334	1,099,793	1,042,069	1,099,770	1,057,573

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during August, September and October of this year and last year:

	September		October		November	
	1914	1913	1914	1913	1914	1913
Coal	2,878,963	3,001,733	2,662,377	3,250,220	2,324,271	2,939,975
Coke	237,661	387,704	208,866	388,337	185,466	343,387
Total	3,116,624	3,389,437	2,871,243	3,638,557	2,509,737	3,283,362

ANTHRACITE SHIPMENTS

Anthracite shipments for December and the twelve months of 1913 and 1914 were as follows:

	December		12 Months	
	1914	1913	1914	1913
Phila. & Reading	954,827	1,058,723	11,998,779	12,914,887
Lehigh Valley	1,055,349	1,062,578	13,136,759	13,011,370
Cent. R.R. N.J.	710,604	663,395	8,924,936	9,092,433
Del. Lack. & West	902,140	839,384	9,912,578	9,903,541
Del. & Hudson	641,952	590,158	7,313,541	7,094,258
Pennsylvania	530,200	546,976	6,434,937	6,351,756
Erie	703,037	709,431	8,268,585	8,192,352
Ont. & Western	204,149	191,973	2,352,486	2,509,031
Total	5,702,258	5,662,618	68,342,601	69,069,628

I. C. C. No. 5855—C. G. Blake Co. vs. Minneapolis, St. Paul & Sault Ste. Marie Ry. Co.

Reparation awarded on account of an unreasonable and unlawful practice affecting the receipt and charge for transportation of coal from Manitowoc, Wis., to St. Paul, Minn., due to the fact that the shipments were delivered to defendant by carriers from the mines in West Virginia in gondola cars, the sides of which exceeded 52 in. in height, and which defendant desires to keep off its line.

FREIGHT DECISION

Investigation and Suspension Docket No. 420—Switching charges on coal and coke within the Chicago switching district.

Proposed increased rates on bituminous coal and coke from points in Ohio, Pennsylvania, Virginia and West Virginia to Chicago & North Western stations, Peterson Ave., Crawford Ave., Weber and Greenwood St., not justified in full. Reasonable maximum rates prescribed.

FOREIGN MARKETS

GREAT BRITAIN

Deliveries slow and an acute shortage is developing. Raid of the German cruisers again disrupts the export business.

London, Dec. 24—The London coal trade continues very brisk. Colliery quotations are more or less withdrawn. Hundreds of loaded wagons are seriously delayed, and the depots are exceedingly short of coal. The colder weather has increased the public orders, but the shortage is creating serious difficulties.

No sooner do the prospects of the coal exporting industry appear to improve than another burden is immediately placed upon it. The recent German raid has been the cause of the latest obstacle being placed in the path of successful business, as it is due to this that navigation in the North Sea has been restricted.

This is most felt by those ports on the Tyne and Wear, where prompt business has been brought to a standstill. At both markets forward inquiry is very strong, and prices have stiffened. The inland trade markets are again brisk. In Lancashire, Yorkshire and Derbyshire the strong tone of a week ago has been maintained. The Scottish coal trade continues to improve, and is exceedingly brisk.—"The Colliery Guardian."

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

◆

Contract No. 28—Brooklyn, N. Y.—The bids on this contract (p. 1009, Vol. 6), which provide for furnishing and delivering coal were as follows:

SCHEDULE NO. 1, for 9,678,000 lb. of anthracite coal to the various public buildings, baths, courts and comfort stations, Borough of Brooklyn: J. F. Schmadke, $27,144; Bacon Coal Co., $25,302; Sackett Coal Co., $25,805.52; Thomas W. Woods' Sons, $24,714.93.

SCHEDULE NO. 2, for 8,586,000 lb. of anthracite coal to the various public buildings, etc., Borough of Brooklyn: Bacon Coal Co., $22,368.24; Thomas W. Woods' Sons, 21,359.41.

SCHEDULE NO. 3, for 3,692,000 lb. of anthracite coal to the various public buildings, etc., Borough of Brooklyn: Thomas Woods' Sons, $7981.86; Bacon Coal Co., $8197.04.

Address Bureau of Public Buildings and Offices, Room 1003, No. 50 Court St., Borough of Brooklyn.

Contract No 30—New York—The bids on this contract (p. 1009, Vol. 6), which provides for furnishing and delivering 2,000,000 lb. of anthracite pea coal No. 1 for the Botanical Gardens, Borough of Bronx, were as follows per thousand pounds: Burns Bros., $2.27; Chas. D. Norton, Inc., $2.21; O. J. Stephens, $2.22. Address Department of Parks, Municipal Building, Manhattan, N. Y.

Contract No. 35—New York—The bids on this contract (p. 1048, Vol. 6), which provides for furnishing fuel supplies under specification No. 2 were as follows:

7000 TONS NO. 1 BUCKWHEAT—Garfield Proctor Coal Co., $3.31; George D. Harris & Co., $2.79; Pattison & Bowns, $2.97; Meeker & Co., $2.86; John M. Peale, $3.05; Charles D. Norton & Co., $2.74.

700 TONS PEA COAL—Meyer-Denker-Sinram Co., $4.95; Garfield Proctor Coal Co., $4.67; Charles D. Norton & Co., $4.39.

800 TONS NO. 1 BUCKWHEAT—Meyer-Denker-Sinram Co., $4.25; Olin J. Stephens, Inc., $3.57; Garfield Proctor Coal Co., $3.61; Meeker & Co., $3.38; John S. Conabeer, $3.50; John M. Peale, $3.38; Charles D. Norton & Co., $3.13.

750 TONS NO. 1 BUCKWHEAT—Olin J. Stephens, Inc., $3.94; Garfield Proctor Coal Co., $4.05; Meeker & Co., $3.82; John M. Peale, $3.90; Charles D. Norton & Co., $3.69.

Address the Auditor, Bellevue Hospital, 400 E. 29th St., New York City.

Contract No. 41—New York—Sealed bids will be received by the Commissioner of Bridges until 2 p.m., Jan. 7, for furnishing and delivering anthracite coal to the Brooklyn Bridge. The amount of security required is 30 per cent. of the amount of the bid, and deliveries are to be completed within 70 days after closing of the contract. Blank forms and further information may be obtained at the office of the Department of Bridges, Municipal Building, Manhattan. F. J. H. Kracke is Bridge Commissioner.

Contract No. 42—New York—Sealed bids will be received by the Board of Trustees or the Curator of the College of the City of New York, until 2 p.m., Jan. 13, for furnishing and delivering the following: Under Contract No. 1, 1000 gross tons more or less of No. 1 buckwheat coal at Amsterdam Ave. and 139th St.; under Contract No. 2, 600 tons more or less of No. 3 buckwheat coal and 200 gross tons more or less of semibituminous run-of-mine coal at Amsterdam Ave. and 139th St. The above contracts are to be bid on separately, and will be completed July 15. The amount of security required is 30 per cent. of the amount of the bid. Further information may be obtained at the office of the Curator of the College, Room 114, Main Building, 139th St. and Convent Ave., New York City.

Contract No. 43—New York—Bids will be received by the Park Board, Department of Parks, until 3 p.m., **Jan. 14**, for furnishing and delivering coal. The security required will be not less than 1½ per cent. of the amount of bid, and the bond will be 30 per cent. of the total amount for which the contract is awarded. Blank forms and further information may be obtained at the office of the Department of Parks, Municipal Building, Manhattan, N. Y.

Contract No. 44—New York—Sealed bids will be received by Borough of Bronx, until 10:30 a.m., Jan. 11, for furnishing and delivering white ash anthracite coal. The security required is 30 per cent. of the bid, and the contract is to be completed before Mar. 31. Blank forms and further information may be had at the office of President Douglas Mathewson, Municipal Building, Crotona Park, 177th St. and 3d Ave., Bronx, N. Y.

Contract No. 45—McKinney, Texas—The McKinney Water & Light Department will be in the market for about 3000 tons of slack coal about the first of next month. The contract is made on a competitive basis, and is usually closed at about $2.70 f.o.b. the power plant. Address the McKinney Water & Light Department, McKinney, Texas.

CONTRACTS LET

Contract No. 22—Philadelphia, Penn.—Awards on this contract (pp. 933, 972, 1009, 1048, Vol. 6, p. 39, Vol. 7) were as follows:

ROGERS-CORR CO., 47,000 tons of Lykens Valley buckwheat, $3.59; 47,000 tons White Ash buckwheat, $2.99.

WESTON DODSON & CO., 2000 tons Lykens Valley buckwheat, $3.35; 2000 tons White Ash buckwheat, $2.65.

EMMONS COAL MINING CO., 40,000 tons White Ash buckwheat, $2.38; 4000 tons of White Ash buckwheat, $2.50; 25,000 tons White Ash buckwheat, $2.60.

The last three items are for use at the city's pumping station, and water departments.

The requirements for schools, fire houses, etc., varying from 5 to 50 tons each, will be furnished by retail dealers at the different points contiguous to the places where they are required. The bituminous requirements aggregating 100,000 tons for use at the pumping stations at Lardner's Point, Shawmont, etc., were awarded to the Greensburg Coal Mining Co.

Address Director Loeb, Room 225, City Hall, Philadelphia, Penn.

Contract No. 29—Brooklyn—The bids on this contract (p. 1009, Vol. 6), which provides for furnishing and delivering 420 tons of stove coal and 225 tons of egg coal, were as follows: Frederick W. H. Nelson, $6.63, on both sections; Thos. W. Woods' Sons, Inc., for 420 tons stove coal, $6.18, and for 225 tons egg coal, $5.50 (awarded contract). Address Department of Parks, Borough of Brooklyn, or Department of Parks, Municipal Building, Borough of Manhattan, N. Y.

Contract No. 31—New York—The bids on this contract (p. 1009, Vol. 6), which provides for furnishing and delivering 600,000 lb. of egg coal No. 1 for the parks in the Borough of Bronx, were as follows per 1000 lb.: M. L. Bird, $3.14 for each section (awarded contract); Burns Bros., $3.38 on first section and $3.50 on other three sections; Olin J. Stephens, $3.37 on all four sections. Address Department of Parks, Municipal Building, Manhattan.

Contract No. 32—New York—This contract (pp. 1009, 1048, Vol. 6), has been awarded to Chas. O. Norton & Co., at $13,400. Address William Williams, Commissioner, Department of Water Supply, Gas & Electricity, Room 2351, Municipal Building, Manhattan.

Contract No. 36 A—New York—The bids on this contract (p. 1048, Vol. 6), which provides for furnishing and delivering 800 gross tons of buckwheat No. 3 and 400 gross tons of semi-bituminous coal at the Fire Department Building, were as follows: For 800 gross tons No. 3 buckwheat coal, Penn Fuel Co., $1.80 (awarded contract); Wm. Farrell & Sons, $2.30; Bacon Coal Co., $2.31; Henry C. Meeker, $2.52; Garfield & Proctor Coal Co., $2.32; Commercial Coal Co., $2.59; Gavin Rowe, $2.29. For 400 gross tons of semi-bituminous coal, Penn Fuel Co., $2.90 (awarded contract); Wm. Farrell & Sons, $3.30; Bacon Coal Co., $3.37; Henry C. Meeker, $3.87; Garfield & Proctor Coal Co., $3.25; Commercial Coal Co., $3.38; Gavin Rowe, $3.25. Address Department of Corrections, Municipal Building, Manhattan.

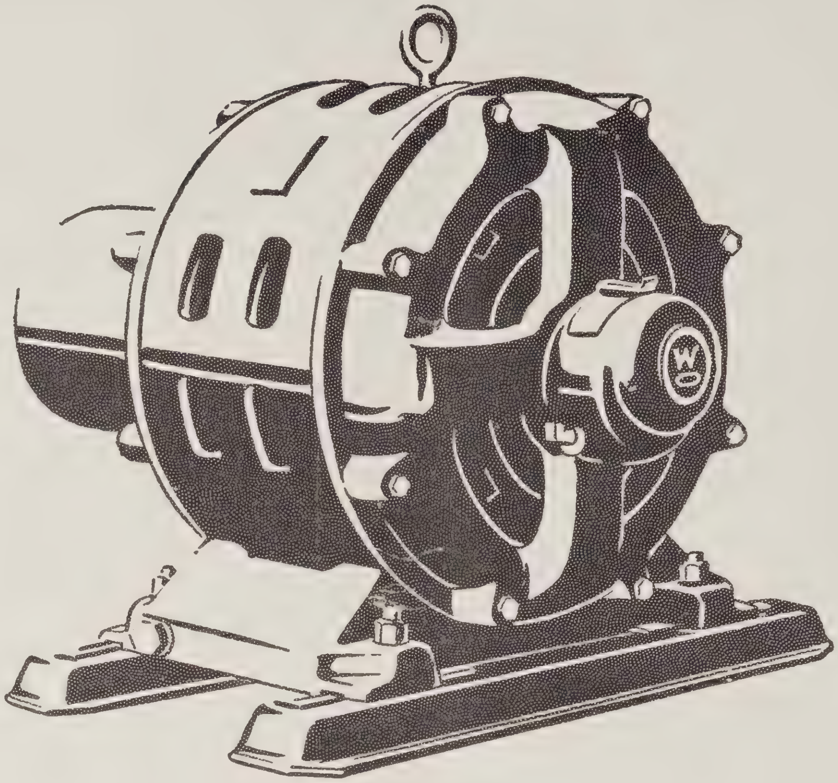
COAL AGE

Volume 7, No. 3
Issued Every Saturday
Hill Publishing Company

NEW YORK, JANUARY 16, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

General Views at Mines of West Virginia-Pittsburg Coal Co., Collier, W. Va.



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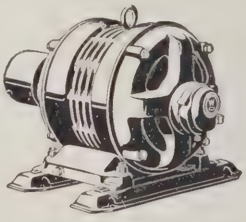

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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000
None sent free regularly, no returns from news companies, no back numbers.

THE WEEKLY AD-TALK PAGE

Another Definition

"Advertising," said a speaker at a great business men's dinner, "is merchandising by wireless — suggesting comforts and necessities before the need is born—creating new markets—building new factories—selling the surplus."

Likewise, advertising makes for better furnished homes, better dressed people, purer food, better health, greater comfort, better equipped shops, improved methods, a happier and more efficient industrial community, bigger life.

And, incidentally, advertising makes the advertiser a bigger, broader man; likewise, the reader of advertising.

COAL AGE

Vol. 7 NEW YORK, JANUARY 16, 1915 No. 3

A Reward for Bravery

Is it not about time that some one was suggesting a suitable method of rewarding the individual bravery displayed in mine rescue work?

THIS thought took possession of us in reading some of the accounts of results obtained by the German Kaiser in distributing Iron Crosses to his soldiers.

Following each mine disaster there is a call for volunteers and as a rule the call is not in vain. The men who willingly risk their lives at such times are not fired by patriotic motives such as move soldiers to enlist for the protection of a Fatherland, but they are carried forward by humanitarian impulses which they do not stop to question.

Such promptings do not incite sensible men toward acts of foolhardiness, but affect such men exactly as does the call of patriotism; and the same rewards that are suitable for patriotism can be safely applied to them.

In considering the possibilities of such a system, we should not lose sight of the fact that at the present time there is little co-operation between first-aid teams in different states or even in different sections, and this condition is also true to a degree between outsiders and the rescue men in the employ of the Bureau of Mines. Very often jealousies spring up when several different crews offer their services simultaneously, and as a result things happen that not only affect the efficiency of the rescue work, but often endanger unnecessarily the lives of the men.

WON'T *Coal Age readers make suggestions as to some feasible plan for properly rewarding the brave men who do deeds of heroism in our coal mines*

?

In working up a system of rewards, opportunity would be presented for perfecting a National organization to deal with just such problems, since the prestige offered by recognition from a National body would appeal to every one, and make such an organization possible.

It might be that nothing more binding than precedent could be offered in lieu of fixed rules and regulations to govern rescue teams in different States and the U. S. Government men, but even well-established precedent openly published would be better than the present uncertainty.

It is a fact that just now any coal operator might feel justified in preventing even a U. S. Bureau of Mines instructor from entering his mine, following an explosion, if he felt so inclined.

First-aid contests offer some encouragement and are an incentive to men hesitating about spending the necessary time required to complete a course of rescue training; however such contests can never appeal to a fellow's imagination as would medals won by acts of bravery in actual service.

But a first-aid meet provides an excellent opportunity for the display of honors won, and even heroes enjoy the experience of receiving public approval.

A Tour through European Coal Mines--III

By Samuel Dean*

SYNOPSIS—Belgians recommend stone dusting. Systematic timbering generally employed. Miners' wages much less than in America. Girls employed to pick slate.

With regard to mine fatalities in Belgium, a paper was issued recently by Messrs. Watteyne and Breyre, in which it was shown that fatalities decreased continuously from 1881 to 1910, until the rate was 0.992 per thousand employed (inside and outside included), which is a world's record.

There was a remarkable diminution in fatalities caused by ignitions of firedamp and coal dust, the figures being 0.437 per thousand between 1881 and 1890, 0.28 between 1891 and 1900, and 0.077 between 1901 and 1910. The causes of accidents in connection with gas and dust, in the last period of 10 years, were: Ignition by electric lamps, 0.011; explosions, 0.025; asphyxia by normal evolution of gas, 0.014; sudden outbursts, 0.027.

The authors of the report attribute these results to the use of permissible powders, which have been used to a much larger extent than the law demanded. Strong warnings were issued against exceeding the charge limit of these explosives.

1—Girls Employed as Slate Pickers. 2—Another Group of French Women Who Work as Slate Pickers. 3—French Bosses. Note the Linen Cap Worn under a Leather Hat. Woman on Right Is the Bath Attendant. 4—Typical French Miner. 5—First-Aid Man and Slate Pickers

Prevention of Dust Explosions

For the purpose of reducing accidents due to explosions of coal dust, Watteyne strongly recommends local and concentrated schistification (shale dusting and arresting barriers), the use of lamps having a high degree of security, and of explosives of proved safety in the presence of both gas and dust.

Four years ago Lemaire experimented with incandescent lamp filaments at the Frameries testing station in Belgium, and proved that breakage of the globe, with either carbon or metal filament, was dangerous in an explosive mixture. Tests were made with 2- and 4-volt lamps in currents containing 7½ to 10 per cent. of methane, and having speeds of 2 to 33 ft. per second.

Methods of Working in Belgium

I am only able to deal briefly with methods of working coal seams in Belgium; no matter what the system is, the goaf is always packed tight with rock or other material. The practice of hydraulic filling has increased every year, and the same may be said concerning Germany and France.

---

*Delagua, Colo.

Galvanized-Steel Cars Used in French Mines

40-Ton Coal Car Used on French Railroads

The method of working a 9-ft. seam of coal near Lens, in France, may be of interest. The seam is first blocked out in pillars 300x900 ft. (Fig. 1), the single headings, 9 ft. wide, being ventilated by means of 2-ft. diameter pipes and small fans driven by compressed air. Slices of coal 9 ft. wide are taken off the pillars until all the coal is removed, these 9-ft. places being driven to the rise as the goaf formed by the previous slice is filled with rock (Fig. 2).

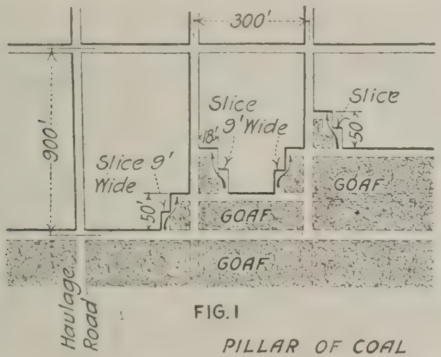


FIG. 1

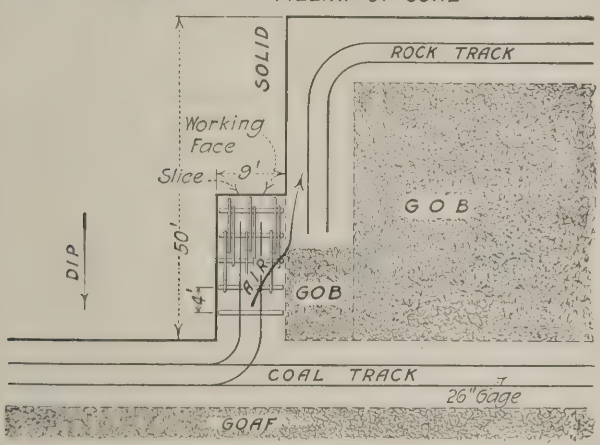


FIG. 2

Showing Methods of Mining in France

Timbering Kept Close to Face

The cars containing the rock are brought down hill from another district, or another mine, and in some instances from the surface. The cars containing the coal also travel down hill to the shaft bottom, the haulageways being so arranged that the grade is always in favor of the loads. The roof is supported by cross-bars 4 ft. apart with three lagging pieces overhead, these pieces being driven ahead as the face advances, after the manner of forepoling, until there is room for another cross-bar against the face 4 ft. from the last one. Thus the miner never works under wholly unsupported roof.

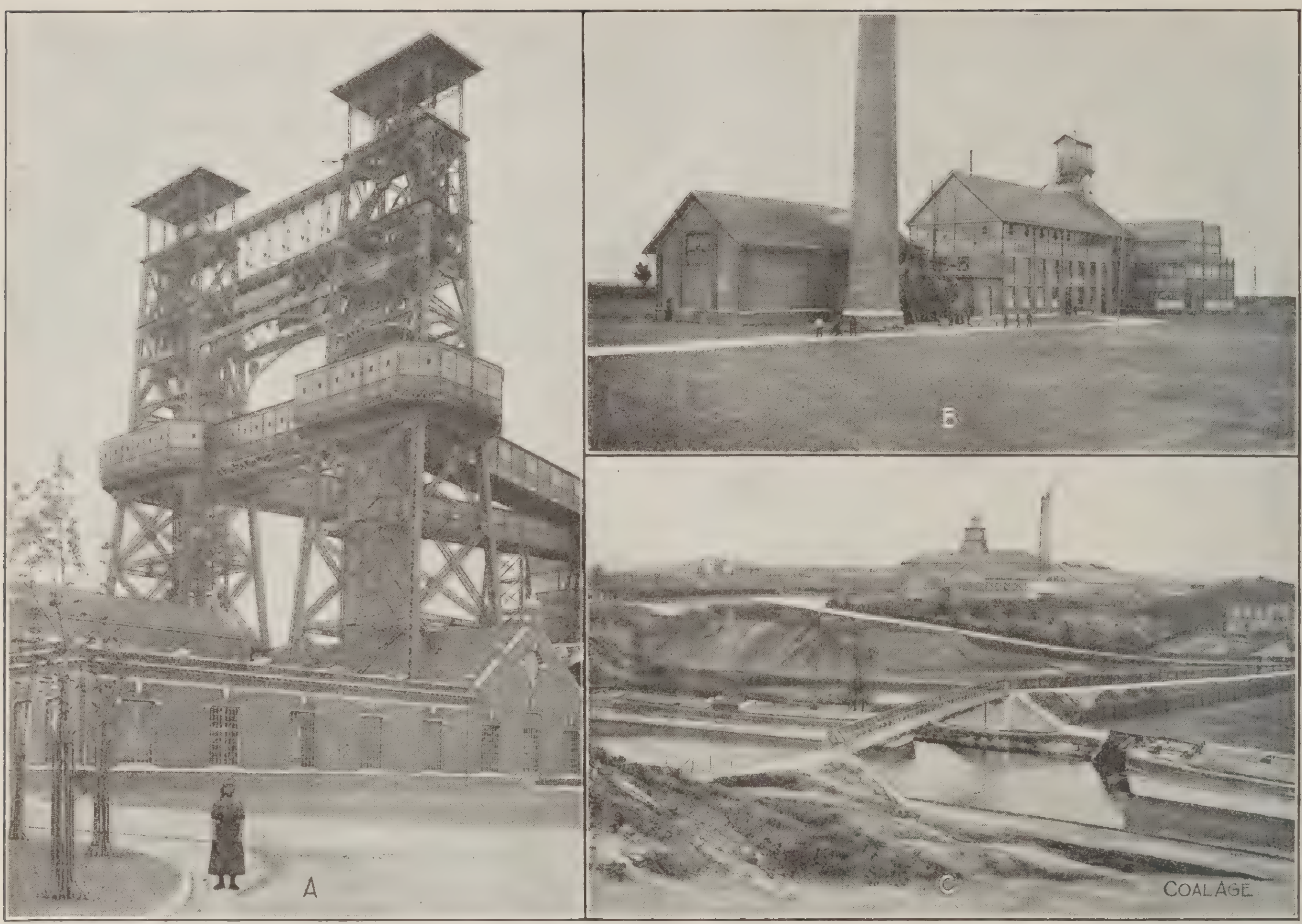
This is the general method of timbering at the face in the mines of France, and the term "systematic timbering" sprang into prominence after a visit which Henry Hall, a British mine inspector, paid to French mines many years ago; but even today no systems of timbering, anywhere, are in advance of the French method, and it may be added that few, if any, are more costly. But the condition of the mine roofs justifies this elaborate system of timbering.

Wages Paid Miners

In this 9-ft. seam, the miners are paid 32c. a ton for mining, loading, timbering their places and laying track. The capacity of the cars is 1200 lb.; they are of galvanized steel and being without end doors are consequently dust-proof.

Colliery No. 12 at Lens, France

Conveying Cars under Tipple



A—Steel Headframe at No. 15 Colliery, Lens, France. B—No. 14 Colliery of the Coal Mining Company of Lens. C—No. 8 Colliery at Lens

Miners average about $1.50 a day (8 hours). Contract company men average about $1.25 a day; these men are paid 20c. per cu.yd. for packing the goaf with rock, which includes hauling the material from other parts of the mine.

Props and cross-bars are not withdrawn from the goaf, and timber costs are often more than 25c. per ton.

Laborers on the surface are paid $1.20 per 10-hr. shift.

The workmen are provided with attractive, well built homes, each house having a large garden. House rent is surprisingly low, being only $1.30 per month for a five-roomed house with garden and necessary out-houses. Workmen are supplied with free coal.

A single man can get room and board for 40c. a day, so that although wages are low, the cost of living is correspondingly cheap, and to me there is always something strange about this, because some foodstuffs are imported, freight rates are high, and the cost of fuel in the country is high. The selling price of coal at the mines is $4 and over per ton.

Amusement Hall for Employees at Lens

No. 13 Colliery at Lens, France

There was a shortage of miners in France, and in the Lens district 25 per cent. more men were needed.

Girls are employed picking slate in the screens, and also work in the safety-lamp rooms. In this connection it may be said that the famed beauties of Paris do not compare with the unadorned beauty seen on the tipples, but as far as I could observe, there was no levity, or lack of discipline at the mines.

UNIQUE SURFACE PLANT

A photograph is shown of the steel headframes over the pits at the No. 15 colliery belonging to the Mining Company of Lens. There are two shafts, upcast and downcast, each 16 ft. diameter circular, and 82 ft. apart. These were sunk by the freezing process and are about 1000 ft. and 850 ft. deep, respectively.

Electric hoists have been installed and the whole of the machinery on the surface is operated electrically.

The mouths of the shafts are 82 ft. below the level of the railroad tracks, and lattice-girder bridges, 106 ft. high, communicate with the screens over the tracks. The bridges are covered with metal panels and glazed windows. The height to the top of the pulleys in the headframes is 214 ft., and to the top of the roofs over the pulleys, 230 ft. The cars are hauled to and from the screens by means of an endless chain.

MODERN SHAFT-SINKING METHODS

I cannot close this article without referring to the excellent work done in recent years by the technical mining men, in connection with shaft sinking through heavily watered, and sandy running strata. In 1904 an engineer named Portier successfully applied the cementation process for stopping fissures in the chalk sides of a shaft in the North of France, and since then this method has been successful in different parts of the world. Cementation has also been resorted to for insuring the success of the freezing process.

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Extracts from a Superintendent's Diary

About once a year we manage to have an entertainment that is intended for and is embraced by most of the families of our community. It may be an open meeting of one of our lodges, or a church festival, or a union celebration; be that as it may, word travels out that everyone is to have a good time, with plenty to eat and everyone proceeds to come.

There have been times when we have had several open entertainments in one year, but, as a rule, one only succeeds. The reason for this is not very difficult to discover.

The women of our community, like the women in all other mining villages (and men, perhaps, if the truth were known), have a desire to display their finery to all of the other women of the community and likewise crave an opportunity to examine the "fine feathers" of the other women.

An open entertainment naturally offers the best opportunity for such display, and as most of these women must content themselves with one "dress-up" dress each season, one entertainment per year suffices.

Nor are dresses the only things that are subject to "dress parade" during these gatherings. Some sort of informal supper is generally served and this gives each of the ladies a chance to contribute her favorite omelet, or cake, or pickle for the approval of the camp's fastidious epicures and in return she is allowed to pass judgment on her neighbors' offerings.

It always happens that there are plenty of children on hand to devour the pies, cakes and jams; a fortunate circumstance since there are generally a dozen dessert courses to each meat and sandwich offering.

Some of the men in attendance begin to pass knowing winks down the line as soon as the kids get interested in the pies to such an extent that their mothers find it necessary to watch them; a few moments later groups of thirsty men spring up outside of the hall and a bottle or two is quickly emptied.

These old offenders always manage to get back before they are missed, however, and while the children are gobbling up the last piece of pie, they manage to empty all of the pickle dishes.

After the tables are cleared, further opportunities for displaying and comparing talents are offered.

Songs, recitations, impromptu speeches, musical numbers, etc., are called for and every one is given a chance.

One of the circumstances that adds to the interest of these gatherings is the number of different nationalities represented. This fact leads to heated and yet withal interesting discussions as to how this or that would be done in the old country, and the various viewpoints suggested preclude the possibility of any one going away with too high an opinion of himself.

For two weeks our camp has been making preparations for the first open meeting of our first-aid organization, which is to be held tonight. As this happens to be the first suggested entertainment of the season, word has gone out that it will be the event of the year. Since the first-aid team will, no doubt, insist on giving a little exhibition, we will have oratory, mirth, and music alternating with demonstrations of how to handle the wounded and the dying. And no one will consider the program unusual or out of tune. We take our pleasures seriously and can even find entertainment in criticizing methods of assisting the wounded.

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New River Operators Honor Retiring Officers

As a compliment to the retiring president, Wm. McKell, and the retiring secretary, W. R. J. Zimmerman, the New River Coal Association served an elaborate banquet at the Dunglen Hotel, at Thurmond, on the evening of Jan. 5, when a handsome and beautifully engraved gold watch was presented to each of the retiring officers. A large number of the members of the Association were present. The presentation addresses were made by Hon. Jos. H. Gaines and R. S. Spilman, of Charleston, the former also acting as toastmaster.

Happy after-dinner talks were made by Hon. C. W. Dillon, on "How Legislatures Do So Much," Hon. H. W. McGinnis on "Raleigh County," John Laing on "Safety First," R. T. Hubbard, Jr., on "The Law and the Profits," and Attorney-General A. A. Lilly.

The newly elected officers of the Association are C. C. Beury, president; Wm. McKell, vice-president; N. S. Blake, secretary and treasurer.

Rescue Operations after Royalton Explosion and Their Lessons

By Oscar Cartlidge*

SYNOPSIS—The rescue work at the Royalton explosion was performed almost entirely by the aid of breathing apparatus, the wearers utilizing their outfits for almost the full time limit. The only failure was due to a chance being taken with spent apparatus. Crude American soda was used in the Fleuss apparatus instead of the imported article. Need for more safety lamps and electric lamps and better identification tags was made manifest. By reason of the use of breathing apparatus and the absence of fire, the mine was practically recovered in less than 20 hours.

The recovery of the mine after the explosion at Royalton was the occasion of much successful work, conducted largely by men in breathing apparatus, the bodies of all but about thirteen of the total of fifty-two having been carried back to the base by men so equipped. This work was done by the rescue teams of the Illinois Mine-Rescue Commission and of the Madison Coal Corporation. The cars of the Bureau of Mines took no part in the work.

The Benton Mine-Rescue Car and Rescue Station

This is stated to show that the hope of the director of the federal bureau has been fully justified, and Illinois is now in position to give adequate assistance in case of such unfortunate disasters. The rescue work proceeded without a hitch, and the apparatus proved to be equal to the full time of service for which it was rated.

The explosion in the North Mine at Royalton, Ill., Oct. 27, 1914, occurred at about 7:35 a.m., just after the men—in all 346—had been lowered into the mine for the day's work. A few were still on the bottom, and others were on their way down the entries to their respective working places.

A Few Preliminary Facts

Charles A. Sine, general superintendent, had just reached the bottom on a tour of investigation, and. strange to say, he was only bruised and shaken up while others near-by were killed. He was out directing the work of mine recovery on the following day.

The mine is about 325 ft. deep, has been in operation nearly five years and has an average output of 3000 tons per day of eight hours. It is worked by the room-and-pillar method. The coal is about 9 ft. thick, 7 ft. being taken in the advance and the remaining 2 ft. of top coal being drawn after the rooms are extended their full length.

The explosion was confined to the northwest section of the workings, and presumably was the result of a body of gas being ignited by coming in contact with an open light, as safety lamps were not used.

The call for help reached the Benton station, through State Inspector of Mines George L. Morgan, at about 8 a.m. Benton is about 20 miles northeast of Royalton, and the roads being good, the trip was made by automobile, part of the crew arriving and being in the mine at 11 a.m.

Many Lives Saved by Reversal of Air

Preceding their arrival, the mine manager, James Brown, and others, who were on top at the time of the explosion, descended into the mine and brought out the wounded and those in the unaffected area. Before going below, Mr. Brown, we understand, had the air reversed, making the hoisting shaft the downcast. At the time of the explosion the air was being forced into the mine at the escapement shaft.

I have no personal knowledge of the manager's reasons for this action, but I assume that he knew in what part of the mine the explosion originated and also that there were many men at the shaft bottom and along the main entry on the way to the interior. I have no hesitancy in saying that this reversal of the air current saved many lives. Two men, however, found near and to the east of the escapement or first and second west may have perished because the direction of the air was changed. An inspection of the map will show that reversing the air caused the noxious gases to return directly to the air shaft, principally over that part of the mine that had been worked out and abandoned.

Details of the Rescue Work

In the first party that descended into the mine at 11 a.m., was W. L. Morgan, inspector; Edward Laughron, county inspector; James Brown, mine manager; Dr. Springs, colored;

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*Manager of mine-rescue stations of Mine-Rescue Station Commission, Springfield, Ill.

NOTE—A detailed account of this explosion appeared in our issue of Nov. 7, 1914.

Shep Clayton, miner; James Towal, superintendent, Benton Rescue Station; M. J. Carraher and Walter Nichols, assistants of the Benton Station. The three latter carried breathing apparatus. All in the party were able to get to within one hundred feet of the air shaft by the heading on the west side of the shaft. At this point they encountered bad air, whereupon Messrs. Towal, Carraher and Nichols explored to the air shaft with apparatus, but discovered no bodies.

They then all returned to the main shaft; went up the main east entry to the main north, and up the main north to the fourth west off the main north. Up to this point ventilation was fairly good and but little disturbance evident, except at the east side of the shaft bottom, where a large pile of rubbish had been thrown up against the loaded cars. This material had evidently come from the west.

Clothes Completely Stripped from Victims

Leaving the rest of the party at the fourth west off the main north, where foul air was again encountered, the men with breathing apparatus proceeded up the fourth west to a point about one hundred feet from the first north off the fourth west, where one body was found, and about fifty feet inbye, two more. The clothes were stripped completely off the bodies, except that the trousers of one man were still hanging over the shoes.

At the first north off the fourth west they found a car turned upside down with two bodies, much mutilated, lying on top. Another body was found inside of the second north.

The rescuers next explored the crosscuts between the first and second north and carried three bodies to the fourth west, where men without breathing apparatus took them to the shaft. This party then returned to the surface, and the rescue team of the Madison Coal Corporation, Dewmaine, John Lyons, captain, having arrived with its equipment, a first team composed of Towal, Carraher, Dixon, Hudson and George Clayton, and a second team comprising Nichols, Lyons, Hawley, Hooper and Bass (the last three colored) proceeded to a point where the first two men were found. Here a base for further operations was established.

Supporting this breathing-apparatus squad, was a crew to reestablish ventilation temporarily. This included James Dunn, Thomas Carraher, E. Laughron, A. J. Skelton, James Brown, Shep Clayton, John Duncan, R. P. Medill, Thomas Watts, Evan D. John, John Eddy, Bernard Cosgrove, Charles Story, John Nutall, James Forrester, William Burton, George Bagwill and Dr. Springs, all mining men in the southern end of the state.

Before going inside, a curtain was hung on the west side of the shaft across the main entry, one in the "forty-five" to the east of the shaft, and a regulator curtain was placed in the main east at the first south, for the purpose of forcing more air to the base of operations.

More Rescuemen Available Than Needed

At about this time I arrived from Springfield. After consulting with the state inspector, the superintendent of the Benton station and the mine officials and learning that everything was progressing favorably, I concluded that we had enough rescuemen and equipment on the ground, counting the team that was on the way from Eldorado. It did not seem necessary to send for any of the state rescue cars. Subsequent events proved that this conclusion was justified.

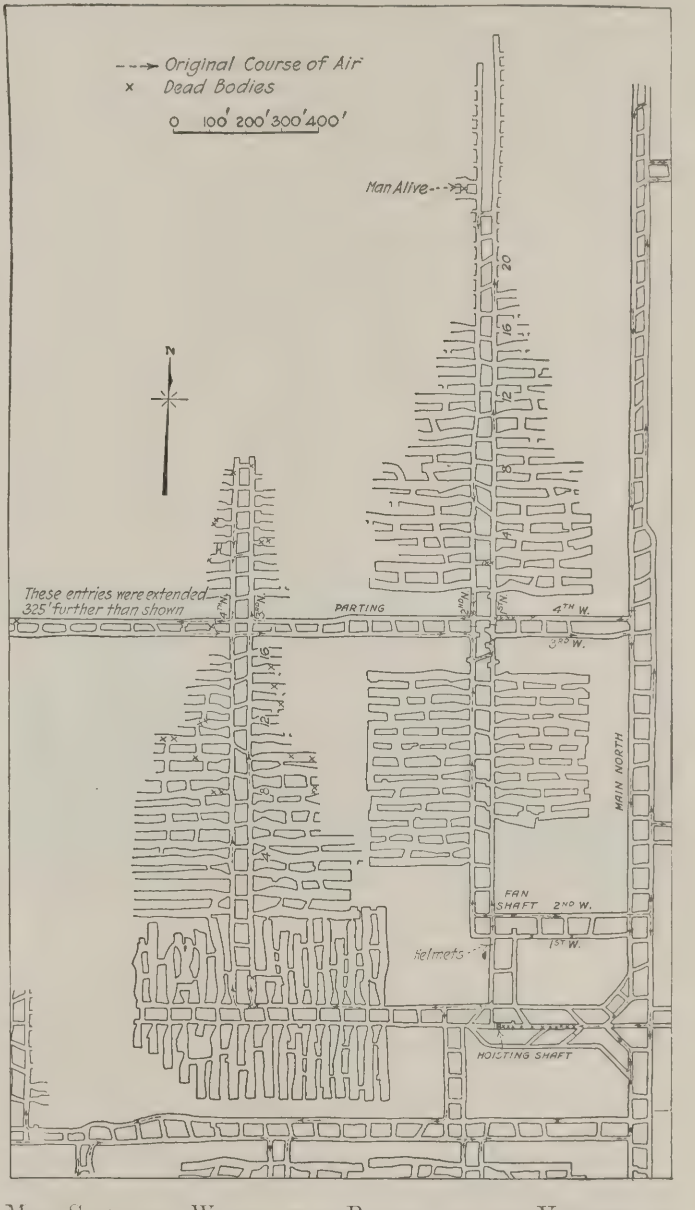
No one had at that time done anything to make stoppings of any permanence, and there was a dearth of lights, so we busied ourself in securing men to tighten stoppings, in procuring lights, extra oxygen, soda, etc., leaving Mr. Towal in charge of the inside rescue crews, while we alternated between the inside and back work.

Up to the point where the base was established the ventilation had been made fair with temporary stoppings. The first team donned breathing apparatus and explored the fourth west to the fourth north, went up the latter and out by the third north. Eight bodies were found on this trip.

Trips Occupying about 1¾ Hr.

The rescuers then ventured down the fourth south a short distance and then retreated by the third west to the base. No more bodies were seen. The parting on the fourth west was nearly blocked with cars, and much violence was indicated; the force of the explosion traveling toward the east in the third and fourth west, and toward the south in the third and fourth south. This fact suggested to us that the origin was probably in the third or fourth north. The trip occupied 1 hr. 45 min., and satisfied everybody that no fires resulted from the explosion.

The second team was then sent up the first and second north. This team explored all the rooms on the first that were standing, there being 35 turned. They then inspected 10 rooms on their return down the second north. In the crosscut between Rooms 25 and 24 of the latter heading a man who was still alive, but in a dazed condition, was found reclining on his powder box. His carbide lamp was burning at his side. Two of the squad returned to the base for assistance and carried the man to the first north where there was better air, due to the work of the temporary ventilation squads. He was brought out, and, I understand, has recovered. The man found at the door between the first and second north had a pinkish color, and the pulmotor was tried on him for possible signs of life, but to no avail. On this trip the men in the breathing apparatus traveled for 1 hr. and 40 min. in their helmets. While the rescue teams rested, the temporary ventilation squads worked in the first south and found three men.



Map Showing Where the Bodies of the Victims in the Royalton, Ill., Explosion Were Found

The breathing-apparatus squad reported that all stoppings between the first and second north were intact, and after the air had been turned into them, Messrs. Dunn, Johns and party explored the balance of the second without finding any dead.

A third breathing squad composed of part of the Dewmaine team and part of the Benton team explored to No. 12 room on the fourth south. On this trip three bodies were found, one at No. 13 under a car and two in No. 14. Four more were found later, farther in. It was now about six o'clock and the teams rested; the ventilating squads working up the fourth west.

One Man Suffers from Use of Depleted Apparatus

A mixed breathing squad composed of Dewmaine, Benton and Herrin men then carried bodies out of the third and fourth north to base, and then explored to face of the third and fourth west. This pair of entries is about 325 ft. farther in than the map indicates. Two bodies were found about three hundred feet from the face, and the squad carried them out, four men being detailed to each stretcher.

Nichols and team then started to explore the third and fourth south but only got a short distance when one of the team became sick and the men returned to the base. This sickness was due to using an apparatus that had previously been in service and in which the chemical had not been renewed, as it was thought that it would last for the short trip contemplated. Leaving the one man the other four returned and explored the fourth south returning up the third south. The O'Gara Coal Co.'s team having arrived from Eldorado, was then sent in under the captaincy of W. G. Taylor, to explore the rooms in the third and fourth south. They discovered and brought out eight bodies.

This ended the exploration of all the explosion area except the escapement entries. Fresh air was turned down this pair of headings, and two bodies were found. One near the escapement shaft and the other about one hundred feet outbye. One body was also found in the sump at the main shaft.

All But about Thirteen Bodies Recovered by Apparatus Men

It was now 5:30 a.m. of the day following the explosion. Forty-seven dead bodies had been removed from the mine by the rescuers, and all but two or three of those inside had been carried to fresh air by men wearing breathing apparatus. According to the records of the company two were still missing, but it was certain that if there were any others in the mine they were not alive. It not being necessary for breathing apparatus to be used further the general manager informed us that his men could handle the rest of the work, and the mine manager organized regular shifts for the cleaning up of the mine, with competent men in charge, and, while this was in progress five bodies were found. We stayed at the mine all of Oct. 28, and upon leaving left Mr. Nichols to stay as long as the mine manager wanted him.

The Car Shed and Rescue Station at Benton, Ill.

The dead were located as follows: Ten at the shaft bottom; 5 in fourth west up to the first north; 3 in the first and second north; 3 in the first south; 8 in the third and fourth north; 2 in the third and fourth west, past second north; 8 in the third south; 7 in the fourth south; 2 in the back west at third south; 2 in the first west or escapement road; 1 in the first west off the main south; 1 in the sump. This totals to 52 men.

The barometer at Royalton, at 7:30 a.m., registered as follows, the readings being corrected to a sea-level basis: Oct. 26, 29.98 in.; Oct. 27, 30.42 in.; Oct. 28, 30.15 in. This indicates a rise of 0.44 in. in the 24 hr. preceding the explosion.

Conclusions

This was the first large explosion in Illinois since the establishment of the state mine-rescue stations, and we believe the exploration of the mine and the recovery of the dead in less than 24 hr. after the explosion occurred justify the efforts put forth by the Mine-Rescue Commission for the propagation throughout the state of mine rescue and first aid.

We have demonstrated the fact to our own satisfaction that breathing apparatus worn by trained men is of great value in exploration and the recovery of the dead after an explosion. It has been shown that the types of breathing apparatus used are practically safe when worn by experienced men, and that long exploration trips to locate the dead and living and ascertain the presence or absence of fires can be made in irrespirable air. We also found that crude caustic soda can be used for rescue work with the Fleuss apparatus, for our men used this absorbent exclusively.

We learned that there are not enough safety and electric lamps at the average Illinois mine, and suggest that every mining man who goes to an explosion should take with him all the lamps he can secure. We also learned that the reversal of the air current after an explosion is sometimes justified.

Every miner while underground should have fastened to his person an identification tag. Some of the bodies were practically without clothing, which goes to show that checks or other identification marks carried in the pockets are not reliable.

Two of the Eldorado team used Draeger 2-hr. apparatus, all the rest of the teams being equipped with the Fleuss outfit, designed for equally extended time of service.

All the men who wore the breathing outfits are, I believe, with the possible exception of Mr. Lyons, holders of Illinois Mine-Rescue Commission certificates.

In addition to the men previously mentioned in this article, much credit is due to James Reid and John McClintock, state mine inspectors; James Seymour, Joseph Morris and George Morris for their valuable assistance and advice.

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Ventilating the Face of Entries

By M. D. Cooper*

When driving two parallel headings, ventilation is secured in both by making one the intake while the other acts as the return. At intervals, break-throughs are driven through the coal separating the headings, in order that the air current may travel from the intake to the return heading. As the work advances and a new break-through is completed, the preceding break-through is closed with a wooden, brick or concrete stopping. At times it becomes impossible to properly ventilate a heading by means of break-throughs alone, in which case a brattice must be constructed.

A good type of brattice is a partition of brattice cloth carried up from the last break-through. At that place, a door is hung across part of the entry in order to force the air current up one side of the brattice and back on the other side.

In Fig. 1, which shows the general arrangement for ventilating both headings in a two-entry system, the right entry is the intake, while the return air goes out through the left entry. Just outside of the break-through, a door *A* is located in the right entry. A line of posts is set from the door to a point about 20 ft. from the face. To the posts 6-in. ship-lap is nailed and the brattice cloth nailed in turn to the boards. The posts may be spaced according to the length of the boards, but in general if the distance between posts much exceeds 10 ft., the boards cannot be rigidly fastened and it becomes increasingly difficult to tighten the brattice to the roof.

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*Ellsworth, Penn.

The air travels as indicated by arrows between the brattice *B* and the right rib, sweeps the face, returns between brattice *B* and the left rib, passes through the break-through, up along brattice *D* to the face of the left entry, and then out the left entry.

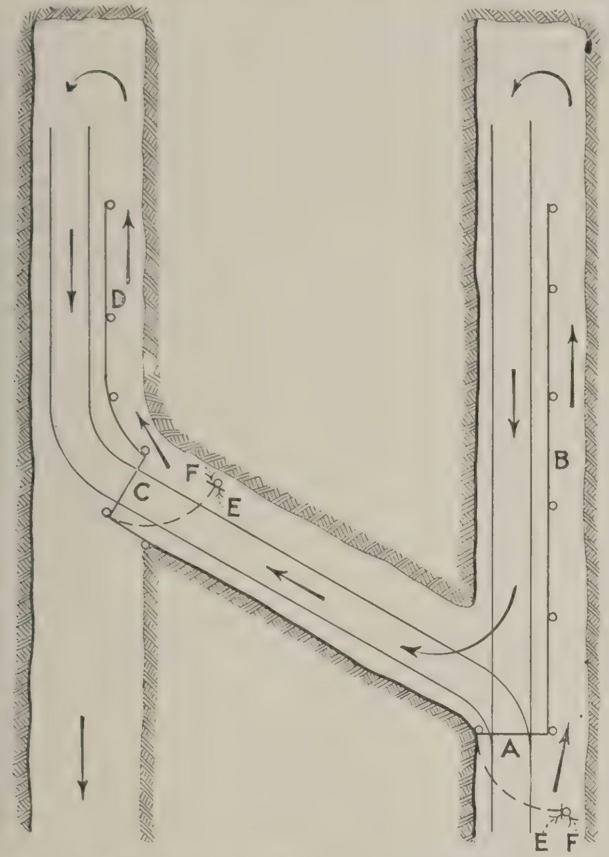

FIG. 1. VENTILATING ARRANGEMENTS OF THE TWO-ENTRY SYSTEM

In order to give a reasonable area on the narrow side of the brattice, it is best to have the entryman lay his track as near the rib as possible, while giving sufficient clearance for his cars. The air may be directed up either the wide or the narrow side of the brattice, but it is generally better practice to cause the intake air to travel the narrow side, as the restricted area increases the velocity of the air current, making it unnecessary to carry the brattice so close to the face as in locations where the intake must be the wide side. This results both in a saving of brattice and in giving greater freedom of movement to the entryman and machine runners.

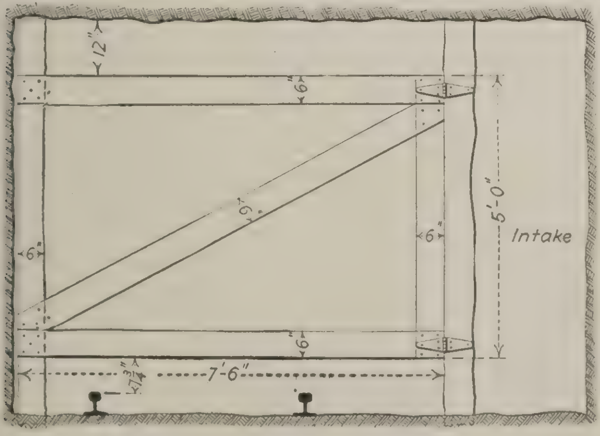

FIG. 2. A BRATTICE DOOR

BUILDING THE MINE DOORS

For use at *A* and *C*, Fig. 1, a simple door built of shiplap, and intended to be covered with brattice cloth, is shown in Fig. 2. This door is suitable for an entry 7 ft. high and 10 ft. wide, in which the track gage is 42 in. In building the door it is best to cut off the necessary boards to the required length, place the side boards across the track and the top and bottom boards in position over the first two. Then drive one nail in each corner, square the door by moving the corners until the diagonal distances are equal, attach the diagonal board, and tighten the door by driving three or four 6-d. nails into each corner and bending the points over. The post to which the door is hung must be slightly inclined toward the face of the entry in order that the door may swing closed by gravity after it is released.

The door is held open by means of a button *E*, Fig. 1, this being a short board attached by a 20-d. nail to the post *F*. Galvanized-iron strap hinges are used for attaching the door to its post, and it is better practice to use two or three 6-d. nails in each hole in the hinge, rather than one larger nail, for by so doing much time is saved when it becomes necessary to remove the hinge from the post.

If the height of the entry exceeds the width of the brattice cloth, the space between the boards supporting the cloth and the roof may be filled by cutting off strips of cloth of the proper width and fastening them by means of short sticks. The sticks are nailed to the boards at intervals of from 12 to 18 in., as shown in Fig. 3.

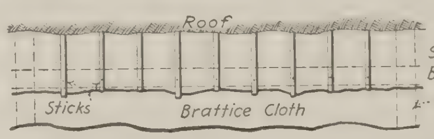

FIG. 3. METHOD OF EXTENDING THE BRATTICE TO THE ROOF

A brattice of this kind, if carefully erected, will prove quite satisfactory in conducting the air to the face. Moreover, when a new break-through is finished, the material may generally be recovered and used a second time.

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Anthracite Shipments in 1914

Statistics show that the total shipments of anthracite from Pennsylvania last year were 68,342,601 long tons. This is 727,027 tons less coal than was shipped in 1913.

Total shipments of anthracite last month were 5,702,258 tons as against 5,662,618 tons in December, 1913, an increase of 39,640 tons. The amount of coal on hand at tidewater shipping ports decreased 141,365 tons, from 811,198 tons on Nov. 30 to 669,833 tons on Dec. 31.

The Lehigh Valley led in tonnage for the month with 1,055,349 tons; the Philadelphia & Reading was second with 954,827 tons; and the Lackawanna was third with 902,140 tons. The Central Railroad of New Jersey carried 710,604 tons, the Erie 703,037 tons, the Delaware & Hudson 641,952 tons, the Pennsylvania 530,200 tons and the New York, Ontario & Western 204,149 tons.

Coal Mining in Ohio during 1914

By J. M. Roan*

SYNOPSIS—Detailed account of the activities of the Industrial Commission of Ohio, Department of Inspection, Division of Mines, for the fiscal year ending Nov. 15, 1914. More than two-thirds of all accidents attributable to falls of roof.

The Mining Industry during the latter months of the year 1913, showed marked activity, and all indications pointed to a prosperous trade in the coal business for the year 1914. The mines during the early part of the year 1914, worked almost full time. On Apr. 1, 1914, the wage agreement between the miners and operators expired, and a large number of the mines in the state suspended operation until a new wage agreement could be entered into.

Run-of-Mine Law

The Run-of-Mine law passed February, 1914, and became operative 90 days after passage. This bill provided that every loader and miner of coal in the state, who, under the term of his employment, was to be paid for mining or loading such coal on the basis of the ton or other weight, should be paid for such mining or loading according to the total weight of his output.

This law put into effect a new basis on which wage agreements could be entered into between miners and operators of the state, as all previous wage agreements had been made on the basis of the ton or other weight of the amount of *lump coal* mined. On account of the provisions of this new law, it was a difficult matter for the miners and operators to come to any satisfactory agreement on a price based on *run-of-mine,* as conditions varied in different sections of the coal-producing districts of the state. In consequence, the coal industry of Ohio for the year 1914 was more or less demoralized, due to this changed system of mining. The industrial depression also served to lower the production and, as a consequence, the tonnage will probably show a decrease of 50 per cent.

During July, a number of conferences were held with the object in view of effecting a settlement, and agreeing upon a wage scale which would be satisfactory to both interests. Later on, district meetings were held, which resulted in several of the coal districts signing up agreements and resuming operations.

The Hocking Valley and Jackson County districts resumed operation about Aug. 1, as well as the Guernsey County district; many of the smaller coal areas are also in operation; however, eastern Ohio, which is the largest coal-producing district in the state, is still suspended.

Accidents

For the fiscal year ending Nov. 15, 1914, 76 fatal accidents were reported; from Nov. 16, 1913, to Dec. 31, 1913, 18 fatalities were reported; from Jan. 1, 1914, to Dec. 1, 1914, 59 fatalities were reported.

Causes to Which Accidents Were Attributable

For the fiscal year ending Nov. 15, 1913, to Nov. 15, 1914, the causes to which the fatal accidents were attributable were as follows: Falls of roof caused th death of 53 persons; mine cars, 11; motors, 5; minin machines, 2; premature explosions, 2; explosions of gas 1; electricity, 1; and miscellaneous, 1.

Measures of Safety

(a) *Safety Commissioner*—On Jan. 1, 1914, the Industrial Commission of Ohio appointed a safety commissioner of mines. This appointment was made with th object in view of reducing the number of fatalities in an around the mines and to devise any measures of safet that might be deemed advisable which would tend to lessen the number of accidents.

"Safety-First Consideration" was the slogan adopted The first publicity step taken into consideration by th safety commissioner was the issuing of monthly bulletins, giving an account of all the fatal accidents, a synopsis of all the facts and circumstances surrounding th death of each person, and comments made in regard to th manner by which the accidents might have been avoide or prevented.

(b) *Motor and Mule Trips*—Trip agreements regulating motor and mule haulage were also inaugurated This agreement provided for the regulation of the number of persons permitted to ride at any one time; fo the speed at which the trip should be run; for the prohib tion of carrying powder, and for the otherwise safe operation of the trip.

(c) *Reporting Conditions of Mines after a Long Su pension*—After a long suspension, such as was experience during the year owing to the operation of the Run-o Mine law and other industrial depression, mines ar liable to get into very unsafe condition from falls, accumu lations of gas, disarrangement of electric wires, the fillin up of refuge holes, etc. In consequence, this departmen issued a circular letter calling attention to these matte and requesting all mines to be thoroughly examined before being placed in operation. Especial attention wa called to the examination of all machinery, hoisting fans, hoisting signals, electric wires, refuge holes; in fac all mine equipment was to be thoroughly gone over and report made to the safety commissioner.

(d) *Solid Shooting*—In carrying out the provisio of Amended Section 976—1-2-3, of the mining law passed Feb. 5, 1914, relative to the method of minin known as "shooting off the solid," this department pr pared a list of questions which it was necessary for co companies to fill out and answer and return, together wi a petition to which was to be attached their own signatur as well as the the signatures of a majority of their em ployees, making request for mining coal by this metho

These questions and answers related to the followin Amount of powder used; size of bit used in drilling t hole; whether dynamite was used or cutting done; wheth squibs and fuse were both used, and reasons given as why it was necessary to mine the coal in this manner.

After these questions were fully answered to the enti satisfaction of the mining department, a permit was i sued, with fixed rules to govern this method of mining.

These rules regulated the amount of powder to be us and the spread of the bit. Dynamite was prohibited vell as excessive charges of powder; shots were to be fired n rotation, and in all mines where more than 15 men vere employed, all shots were to be fired at quitting time.

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*Chief deputy and safety commissioner of mines, Columbus, Ohio.

(e) *Fireboss Reports*—Realizing the dangers encoun- ered in gaseous mines, this department prepared fireboss lank report books, which were mailed out to all mines nown to generate firedamp, and where firebosses were em- loyed. Coal companies were requested to have their fire- osses fill out these blanks daily in duplicate form, re- aining one report for their office records and mailing he other to the deputy mine inspector, in whose district he mine was located. After these reports have been gone ver by the deputy mine inspector, they are mailed to is office to be checked over and any suggestions offered hich may be deemed necessary. These blanks provide r reporting where gas was found, in what room or rooms, nd the number of the entry; also space was provided to eport other dangerous conditions, such as falls, bad p, etc. In this way the deputy inspector and this de- artment are kept in touch with the conditions of mines nown to generate firedamp, which are always considered e most dangerous.

(f) *Mine-Rescue Car*—One of the most important ctors relating to safety which the state has inaugurated as the purchase and equipment of a mine-rescue car. his car has already performed valuable service in a ine fire during the year, and in the reopening of a mine here a fire has originated and which had been sealed up r several months.

(g) *Oil and Gas Wells*—The law permitting oil and s wells to be drilled within the limits of coal-producing unties, although safeguarded by law, has caused serious ncern on account of some of them being drilled through al mines in operation, and proper precautions for safety t always being used in all cases.

So serious became the situation that a resolution was commended by this department and was adopted by the dustrial Commission of Ohio, July 6, 1914, requiring l oil- and gas-well companies to file a map, showing the cation of wells to be drilled, 10 days before commencing drill said well or wells.

Upon receipt of the proposed location, if satisfactory d in compliance with the statutes regulating same, a rmit is issued giving authority to drill these wells. is requirement met with opposition and disapproval many of the oil- and gas-well companies, and the mat- r was taken up with the Industrial Commission of Ohio. is conference resulted in a committee being appointed, nsisting of the representatives of three coal companies, ree representatives of oil- and gas-well companies, the ate geologist, a representative of the engineering de- rtment of the Ohio State University, and the commis- ner of safety and chief deputy of mines, division of nes, of the Industrial Commission of Ohio, acting as airman.

This committee was instructed to investigate the ques- n of oil and gas wells penetrating the coal-producing unties of the state from every angle, and was requested report to the Industrial Commission of Ohio some plan at would be satisfactory to all persons interested and ich would not work a hardship on the oil and gas com- nies. At the same time "safety" was not to be ignored, d the future operation of coal lands yet undeveloped s to be taken into consideration, and life and property tected.

(h) *Heating Mine Air*—Early in November this department issued a bulletin to operators, general superintendents, mine bosses and mine foremen, relative to dangers arising from cold weather, as the cold air entering the mine is warmed and absorbs moisture; it was also recommended that all dusty places be wet down. It was recommended that the air be heated to at least 40 to 45 deg. The method of carrying out this plan was left to the judgment of the mine managements, owing to local conditions varying in different parts of the state.

(i) *Checking Up the Deputy Inspector's Orders*—During the year this department put into operation a system of checking up all orders issued by the deputy mine inspectors to mine managements. In this way an order is followed up until complied with.

Mining Department Acts as Mediator

(j) *Matters of Arbitration and Conciliation*—During the year the safety commissioner and chief deputy have been called upon by the Industrial Commission of Ohio to act as arbitrators where disputes have arisen between employer and employees, and there has been difficulty in effecting a settlement. Chief of these was the settling of strikes in and around the brick plants and clay mines of the Shawnee and Straitsville districts, which, owing to disputes, had been suspended for about three months.

Operators and miners finally decided to arbitrate and requested the Industrial Commission of Ohio to name an arbitrator. This matter was referred to the mining department and all disputes were adjusted to the entire satisfaction of both employer and employee, and a three-year contract signed which covered in detail all classes of labor in and around the plants and coal mines. Many other local cases of arbitration have been disposed of by the mining department acting as mediator.

(k) *Rules and Regulations Affecting English and Non-English-Speaking Persons Employed in and around the Mines of the State*—Owing to the numerous fatal and nonfatal accidents in the State of Ohio, the greater number being attributable to carelessness and neglect on the part of the mine management and miners, the fact was brought to the attention of the Industrial Commission of Ohio, through the division of mines, that some of the laws of the state were, in many instances, being violated.

The mining department felt that a great many of the violations were due to the fact that mine managements, miners and men employed in general, did not familiarize themselves with the laws under which they labor; therefore, for the purpose of enlightening all nationalities in their own language, it was deemed advisable that excerpts of the mining laws be printed in pamphlet form and a set of rules attached thereto governing the different occupations in and around the mines, with a request that all familiarize themselves with the same in order to carry out the advice given, and as far as it is within the power of all those connected with mining in any way, to assist in seeing that the same is carried out.

The mining laws in condensed form, with rules, have been printed in the English language, and we expect soon to have them finished in the foreign languages, when they will be distributed to each and every person in and around the mines—superintendents, mine bosses, and all vested with authority, as well as miners and mine laborers.

Wolf Run Explosion

This explosion was of a most unusual nature and occurred at the Wolf Run mine, June 14, 1914, due to an explosion of firedamp. The fan, which was located at the top of a two-compartment shaft, and operated as a blower, had been shut down for a period of 16 days; during this time the mine filled with firedamp, the volume becoming so great that on this date it began to drift up the shaft, where a number of men were engaged in making repairs or alterations to the fan.

One of these men carried an open light into the fanhouse, igniting the gas. As the flame followed the column of firedamp down the shaft, the men ran from the fanhouse, escaping from the path of the explosion before its full force was manifested at the surface. Fortunately, all escaped serious injury, but two of them were slightly burned. Flame issued from this shaft in great volume and with considerable violence, igniting a pile of mine posts about 30 ft. from the shaft.

The greatest damage was done in the west part of the mine, a large number of stoppings in both live and abandoned workings were destroyed, and doors, tracks, timbering and wiring were displaced. The force of the explosion was manifested in the innermost workings, mine cars near the head of the workings being badly damaged. There was also some evidence of flame in some of the working places, but probably owing to a deficient supply of air, no fires resulted. The deficiency of air also probably prevented the explosion from being much more violent and destructive.

Following this explosion a number of conferences were held with the management and owners of the mine and plans discussed as to the best method of operating same to avoid similar explosions in the future.

Mine Fires

Superior No. 9 Mine Fire—On Mar. 1, 1914, the Industrial Commission of Ohio purchased a mine-rescue car for use by the department of inspection, division of mines, in mine-rescue work and for use in any emergency met with at mines, such as mine fires, explosions, or other mine catastrophes. This mine-rescue car has been fully equipped with helmets, resuscitating apparatus, and a small hospital fully equipped with first-aid outfits and surgical instruments. Hospital equipment on mine-rescue cars is a new feature and should prove of great benefit in cases of emergency.

Aug. 12 saw the Buckeye mine-rescue car on its initial trip, having received a call that the Superior No. 9 mine, located near Wellston, Jackson County, Ohio, and operated by the Superior Colliery Co., Detroit, Mich., was on fire, the tipple having been destroyed, and the fire extending to the timbers and coal on the bottom on the north side of the mine.

The fire occurred on Aug. 11, and the fire department at Wellston was called upon to assist in extinguishing the fire. The department responded and did excellent work. However, when the fire extended to the bottom, and there was fear that it would be difficult to control, the state rescue car was called and responded, arriving at the mine on the morning of Aug. 12, in charge of J. M. Roan, Chief Deputy and Safety Commissioner, and Assistant Chief Deputy J. C. Davies, who entered the mine at once upon arrival by slope or manway, and succeeded in reaching the fire.

After consultation it was decided to take the hose down the slope and up to the fire; from this position a stream of water was thrown on the flames for three hours, when the fire was under control. A force of men was then set to work to timber the run-a-round and make it safe in case it should be necessary to carry the hose on the south side of the mine.

A number of the deputy mine inspectors assisted in this work. On Aug. 13, it was discovered that the coal was on fire on the southwest side of this shaft, and it was extinguished by water thrown from the north side.

Aug. 14, another examination of this mine was made and no fire found. A. J. Lafferty, superintendent, U. S. Morris, general superintendent, Mr. Samuels, mine foreman for the company, and other employees of the mine rendered valuable service in fighting the fire.

Sunday Creek No. 301 Mine Fire—Aug. 16, 1914, the mine-rescue car was again called to assist the mine management of the Sunday Creek Co., Columbus, Ohio, in reopening their No. 301 mine, located at Congo, Perry County, Ohio. This mine experienced a serious mine fire Nov. 1, 1913, which was supposed to have been caused by electric wires. Several of the deputy mine inspectors were called upon at this time to assist Inspector Thos. S. Grogan, in whose district the mine was located.

The fire was located about 3000 ft. from the entrance to the mine. It was considered useless to try to extinguish the fire, and it was decided to seal it off. This work was attended with considerable danger, an explosion taking place while the work of construction was in progress. Fortunately, no one was injured, the workmen and those overseeing the work not having been in the direct line of the explosion. After further consultation it was agreed to be too dangerous an undertaking to continue the work of sealing off the mine in the locality in which the fire was located, and it was decided to seal the mine from the outside, which was done Nov. 9, 1913.

The mine having been sealed up entirely for a period of ten months, it was decided to reopen it to ascertain if the fire had been entirely extinguished, and the state rescue car arrived at the mine on Aug. 15, 1914, several of the deputy mine inspectors having been called to assist in the work.

August 17, 18 and 19, were spent in making ready to shoot the bottom of the shaft on the first north and third north entries, which was completed Aug. 20, 1914, and the fans placed in operation. An inspection was then made at the bottom of the shaft in the north third entry by Chief Deputy J. M. Roan, and Deputy Inspector L. D. Devore, when it was agreed that the fire territory would be explored that evening and that the helmets would be used for that purpose. At 10 o'clock each inspector, equipped with a helmet, entered the shaft. Inspectors Devore, Wheatley and Grogan were selected to lead the exploring party to where the fire territory was located. Chief Deputy and Safety Commission of Mines J. M. Roan, acted as a signal between the men making the examination and the reserve force of deputy inspectors, which was in the rear to act in case of emergency, if any accident should befall the exploring party.

Upon examination the fire was found to have been extinguished. On Aug. 21, the main shaft was cleaned out and an effort to remove the blackdamp from the mine was then in progress; this will require a great deal of time, as the mine has a large area, and there will be a number of stoppings to be built.

INSPECTIONS

Two thousand three hundred and fifty inspections were made by the 12 deputy mine inspectors, in addition to the inspections, joint conferences and investigations made by the chief and assistant deputies. Three hundred days were spent by the deputy inspectors and assistant chief deputy, in the oil- and gas-well fields looking up delinquent oil- and gas-well companies who were failing to carry out the provisions of the law relating to securing a permit to drill wells for oil and gas penetrating the coal-producing counties of the state; also witnessing the abandonment of oil and gas wells to see that they were plugged and sealed according to law.

FINES AND PROSECUTIONS

Fourteen prosecutions were reported to the department during the year; there may have been many more prosecutions brought by coal companies that have not yet come to the attention of this office. Of the number reported, eight were brought by coal companies against their employees, or loiterers, two by the deputy mine inspectors, and one by the safety commissioner of mines.

The most serious violations reported were for removing danger signals, nine in all. It does not seem that any miner or any other employee of a mine would become so careless or negligent of not only his own safety, but the safety of others, that he would remove a danger signal placed there by a fireboss making his examination in the morning before the men enter the mine. Violations for such causes as this cannot be too vigorously prosecuted and the full penalty assessed, no matter who the offending person may be.

One arrest was made for failure to supply props and timber by the mine management; one for a person entering a mine intoxicated; one for loitering around mine property, and one for violating the section relative to the use of motor haulage in mines; one for depositing calcium carbide on the inside of a mine. On Dec. 5, 1914, two men were prosecuted and fined for throwing back fine coal in a mine, contrary to the law.

MINING LEGISLATION

During the year the "Run-of-Mine" law was passed, regulating payment by weight for all coal mined; section 976—1, 2 and 3 of the mining code was amended, regulating the method of mining coal known as "shooting coal off the solid," and providing for a permit to be issued in all such cases based upon questions made out relative to the seam of coal; why it was necessary to so mine the coal; the amount of explosives used, etc.; this petition, requesting permission to shoot coal off the solid, was to be signed by the mine management and a majority of the miners employed at the mine desiring to mine the coal in this manner.

Section 934 of the mining laws was amended relative to mines at which ten or more persons were employed; for every 35 so employed, a waterproof blanket, a sufficient quantity of bandages and other linen and all other requisites were to be provided in case of accident; at mines known to generate firedamp, so as to be detected by a safety lamp, a sufficient quantity of olive and linseed oil is to be kept for use in emergency.

CONCLUSION

The Industrial Commission of Ohio has jurisdiction over a number of departments of state, of which the division of mines is one, and its powers are sweeping in effect. This commission has authority to enter any place of employment to collect statistics, and to examine provisions made for the health, safety and welfare of the employees therein; to enforce all the laws relating to the several departments under its control. It has power also to promote voluntary arbitration and conciliation between the employer and employed; to conduct free employment agencies; to license persons who desire to act as steam engineers, and operators of steam boilers, and to censor moving-picture films. With such power, which is almost unlimited, great and lasting benefits should result to the state of Ohio.

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Don't let your fireman turn his fire upside down so that the ash is lifted to the top. Under those conditions the ash gets hot and melts and by the time it reaches the grates it will form clinker and slag. Boiler fires should be cleaned by the clock rather than by the appearance of the fire.—Bromley in "Power."

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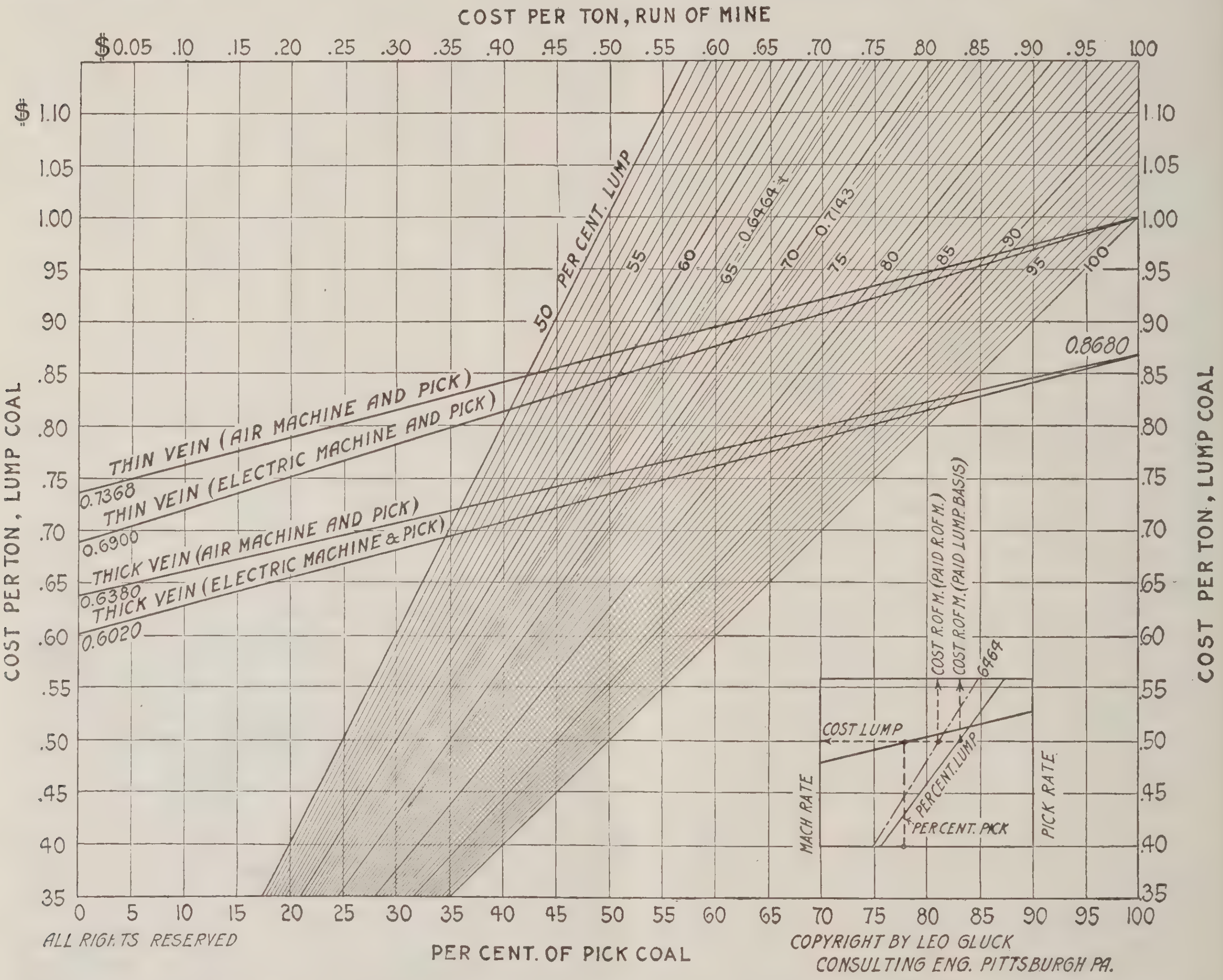
Down in Tennessee

INCLINE AT A MINE OF THE CHATTANOOGA IRON & COAL CO., DUNLAP, TENN.

The Cost of Mining Coal

The accompanying chart showing the cost of lump and mine-run coal for all types of mining machines and mining rates will be found valuable for quick reference in many instances.

The chart, while primarily designed for the Pittsburgh district, can be used for any other machine or pick rate. If we mark a point on the left side of the chart, equivalent to the lump-machine rate, and then mark another point on the right side of the chart equivalent to the lump pick rate, a line may be drawn connecting the two points, and the chart becomes general.



General Chart Showing Cost of Lump and Mine-Run Coal for All Types of Machines and Mining Rates. The Chart Is Based on Rates for (1) Undercutting (2) Drilling by Hand, and (3) Loading in Rooms

To make it clear, let us assume the machine lump rate per ton as 69c.; the pick lump rate as $1. Then the line connecting these two points is marked (see diagram) "thin vein—electric machine and pick."

Now the basis for cost of mine-run coal (paid on the mine-run basis) for the Pittsburgh district, is shown by a dot and dash line as 64.64 per cent. lump. Calculations can be made for any other district by substituting another run-of-mine lump base line similar to the 64.64 line shown on the chart.

For example: Suppose the percentage of pick coal in the "thin vein" is 40 per cent. Then from the line marked 40, at the bottom of the chart, read up to the point where this line intersects the line marked "thin vein—electric machine and pick." We then read to the left and find the cost of lump coal is 81.4c. per ton. Again, from the point of intersection of the "percentage of pick-coal line" (40, with the "electric machine and pick line" read horizontally to intersect the line spoken of above, which shows the base percentage of lump in the mine-run coal. In this case, if this latter percentage is 64.64, we read over to this point of intersection, and then vertically up to the top of the chart, where we can read off the cost per ton of run-of-mine coal paid on the run-of-mine basis—in this case, the cost is about 52.5c. per ton.

For costs of run-of-mine (paid on the lump basis) assuming the run-of-mine to have 70 per cent. lump (30 per cent. screenings), from the point of intersection of the "percentage of pick-coal line" (40), with the "electric machine and pick line," read horizontally to the right to intersect the 70 per cent. lump line, then read vertically up to the top of the chart where we read off the cost per ton of run-of-mine coal (paid on the lump basis), which is for this example about 57c. per ton.

Storage-Battery Locomotives in a Developing Mine

The Nokomis Coal Co. is using a storage-battery locomotive in its new mine at Nokomis, Ill. The results this firm is obtaining are worthy of a passing glance, particularly at this time, when so much is being written relative to the efficiency of this type of haulage.

The storage-battery locomotive seems to be well suited to the needs of the new mine. It can be used in driving the main entry or haulageway until the roadway is extended a thousand or fifteen hundred feet, as no wires need be strung along the headings nor do the rails require bonding. Later on when the mine is developed the locomotive can be placed in a cross-entry or to gather from rooms, and "a no-mule mine" can thus be secured.

This is the system employed at Nokomis, which is one of the most uptodate mines in Illinois and bids fair to be one of the largest mines in the country. The coal is 8 ft. 4 in. thick and the shaft is located in the center of a 3000-acre tract of rich Montgomery County coal. The shaft was sunk in January, 1913, and today the mine is producing 2500 tons daily.

HAULS 1000 TONS AND COULD HAUL MORE

The cars have roller bearings, weigh two tons apiece and hold five tons of coal. The tracks are laid with 40-lb. rails and the roadways are kept in first-class condition. The six-ton storage-battery locomotive is hauling to the shaft bottom from the northwest main-line haulageway, a distance of 900 ft. with 500 ft. of 1½ per cent. grade against the load. It is also hauling from the southwest entry, also a distance of 900 ft. with a similar 500 ft. of 1½ per cent. grade against the load.

As above stated, the car and load weigh 7 tons and the locomotive is averaging about 200 cars in eight hours, which gives a tonnage of 1000 tons of coal hauled from these two entries by this single unit. This is equivalent to a gross tonnage of 1800 tons as the cars transporting the coal weigh 400 tons and make the trip both ways, once empty and once loaded. The motor has hauled as many as 212 cars in a day of eight hours. The average trip contains five to six cars, but to prove the capacity and ease with which this motor handled the work on the next to the last trip for the day, it was hitched to ten cars, or a combined trainload of 76 tons, including the weight of the motor itself.

SAVES WIRING ROOM ENTRIES AND YET DISPENSES WITH MULES

This machine will soon be placed at the actual work for which it was intended, that of gathering the coal from rooms and delivering the cars to the partings for main-line motors to collect. It will easily gather 200 to 225 cars a day. This demonstrates beyond a shadow of doubt that the storage-battery locomotive will take care of the early output of a new mine and later on it can be placed on room and cross-entry work. Thus it will do away with the mule entirely. It is also a flexible unit and can be taken out of one mine and placed in another with little trouble, wherever, of course, the gage is the same, as it requires no trolley wire or bonded rails.

The results the Nokomis Coal Co. has obtained with this method and the fact that it has now ordered two duplicate motors prove that where these machines are equipped with adequate batteries they will handle a large tonnage economically. This locomotive was manufactured by the Geo. D. Whitcomb Co., of Rochelle, Ill., and was especially designed for the work.

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Two Christmas Days in Many Mining Camps

In many of our coal-mining towns, there will be celebrations of two Christmas days, and the same is true of New Year's Day. This is due to the fact that many of the miners are members of the Greek Catholic Church, which has never accepted the Gregorian calendar, by which time is measured by most of the civilized nations. The adherents of the Greek faith, which include Greeks, Russians and the people from the Balkan States, use the old style calendar, which is 13 days later than the one generally used.

A one-day celebration of Christmas is also beyond the conception of the average foreign-born miner, as many require a day or two to get ready, and often the same length of time to recover from the festivities. The Polish miner celebrates the 25th and 26th of December. Thus it is necessary to shut down the mines for at least four days for the first Christmas, and after the Christmas holidays are over the same miners have another holiday on January 1.

Where there are a number of Greek Catholics another period of idleness begins on January 7, and continues for several days, and New Year's day for these people occurs on January 14.

Coal mining presents many queer problems, and one of the queerest is the celebration of dozens of different holidays by the foreigners throughout the year. Often these celebrations, unannounced to the management, will draw away enough workers to seriously hamper the operation of the mines. The difficulty comes from the varying nationalities of the workmen, and each nationality or religious sect has its "holy days" and other occasions for celebration.

There seems to be no remedy for the situation, as an attempt to bring about any uniformity in the observance of these holidays would be like trying to get all the foreign-born miners to speak the same language.

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Replacing Valves in Triplex Pumps

A short time ago, says C. H. Lloyd in *Power*, I saw a tool for holding in place the springs on a pump valve where the valve chests open at the side and there is no room to hold the spring down with one hand and start the nut with the other. I always press the spring together and tie it on each side; then it can be dropped in place and the nut put on without difficulty, after which the string is cut to release the spring.

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When it is desirable to use compressed air for hoisting, the air can be stored in large receivers. The Anaconda Copper Mining Co. at Butte, Mont., has a number of these 10 ft. in diam., 30 ft. high, having a combined cubical capacity of about 70,000 cu.ft. and capable of retaining about 500,000 cu.ft. of free air, an amount which the compressors combined could not compress in half an hour. The air pressure is maintained constant by a back pressure of water which reduces the capacity of the receivers as the air is used.

The Coal Fields of Ohio

By J. S. Burrows*

SYNOPSIS—A description of the Ohio coal fields containing the best authenticated data there are on the subject. The geology and commercial importance of the different seams are carefully and accurately worked out. This is the second article along this general line, the first having covered the state of Pennsylvania.

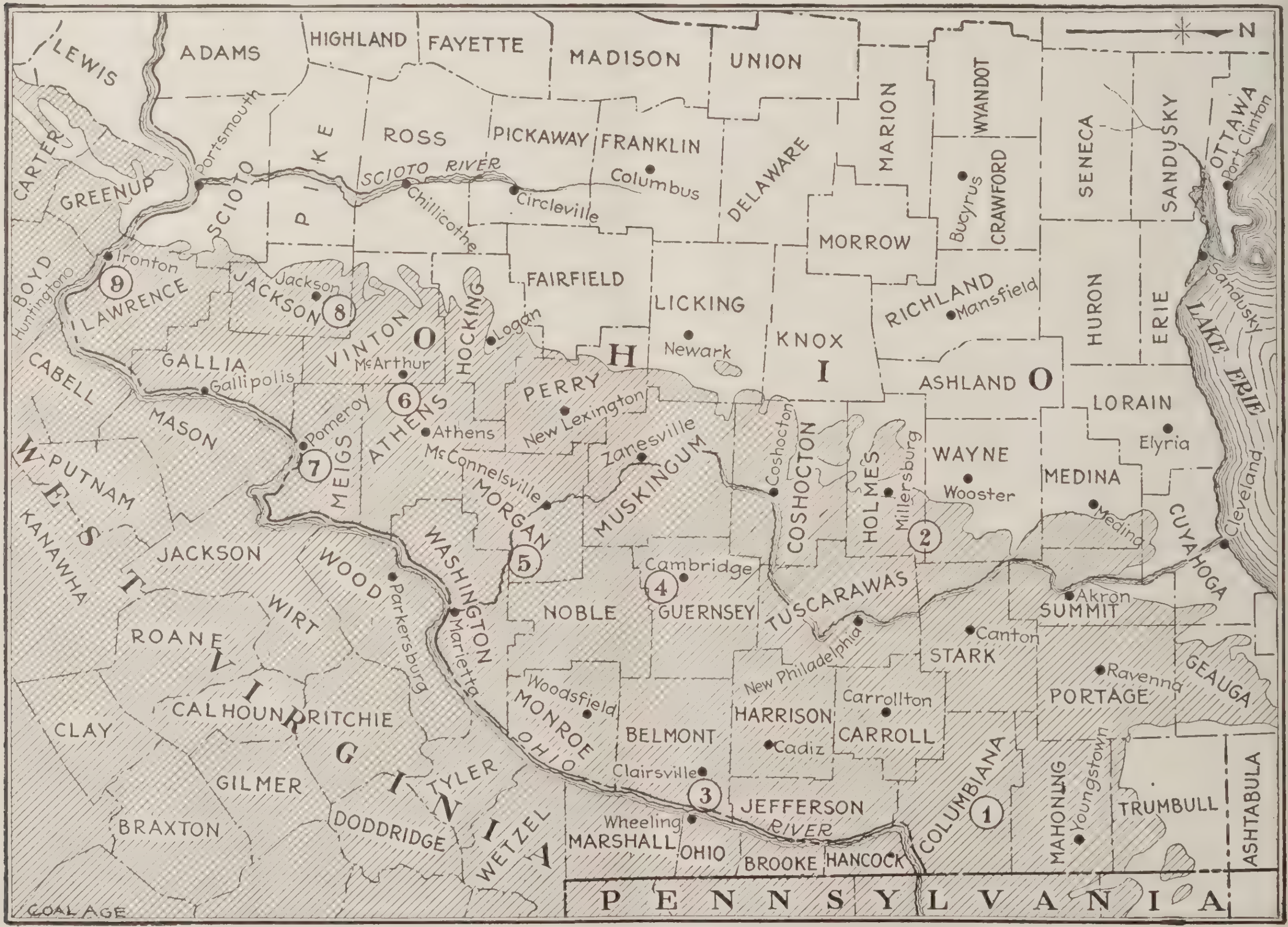
The Ohio coal field embraces an area estimated at 12,600 square miles and lies entirely within the eastern half of the state. The field as a whole is a continuation of the Pennsylvania bituminous field to the eastward, and with it forms the northernmost part of the great Appalachian field, which extends southward from Ohio into West Virginia and Kentucky and thence through Tennessee as far as central Alabama.

The accompanying map of Ohio shows the coal areas and principal mining districts, the latter indicated by the numbered circles. The numbers refer to the table of mining districts which gives the particulars covering each district. The last column in the table of mining districts refers to the index column of the table of coal beds from which may be found the important coals of each district.

The table of coal beds is arranged geologically from the lowest known coal at the bottom of the table to the highest coal at the top. This table, which has been compiled from the best information available, is based on

MINING DISTRICTS—OHIO

Map No.	Name of District	Railroads	Kind of Coal	Principal Uses of Coal	Index Numbers Important Coal Beds
4	Cambridge	B. & O. R. R., Cleveland & Marietta Ry	Bituminous High Volatile	Steam, Railway and Domestic	4-7
6	Hocking Valley	B. & O. S. W. Ry., K. & M. Ry., Hocking Valley, Zanesville & Western, Cin., Toledo & Ohio R. R.	Bituminous High Volatile	Steam, Railway and Domestic	10-7
9	Ironton	Detroit Sou. R. R. C. H. & D. R. R.	Bituminous High Volatile	Steam, Railway and Domestic	11-14
1	Mahoning Valley	Penn. Lines, Erie R. R.	Bituminous High Volatile	Steam,-Railway and Domestic	7-10
2	Massillon	Penn. Lines, W. & L. E., Cleveland, Akron & Columbus R. R.	Bituminous High Volatile	Steam, Railway and Domestic	10-7
5	Meigs Creek	B. & O. R. R.	Bituminous High Volatile	Steam, Railway and Domestic	2-4
3	Ohio River	Penn. Lines, W. & L. E., Cleve., Akron & Columbus R. R.	Bituminous High Volatile	Steam, Railway and Domestic	4-8
7	Pomeroy	Hocking Valley R.R.	Bituminous High Volatile	Steam, Railway and Domestic	3-4
8	Wellston	C. H. & D. R. R., Hocking Valley, B. & O. S. W. R. R., Detroit Sou. R. R.	Bituminous High Volatile	Steam, Railway and Domestic	18-19



Map Showing Coal Areas and Different Fields in Ohio

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*Fuel expert, Castner, Curran & Bullitt, Inc., Norfolk, Va.

The Coals of Ohio

Index No.	System	Series	FORMATIONS	NAMES OF COAL BEDS	NOS. OF COAL BEDS	LOCAL NAMES OF COAL BEDS	COMMERCIAL IMPORTANCE
1	(Upper) Carboniferous	Pennsylvanian	**Monongahela**	Waynesburg	8-b or 11	Macksburg	No commercial importance.
2				Sewickley	8-a or 10	Meigs Creek	Comparatively unimportant, coal with future value.
3				Redstone	9	Pomeroy	Mined in Gallia, Lawrence and Meigs Counties.
4				Pittsburg	8	Pittsburgh number eight	Third place in production. Will probably take first place in future. Occurs in southeastern part of the state and occupies the whole or a part of Belmont, Jefferson and Meigs counties, the most important productive areas, and Harrison, Guernsey and Athens counties.
5			**Conemaugh**	Crinoidal	7-b	Norwich and Patriot	Commercially unimportant.
6				Mahoning	7-a	Grof, Strip vein, and Brush Creek	Commercially unimportant.
7			**Allegheny**	Upper Freeport	7	No. 6 in Southern Columbiana County, No .7 in Stark County, and Southwestward, Black band coal in Stark and Tuscarawas counties, Big Vein of Salineville, Del Ray and Sherrodsville coal, Cambridge coal, Alexander coal of Muskingum County, Blue Rock coal of the Muskingum Valley, Bayley's Run and Norris coal of the Hocking Valley, Waterloo coal of Gallia County.	Second place in production, and extensively mined in Guernsey and Carroll counties and an important coal of the Sunday Creek district.
8				Lower Freeport	6-b	No. 5, No. 6-a in Stark County and Southwestward Whan coal of New Lisbon, Steubenville Shaft coal, Hamden Furnace coal of Vinton County, Hatcher coal of Lawrence County.	Thin and uncertain except in the Steubenville district along the Ohio River where it is mined to some extent.
9				Upper Kittanning	6-a	No local name	Absent or of no value.
10				Middle Kittanning	6	No. 4, Osnaburg coal of Stark County, Pike run and Dennison coal of Tuscarawas County Coshocton coal, Upper Zanesville coal, Upper New Lexington coal, Nelsonville and Straitsville coal, Great Vein of the Hocking Valley, Carbondale and Mineral City coal, Upper Zaleskie coal, Washington Furnace coal, and, Sheridan coal.	First place in production and extensively mined in Hocking, Perry, Tuscarawas, Athens, Coshocton, Carroll and Muskingum Counties. The coal known to the trade as "Hocking Valley coal" is taken from this bed.
11				Lower Kittanning	5	No. 3, No. 4, Leetonia, Creek Vein, Hammondsville, Potter's Vein, Clay Vein, Mineral Point coal, Lower New Lexington coal, and New Castle coal of Lawrence County.	Thin but persistent bed found in nearly every county in the coal fields of the state and the source of a considerable output in Tuscarawas County where it reaches its greatest thickness.
12				Upper Clarion		Limestone coal of Jackson and Vinton counties, No. 4 of Mahoning County, No. IV-a.	Commercially unimportant.
13				Lower Clarion		Limestone of Jackson and Vinton counties, No. 4 of Mahoning County, No. IV-a.	Commercially unimportant.
14				Brookville	4	Gray Limestone coal, Upper Limestone coal, Winter's coal of Vinton County, Flint Run coal, Conway coal of Lawrence County, No. 3-c.	Generally unimportant, coal mined to some extent in Vinton County.
15			**Pottsville**	Tionesta	3-b	Wartman coal, Bolivar coal of Stark and Tuscarawas counties.	Commercially unimportant.
16				Upper Mercer	3-a	No. 4, No. 3, Bruce coal of Mahoning County, Strawbridge cannel of Holmes County, Bedford cannel of Coshocton County, Newland coal of Vinson County.	Commercially unimportant, coal bed changing at some points into low grade cannel.
17				Lower Mercer	3	No. 2 of Mahoning County, Blue Limestone coal, Flint Ridge cannel.	Generally of little commercial value, but mined to some extent in Carroll and Mahoning counties.
18				Quakertown	2	Wellston coal, Jackson Hill coal.	Generally thin commercially unimportant coal bed, but most important coal of Jackson County where it has been extensively mined although the production of this area is gradually declining.
19				Sharon	1	Palmyra, Block coal of Mahoning Valley, Briar Hill coal, Massillon coal, Wadsworth coal, Jackson Shaft coal.	Formerly extensively mined beginning in 1828 but now nearly exhausted. Principal operations at present in Stark County.

the Pennsylvania nomenclature. As stated in the first paper of this series, covering Pennsylvania coals,* the official names of formations and coal beds adopted for the State of Pennsylvania, are considered the standards of reference for the coals of the Appalachian fields.

Originally the Ohio coals were designated numerically from No. 1, which is now correlated with the Sharon coal, consecutively up to No. 8, which is the Pittsburgh seam, there being considered but eight coal beds in all. Later discoveries, however, made it necessary to increase the series. This was accomplished by adding more numbers to coals higher than the Pittsburgh and by using a letter with the old numbers where the addition of an intermediate seam came within the old series of numbers. This system has caused some confusion in identifying the Ohio coals, which is greatly increased through the use of a large number of local names for the same bed, both within the same, and in different districts.

In the table of coal beds presented herewith, the correct, or Pennsylvania names, for the coal beds are given precedence, followed by the old Ohio system of numbers and then the numerous local names.

The coals of Ohio are entirely bituminous in character, that is, of the high-volatile type, and while they are mostly used for steaming, railway and domestic purposes, several of the seams yield coal suitable for special purposes, such as rolling-mill and blast-furnace work. Other seams yield coal which is widely known as a high-grade domestic fuel.

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One soldier out of every four men—that is the measure of the response given by the miners of Northumberland and Durham to the call to arms. Over 40,000 of the 170,000 organized colliers in the two counties are in camp. The miner, as a rule, makes an excellent fighting man. He is not of imposing stature, but he is tough and fearless. The pit has no place for the weak or timid.—"New York Evening Post."

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*"Geology and Location of the Coal Fields of Pennsylvania," Coal Age, Vol. 6, p. 459.

Durable and Fireproof Linings for Mine Shafts

Much has been written of late concerning the construction of durable and fireproof mine shafts. A further contribution to the existing literature upon this subject may not, however, be without value.

The problem involved divides itself into two phases, first the lining of a new shaft and second the protection of a shaft lining already in place and in use, so as to render it both durable and fireproof.

When a new shaft is to be sunk, the engineer may consider the nature of the strata to be penetrated, and then select from several excellent designs which have been tested in actual use the one which circumstances and financial limitations may prove to be the most satisfactory, all things considered.

Excellent designs of concrete linings for shafts were described in Coal Age for Nov. 7, 1914, and in *Colliery Engineer* for August, 1913.

The Allen & Garcia Co. of Chicago is at present engaged in lining a new shaft at Sesser, Ill., with premolded beams and slabs. The latter being cast complete at a factory in Indiana and shipped to the mine, to be lowered and secured in place in a manner quite similar to that employed in timbering. A description of a somewhat similar installation may be found in the *Engineering Record* of Oct. 31, 1914.

It is the purpose of this paper to describe a method of lining a shaft which may be applied to a new operation or adopted for the protection of one that may have been timbered and which it is desired to protect against fire, decay or corrosion.

"Gunite" is a trade name to denote the grout deposited by means of the cement gun. The mixture usually employed is composed of one part portland cement to three parts of sand. When this is "shot" by an air pressure of about 25 lb. per sq.in. by means of the cement gun, the product adheres tenaciously to the surface of application, regardless of whether this surface is masonry, wood or steel. It is quite dense, being about 23 per cent. heavier than 1 : 2 : 4 concrete, while tests have shown it to be impervious to water, nonabsorbent, and possessing a much higher tensile and compressive strength than ordinary high-grade concrete. A 2-in. layer of gunite is considered a safe fire and rust protection for steelwork in skyscraper construction, when subjected to a temperature of 1700 deg. F. for four hours. A 1½-in. layer will protect steel buntons or mine sets against corrosion indefinitely, or it will protect wood or steel from any mine fire which may occur.

A Common Practice

A practice not infrequently followed in coal mining is to line the shaft with solid concrete down to the rock, from which point onward an ordinary thin lining of wood is employed. On the other hand, the same shaft might be lined with wood throughout its entire depth, the sizes of the timber depending upon the depth of the shaft and the pressure encountered. A 2-in. layer of reinforced gunite would fully protect this wood from fire and seal off all water and air, making a shaft at once dry and fireproof. The water-logged timber behind the gunite lining would never be subjected to the action of the air and would consequently never decay or require repair.

In the case of a new shaft with new timbers, the gunite protection insures durability as well as fireproofness. Since decay in wood requires the presence of moisture, warmth and air, the exclusion of the latter renders these timbers proof against deterioration. There is the further advantage that sinking may be pursued in the usual manner, and the gunite applied on the night shift after the shaft is completed and while it is in operation during the day. This grout lining is also an extremely efficient means of sealing off the airway in the shaft from the hoisting and manway compartments. In an old shaft, on the other hand, if decay has not already made damaging progress, the shaft may be fireproofed and secured against further deterioration by this method.

There are many instances, also, where a timber lining may be omitted entirely through the rock strata. This is accomplished by sinking and trimming close to the required dimensions and then sealing up the interstices of the rock with gunite applied before the mineral has had opportunity to disintegrate. In this case the grout is shot into every crack and crevice, not only covering the surface, but cementing adjacent strata together.

In some mines it is necessary to use heavy sets either of wood or steel, with lagging on the outside. In this case, the entire inner surface may be protected by reinforced gunite. This method was employed in lining the Cary shaft of the Odanah Iron Co., at Hurley, Wis., a description of which may be found in *Black Diamond* of Oct. 31, 1914. In this case the three-compartment shaft was lined with 3-in. wood plank, carried by I-beam sets. Lagging and beams were then covered with 2 in. of reinforced gunite. The shaft was originally so wet that the sinkers were obliged to work in oilskins. The portion which was lined as above described is now, however, perfectly dry.

The extent to which the various methods of shaft lining are to be employed will depend largely upon the cost of the material necessary. The method of sinking and lining with timbers, as heretofore followed, will doubtless be continued largely in the future, and in general it is believed that when permanency is considered, the method of timber lining and protecting this lining with gunite will be found least expensive. The great advantage claimed for this process is that it can be applied at a relatively small cost to shafts either old or new without seriously interfering with the operation of the mine.

Coal Mining in the Transvaal

By H. F. Mariotte*

The following are the coal outputs and prices per ton in the Transvaal, Union of South Africa, since 1910:

COAL OUTPUT OF TRANSVAAL

		Gross Receipts			
		Totals		per Ton	
	Tons Sold				
1910	3,970,000	£986,200	$4,802,794	5.0s.	$1.21
1911	4,344,000	1,021,000	4,972,270	4.7	1.11
1912	4,752,000	1,045,000	5,089,150	4.4	1.05
1913	5,225,000	1,143,000	5,566,410	4.3	1.03
1914 (estimated)	5,266,885	1,180,526	5,749,162	4.5	1.07

The output and value of the coal produced again increased in 1914. There are coal-bearing areas in the province still untouched, and it is not unlikely that, owing to the increased demand for coal caused by the war, efforts will soon be made to develop these resources.

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The Labor Situation

SYNOPSIS—A conciliation committee is appointed to restore industrial peace in the Ohio coal fields now on strike. The operators move to run "open shop" mines. In Colorado, the U. S. troops being removed, the militia has to be called in to replace them, though, so far, this service is local. The union in Illinois obstinately demands a favorable decision while admitting that it is in the wrong.

The statement of President Dwight P. Cary, of the Lorain Coal & Dock Co., most adequately describes the strike situation in the eastern Ohio field:

> During the ten months in which the miners have been on strike in eastern Ohio, they have been treated by the operators with every fair and reasonable consideration. They have been permitted to occupy their houses without molestation, and no attempt has been made to operate the mines, either with former employees or nonunion labor. There has been no war against the miner's union. At all times since the so called mine-run law became effective in Ohio, the eastern Ohio operators have been willing and have offered to negotiate a contract on the mine-run basis. The only matter in question has been the price and any statement made to the contrary is absolutely false and misleading to the miners and the public.
>
> All contracts in Ohio, Indiana and Illinois and in the Pittsburgh district of Pennsylvania, the area comprising the central competitive field, have been made under the conditions formulated in the report of the miners' policy committee, which provided that all contracts should be made at the price prevailing in the last agreement or its equivalent. The miners' organization has signed contracts with the operators of Illinois and Indiana and of the Pittsburgh district of Pennsylvania providing the same wage scale as prevailed in the preceding agreement.
>
> It also made a contract with the operators of the Hocking Valley district of Ohio in which the scale is approximately 3c. per ton less than the scale prevailing under the last agreement. Nevertheless it has demanded that the operators of eastern Ohio pay an increase of approximately five per cent. above the price prevailing in the last contract.
>
> The strike of the last ten months has given our business to the operators of other states and districts, and an increase in our price would enable them to retain it. This is the reason why we have opposed the increase. Just why the miners' organization should hold their eastern Ohio miners on strike for ten months, demanding a scale that is a decided increase over our last contract price, and over that given to competing operators, thus playing directly into the hands of our competitors, is something that we fail to understand.

The Pursglove-Maher Coal Co. states that its eviction order which was effective Jan. 15 has been held up pending the result of the federal investigation of the strike situation. This statement was made after it was definitely decided that the U. S. Department of Labor would take a hand in the settlement.

A Conciliation Committee Appointed.

To this end the Department on Jan. 5 appointed Hywell Davies, one of its representatives, one of the two unsuccessful conciliators in the Colorado dispute, and Daniel J. Keefe, formerly Commissioner-General of Immigration, Dec. 1, 1908 to May 31, 1913. In 1882 the latter was president of the Lumber Unloaders' Association and since 1893, except during an interval of two years, has been president of the International Longshoremen, Marine & Transport Workers' Association. He was an original member of the National Civic Federation and was at one time sixth vice-president of the American Federation of Labor and was a member of the Industrial Peace Commission in 1906.

On Thursday, Jan. 7, Hywell Davies arrived in Cleveland, Ohio, and conferred with President W. R. Woodford of the Pittsburgh Vein Operators' Association. On the same day Daniel J. Keefe discussed the situation with President T. P. White, Vice-President Frank J. Hayes and Secretary-Treasurer William Green, of the United Mine Workers of America. This meeting occurred at Indianapolis, Ind. On the following day the conciliators met at Cincinnati, Ohio.

Desire Conciliation if Conciliators will Concede Claims

A meeting of conciliators, operators and miners was arranged for last Wednesday, Jan. 13, but we have no advices as to its outcome. Thomas Haggerty, C. J. Albasin and Thomas Cairns have all declared themselves as not unfavorable to the investigation. C. J. Albasin, the local president, however, in writing to W. B. Francis, of the House of Representatives at Washington, while thanking him for his action toward the appointment of conciliators, declares his firm intention not to be conciliated unless his demands are granted in full. T. K. Maher, of the Pursglove-Maher Coal Co., said the operators welcomed the federal investigation and had no fear of the result.

"Open Shop" Operation to Be Attempted

On Jan. 7 the eastern Ohio operators, after a three-day conference, announced that they would open their mines on the "open shop" basis. The operators voted unanimously for that policy and it is expected that efforts will be made to start the mines in Belmont, Harrison and Jefferson Counties. At several mines instructions were given that the miners were to be informed of the intention to start the mines and that those desiring work must apply individually. Preference is to be given the old employees in every case. Failure to obtain a sufficient number of union men will result in the bringing in of other men from outside of the district.

A special committee, comprising W. R. Woodford, Michael Gallagher, H. E. Willard, Joseph Pursglove, S. H. Robbins, of Cleveland, George M. Jones, of Toledo, and Judge R. L. Wildermuth, of Columbus, was appointed to direct the reopening of the mines and to remain in Wheeling, W. Va., to watch developments until they were again working. Only one mine will be opened by each company at this time.

It was reported on Saturday that the Somers-Roby Coal Co. had 50 men at work in a mine in Belmont County and on Monday had 60. This is one of the properties opened under the open-shop system.

Moving Out of Ohio

It is said that the Lorain Coal & Dock Co. will close all their Ohio mines except the Crescent and will supply their trade from a new mine in Logan County, W. Va., the work of erecting the tipple progressing rapidly. Samuel and James Pursglove, large stockholders in the Pursglove-Maher Coal Co., are preparing to let contracts for a new tipple in Logan County, W. Va. The Troll Mining Co., of St. Clairsville, Ohio, purposes to close its mines indefinitely. No matter what the outcome of the strike may be, operating in Ohio will not be attractive and the first two companies will probably endeavor to get all their coal in West Virginia.

Miners in Illinois Declare Themselves Not Guilty But Will Pay the Bill

A serious break between the United Mine Workers and the Illinois Operators' Association threatens as the result of a dispute over the wages at the mine of the Berry Coal Co. at Spring Valley. The miners have been on strike for several weeks, and the operators insisted that the strike be called off.

The United Mine Workers' officials contend that their miners are in the right, but have agreed to reimburse the coal company the amount of money in dispute if it will acknowledge the claim. As a matter of principle, the operators will not concede this, and have served notice that they will have no further dealings with the miners' organization until the Berry strike is settled. The U. M. W. of A. are trying, according to rumor, to have the Central Illinois Coal Operators' Association and the 5th and 9th District Association agree not to support the Illinois Operators' Association, thus bringing about a disagreement that is likely to cause much confusion and trouble in the Illinois field.

Union Desires to Buy Mines

The United Mine Workers of America has offered $200,000 for the holdings of the Bache-Denman Coal Co. in the Hartford Valley, Arkansas. The transfer is to be conditioned on the quashing of all actions growing out of the troubles between the coal company and the miners, including a suit for $1,450,000 brought by the company to recover for the burning of their tipples and houses.

Militia Called Out In Colorado

The U. S. troops being entirely withdrawn from Colorado, on Jan. 9, Sheriff Jeff Farr, of Walsenburg, concluded he could not protect the jail at that place in which 15 strikers were incarcerated charged with murder, conspiracy, and other crimes, in the mine battles of last spring. Samuel DeJohn, one of the alleged participants in the La Veta ambuscade, is reported to have turned state's evidence, and as he is imprisoned in the same jail, there might have been not only a jail delivery but a lynching. He is the only man who took part in the La Veta attack who has not been taken to Pueblo. A company of 70 militiamen was furnished by Governor Ammons, and two more are ready to assist in case of an emergency.

Editorials

Coal Beds and Their Characteristics

Recent correspondence and even some technical reading have convinced us that the public and some mining men have a hazy idea of the relative unimportance of determining the particular bed from which a coal supply is derived. Of course, it is well known that in *any particular locality,* one bed is clean, another not so clean and perhaps a third is relatively dirty and a fourth may not be workable. Then, also, of course, thickness varies most markedly.

Nevertheless it is also true that as far as freedom from bone, slate and sulphur is concerned, any one bed of coal will vary immensely over large areas. In the bituminous regions of Pennsylvania, for instance, the best coal in eastern Clearfield was the Moshannon or Lower Freeport, in Indiana it is the Miller or Lower Kittanning, in parts of Cambria, the Upper Kittanning. In many places where the Miller is good, the Lower Freeport is worthless, and where the latter is good, the Miller bed can be placed on the market only with difficulty.

We know that a host of people will immediately, on reading this, defend the Miller bed as being everywhere a low-volatile coal of great calorific power. As a matter of fact, where that bed does not have the qualities mentioned, it is not called the Miller bed, but the Lower Kittanning. The low volatility is not a quality of the bed but an attribute of location which it shares with all the other beds in the same locality.

The Miller bed today is being sold as Moshannon coal in Clearfield County, Pennsylvania, because the Lower Freeport, which rightly bears the name "Moshannon," has been almost entirely worked out. The purchaser is really not deceived. He desires a low-volatile coal and he gets it, even though the fuel may come from the Clarion or the Lower Kittanning seam. If he should secure the real Moshannon he will probably find it a badly weathered coal, as most of it now comes from formerly abandoned outcroppings.

To show how largely volatile content varies in the same bed, we will quote these analyses from the report of the U. S. Bureau of Mines, the United States and Maryland Geological Surveys and the Second Geological Survey of Pennsylvania.

TABLE CONTRASTING IDENTICAL BEDS IN PARTS OF PENNSYLVANIA

	Moisture	Volatile Matter	Fixed Carbon	Ash
Lower Kittanning—				
Windber mine, Somerset Co.	3.2	12.5	80.6	3.7
Pulaski Township, Beaver Co.	2.2	40.9	49.5	7.4
Upper Kittanning—				
Windber, Somerset Co.	3.0	12.0	77.4	7.6
New Salem, Armstrong Co.	1.2	37.9	52.8	8.1
Lower Freeport—				
Stony Creek, Cambria Co.	4.7	13.8	72.3	9.2
Center Hill, Armstrong Co.	1.0	40.2	47.4	11.4
Upper Freeport—				
Conemaugh, Cambria Co.	2.6	14.9	72.4	10.1
Shippingport, Beaver Co.	1.5	41.4	49.8	7.3
Pittsburgh—				
Eckhart, Allegany Co., Md.	0.7	17.6	75.9	5.8
Bruceton, Allegheny Co.	2.9	36.2	55.1	5.8

It will be seen that the range of values for volatile content is not quite as great in the Upper Kittanning and Pittsburgh beds as in the others. That difference solely arises from the fact that we have taken Armstrong and Allegheny County values in those instances and the coals in those counties are not nearly so high in volatile matter as those in Beaver. As the percentages of volatile matter are about equal in any given boring, it is likely that if we had analyses of Upper Kittanning or Pittsburgh coal near Shippingport, Beaver County, we would find those fuels would have over 40 per cent. of volatile matter, and if we could find Upper Freeport coal at Windber and obtain an analysis, it would probably not be far from 12.0, which is the value for the Upper Kittanning at that point.

It will be noted that one analysis is from Maryland. It is so taken because the figures for volatile matter in that state rule low. Pittsburgh coal is nowhere found in Pennsylvania so near the great uplift, but even in the Salisbury basin of that state that bed is found to contain only 19.61 per cent. of volatile matter, which is much less than the 36.2 at Bruceton.

It is well to add that the excellent analyses in the books published by the Bureau of Mines under the title "Analyses of Coals," as Bulletins 22 and 85, especially the latter, are not by any means complete. It is only just to add that the authors of the bulletins make no claims for completeness except to say they completely cover the tests of the Bureau between July 1, 1904, and June 30, 1913.

Thus in Pennsylvania only 19 counties are partly covered, whereas in all 37 are coal producers. In the State of Ohio the analyses of the coal in only 10 counties are given, whereas 28 counties are reported as coal-producing in E. W. Parker's report. Erroneous ideas can easily be formed by assuming the lists given to be representative of American coals rather than typical of fuels offered to the United States Government for test or purchase.

To state the purport of this editorial in another way: Fuels from different beds in the same districts of Pennsylvania more closely resemble each other than coals from one and the same bed in different parts of the state. Superincumbent and subjacent coals are usually much alike in texture, coking qualities and volatility, whereas coals of the same bed in different counties may not even serve the same industrial purposes, so utterly unlike are they.

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The Year of the Great War

We do not know which year will best fit the title of this article. Perhaps there may be several years of the Great War before the struggle is completed, but let us never lose heart. When we compare the cost of the strife with the stock of gold and the holdings of corporations, we are horrified by the immensity of the expenditures, but nations are bigger than their hoardings and stronger financially than their joint-stock companies, and the inefficiencies and wastes of the people are so great that, if these are only surrendered, the champion waste of all wastes, war, can be allowed to continue for years without exhaustion.

Let us be careful of the excessive use of superlatives. It is true the war may be Armageddon, but it does not spell annihilation. Let it not be forgotten that the annual governmental expenditures of the Allies, omitting those of Japan and Portugal from the list, as these countries are really not in the war, amount to the colossal sum of \$5,093,006,000. Similarly the annual government outgo of Germany, Austria-Hungary and Turkey amounts to no less than \$3,704,527,000. It is easy to see, therefore, that the nations involved have so far not borrowed much more money than would run the governments for a year in peace.

It is interesting to note that the world's governments spend in the piping times of peace \$12,626,938,000. These figures obtained from the *World Almanac* show that a large draft on resources can be made, and the world's pockets will meet the strain without disaster.

The wealth of the world is largely of comparatively recent growth. Yet the property of the principals on the side of the Allies foots 184 billions. On the other hand, that of Germany and Austria-Hungary alone is 105 billions. All this takes no count of colonies and minor contestants as Turkey, Servia and Montenegro. If their property is proportional to their annual expenditures, the Allies must have a wealth of 243 billion, and the Teutonic league, resources of 110 billion dollars.

If America would try and forget the struggle, which is not the only source of her misfortunes, and would steadily have faith in herself and a little more consideration for her capitalists, she would experience unfettered prosperity.

Her financial isolation, though so generally deplored, has placed her where the surges of foreign tides can do her no harm.

The Illegitimate Dealer

Out in Indianapolis, a large furniture installment house, for the second time, has entered into the retail coal trade for the winter season. Such cases are not new to the coal business, instances of this kind being on record in many parts of the country. They are none the less a source of irritation, and frequently create bitterness on the part of the strictly legitimate dealers. However, efforts of this kind have seldom ever attained to serious proportions, for it is obviously illogical that a business venture of this character, dependent for success upon the destruction of another business, can long prevail.

So far the scheme has not extended to large proportions, and it is understood that the quality of the coal handled is in keeping with the prices at which it is offered. Under ordinary conditions the dealers' organization would, of course, take immediate steps to compel the operator furnishing coal for such an enterprise to withdraw from the business. But the company supplying this coal seems to have no regular dealer trade.

A Brighter Outlook in the Middle West

Indiana and Illinois coal producers are devoting considerable time and thought to the uniform sizing of coals, and are getting closer together than ever before on the matter of prices and the question of regulating production. While these remedies are not a panacea for all ills, their majority adoption will have a far-reaching effect toward betterment of the coal trade in the Central West. The agitation for concerted effort in these directions is causing many to feel that better conditions will prevail next season, which tends to make the mine operator feel more hopeful.

Producers generally feel that higher prices will be received in the early months of this year than in previous years, and express confidence that benefits will accrue from the movements now afoot to afford the coal man an opportunity to receive his share of the rising prices generally connected with the cost of living. The mine owners of the Central West probably receive a smaller return on their investment than any other kind of industry, and this unfavorable condition will be largely overcome by price agreements, restricted production and uniform methods of preparing coal.

Who Gets the Promotion?

It has been impossible to handle all the replies to the Cartoon Problem, "Who Gets the Promotion?" in time for this week's issue of Coal Age. An earnest effort was made to get the matter in final shape, but the task was too great for the time available. Several days have been required simply to read and classify the answers, for no question ever advanced by Coal Age has attracted such widespread interest and elicited so many replies.

Out of the great number of answers sent to us, 102 have been selected by the judges as worthy of consideration. It would require a special edition of our paper to print even this number; so it has been decided to abstract and condense the majority of the answers, only publishing in full the replies selected by the judges as having the greatest merit.

One thing has been shown clearly by the answers received—no single one of the three men up for promotion has all the worth-while arguments or sympathy on his side. High coal-mining officials with thousands of men under them differ wholly in their opinions and choice. Everybody admits the value of a pleasing personality, as indicated by one of the applicants who is popular with his associates. Everyone also condemns being grouchy, although one of the most important mine presidents in the country selects the "grouch" for advancement because of his otherwise excellent qualities.

It is seldom that a question comes so close home to everyone generally as the problem advanced in the cartoon we published. We are all hoping for promotion, and we all realize that certain of our personal traits will be weighed by the boss when he makes his selection of a man for advancement. Consequently, it is likely that Coal Age readers will be afforded an opportunity to reflect on the matter of their own personal assets, in the way of individual characteristics, when the letters on the "promotion problem" are published next week. It is just possible that some of the answers may help us understand why the other fellow was promoted and we were not.

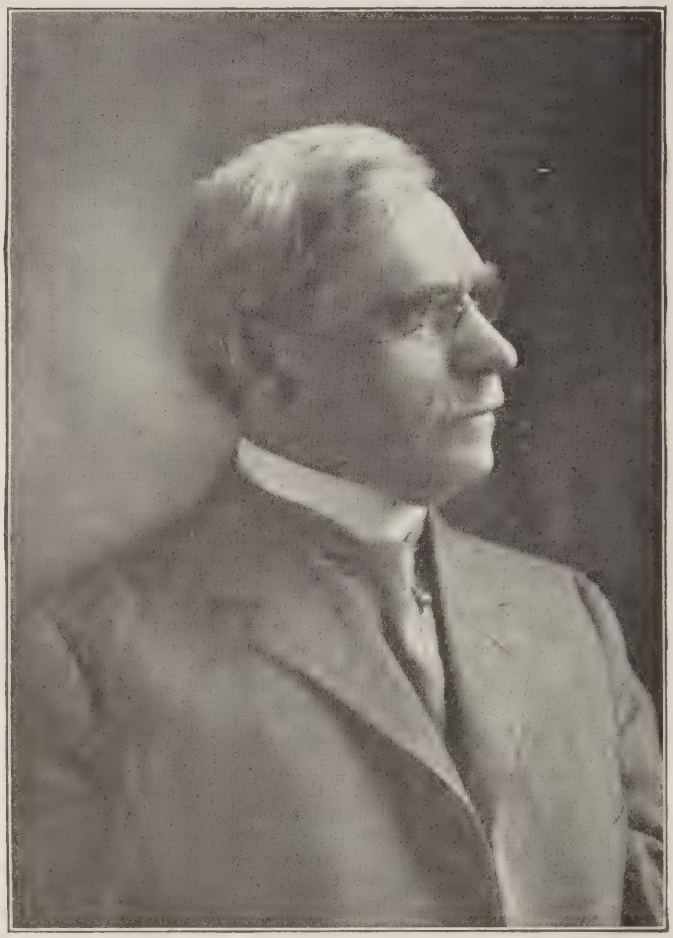
Coal Age Indexes Now Ready

Indexes to Coal Age are furnished free to all who ask for them. The index for the last half of 1914 can now be obtained by addressing a request for one to the Subscription Department, Coal Age, New York City.

Thomas Lynch

On Jan. 1, from the Church of the Most Holy Sacrament, in Greensburg, Penn., occurred the funeral of Thomas Lynch, for many years president of the H. C. Frick Coke Co., as well as many other industrial firms. Death occurred from exhaustion following an operation for septic peritonitis.

Of all men who have ever materially influenced the coal-producing and coke-making industry of the land, few, if any, have possessed greater power and at the same time have been more self-effacing. Born of Irish parentage in Uniontown, on Aug. 13, 1854, Mr. Lynch attended the common schools until he was 17 years of age. He then started his business career as a clerk in a store. In 1875 he began clerking in the Frick company's store at Broad Ford. In 1877, the H. C. Frick Coke Co., then owning 200 coke ovens and about 150 acres of coal, began to expand beyond the confines of the Morgan Valley, leasing what was then known as the Valley Works from Willson, Boyle & Playford. Mr. Frick selected the ambitious clerk in his Broad Ford store to take charge of the new operation, making Thomas Lynch superintendent and store manager. He was also given charge of the Anchor and Ferguson Works, at Dunbar, in 1878, when these were acquired by the H. C. Frick Coke Co.



Thomas Lynch

In 1882, Mr. Lynch was named general superintendent of the H. C. Frick Coke Co., becoming at that time the virtual operating head of the firm. From this time on the Frick company began its phenomenal growth. With H. C. Frick as the executive head of the corporation, and Thomas Lynch as his assistant and chief of the operating department, the company soon dominated the coke trade, which position it has never lost.

In 1890, Mr. Lynch was given the title of general manager, retaining the same until about 1896, in which year H. C. Frick retired as president, Thomas Lynch being elected to succeed him. It was during this period that Mr. Lynch issued his famous Safety-First order.

As president of the firm, Mr. Lynch was by no means a figurehead; he maintained the same close touch with operating conditions which marked his career as general superintendent and general manager, and was admittedly the controlling spirit of the H. C. Frick Coke Co. At the time of his death he was not only president of that company, but was at the head of the coal-mining operations of the United States Steel Corporation. He was president of the United States Coal & Coke Co., of West Virginia; the Bunsen Coal Co., of Illinois; the National Mining Co.; the Sharon Coal & Limestone Co., the Republic Coke Co., and the Hostetter-Connellsville Coke Co., all of Pennsylvania.

On Dec. 16, 1879, Mr. Lynch was married to Miss Sarah Agnes McKenna, of Pittsburgh. At that time he made his home at Dunbar, moving to Greensburg about 1890. He is survived by a widow and the following children: Mrs. Joseph B. Wentling, Miss Sarah A. Lynch, Thomas Lynch, Jr., Ralph Lynch, Clay F. Lynch, and Charles McKenna Lynch, all of whom reside in Greensburg, except Clay Lynch, who is general manager of the Bunsen Coal Co., at Danville, Ill.

Throughout his entire career, Mr. Lynch has been the friend of the workingman and the ardent advocate of safety. In the welfare work among miners, in which the H. C. Frick Coke Co. has admittedly taken the lead, he was strongly interested. He was a firm believer that attractive homes made contented workers and not only encouraged annual garden contests, but strongly supported large appropriations for sanitary improvements in and about the various mining plants under his charge and for safety appliances at the mines and instruction among the employees.

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Largest Class of First-Aid Workers

The largest class of mine-rescue and first-aid workers yet trained in the West Virginia coal fields has just completed a successful course at Gary, in McDowell County, and 86 miners have been thoroughly trained for the work at that place by the crew of the United States Mine Rescue car No. 8, which has been in the Pocahontas field for the past two months. In addition to this number, six young men from the Gary High School were also given complete first-aid training.

The hearty and efficient coöperation of the officials of the U. S. Coal & Coke Co., at Gary, made possible the organization of such an unusually large class in this important work, and the enthusiasm manifested by every employee of the company indicates that the efforts of the U. S. Bureau of Mines in this training work will be of a permanent nature.

A large number of classes in the Pocahontas field have been trained by the crew of this car, and at each place enthusiasm and interest have been displayed by both mine officials and employees.

Legal Department

Aspects of F. O. B. Sales Contracts

By A. L. H. Street*

One of the latest and leading court decisions affecting agreements for sale of coal, f.o.b. the seller's mines, is that announced by the Texas Court of Civic Appeals, in the case of Richard Cocke & Co. vs. Big Muddy Coal & Iron Co., 155 Southwestern Reporter, 1019.

The opinion, recognizing the well established principle that delivery of coal to a railroad company at a mine under a contract of sale, f.o.b. mines, constitutes a delivery to the buyer, holds that in a suit by the seller under such a contract, to recover the purchase price, the buyer is not entitled to show that he did not receive any of the coal shipped. The court says: "The proffered testimony of Cocke that he did not get a lump of coal in Houston shipped by the Big Muddy Coal & Iron Co. was properly excluded, because the question was, did the coal company deliver on board the cars at the mine and the fact that only so much coal reached Houston would not tend to prove that it was not put on the cars."

According to the Texas decision, the best evidence of the quantity of coal delivered to the buyer was the record of the mine weights.

The Buyer May Reject a Coal Shipment if the Quality Is Not as Specified in Contract

Again, the Court of Civic Appeals holds that when a buyer of coal inspects that tendered for delivery and finds that it is not what the contract calls for as to quality, he is at liberty to refuse to receive it, and is entitled to sue for such damages as he has suffered in consequence of the seller's breach of agreement to furnish fuel of a better quality. But the buyer must either receive or reject the entire shipment.

The last report of the Texas opinion takes up the question as to how damages for breach of a contract to deliver coal of a certain grade are to be measured. On this point the court decides:

"Ordinarily, if a contract for the sale of personalty, unperformed on the part of the seller, is broken by him, the measure of damages is the market price of such property, less the contract price, and the market price for this purpose must be determined as to the time and place of the delivery agreed upon.

It is ruled, however, that if at the time the contract is made, the seller has notice or knowledge that the goods are being purchased for sale in a particular market, or to be supplied in pursuance of a particular contract, he may fairly and reasonably be deemed to have made the contract in contemplation of that purpose, and to have assumed the risks thereby entailed; then, if he breaks his contract, damages for loss caused thereby, if not uncertain and remote, may be recovered."

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Recent Judicial Decisions

Duty of Operator to Miners—The duty which an operator of a mine must exercise to promote the safety of his employees is commensurate with the danger to them. (Oklahoma Supreme Court; Davis vs. Rock Island Mining Co.; 144 Pacific Reporter, 600.)

Interpretation of Leases—When the terms of a coal lease appear to be ambiguous, but the parties by their conduct have placed a practical construction on the doubtful provisions, the courts will enforce the lease according to that construction. (United States Circuit Court of Appeals, Fourth Circuit; Prudence Coal Co. vs. Perkins; 217 Federal Reporter, 569.)

Seller's Right to Rescind Contract—Under an agreement for a sale of coal deliverable in installments and providing for monthly settlements by the buyer on the 10th of each month, and authorizing rescission of the contract as to further deliveries on his failure to make payments on that date, the seller acted within its rights in cancelling the contract where remittance due in the seller's hands on the 10th was not mailed until the 11th. (Kentucky Court of Appeals, Southern Coal & Coke Co. vs. Bowling Green Coal Co., 170 Southwestern Reporter, 1185.)

"Chokedamp" and "Firedamp" Defined—Prooof of Negligence—Carbonic acid is commonly known in mining operations as "chokedamp," because of its extinguishment of flame and animal life. "Firedamp" consists of light carbureted hydrogen, and is so called because of its tendency to explode when mixed with atmospheric air and brought into contact with flame. In a suit to recover damages for death of a miner resulting from inhaling deadly vapors, the burden is on plaintiff to show that it was caused by some negligent act on the operator's part. (West Virginia Supreme Court of Appeals; Well's Administrator vs. Sutherland Coal & Coke Co., 83 Southeastern Reporter, 385.)

Contributory Negligence of Tipple Boss—A tipple boss, in moving a car to the tipple, discovered the presence of a timber too close to the track, jumped from the car to remove the timber, and in attempting to re-board the moving car was crushed between the car and a tipple post, and was fatally injured. He was in charge of the particular place and had the duty of inspecting the surroundings to determine their safety for himself and the other employees of the operator, and was therefore chargeable with knowledge of the proximity of the post to the track. Further, it appeared that he could have safely re-boarded the car by waiting until it had proceeded a little farther. Held, that he was guilty of contributory negligence, barring any right of recovery for his death. (Kentucky Court of Appeals; Louisa Coal Co. vs. Hammond's Administratrix; 169 Southwestern Reporter, 709.)

Liability for Injury to Children—The principles of law which render one liable for injury to a child of tender years, caused by a dangerous condition which is attractive to such children, where no attempt is made to guard against such accidents, cannot be applied to a case where a coal company permitted a lot of empty coal cars weighing 1000 lb. each to remain on a level track, several boys more than 15 years old rerailed a car which afforded an obstruction to movement of the other cars down a nearby grade, and in their running the cars a child ten years old was killed. "Here the coal company was not negligent, because there is no evidence here that these coal cars had ever been attempted to be operated by children of tender years, or that it was likely they could have been operated by them. But that is not all of this case: The coal company knew and recognized the fact that these cars were being thus operated, or might be so operated, and took precaution to prevent it, and had derailed a car at the connecting point of the side track on which they were standing with the main track. * * * If that car had been allowed to stay there, nobody could have operated those cars, and it could not have been moved by children of tender years—it could only have been moved by large boys or men." (United States District Court, Eastern District of Kentucky; Barnhill's Administrator vs. Mt. Morgan Coal Co., 215 Federal Reporter 608.)

Sociological Department

First-Aid Contest at Gillespie, Ill.

SYNOPSIS—A thoroughly democratic first-aid meet, which miners and operators together financed and conducted. Some youths also gave an exhibition of their skill. The discount or demerit list shows further improvements, the result, doubtless, of matured consideration.

The third annual meet, under the united auspices of the American Mine Safety Association, Local Union No. 730 of Mine No. 1, and the Superior Coal Co., was held Dec. 8 at the Colonial Theater, Gillespie, Ill. Nine teams contested in the full-team event, 18 teams in the two-man and 38 men in the individual event.

Winners of First Place, Full-Team Event, No. 3 Team, Gillespie First-Aid Association

From left to right: John Aitken, Fullerton Fulton, Sr., captain; Fullerton Fulton, Jr., James Fulton. S. Trainer, the patient, is not present.

SUPERIOR COAL CO.
MINE RESCUE STATION.

James Boston and His Boys' First-Aid Team, the Members of Which Received State Diplomas

From right to left: Richard Harris, captain; Philip Shanahan, John Shanahan, James Bergen, Willie Carroll, Bartlett Carroll.

The judges were Dr. August F. Knoefel, president of the American Mine Safety Association, Terre Haute, Ind.; Dr. C. W. Hopkins, chief surgeon for the Chicago & Northwestern R.R., Chicago, Ill., and Dr. H. C. Blankmeyer, local president of the American Red Cross, Springfield, Ill. The recorders were F. F. Jorgensen, chief engineer for the Superior Coal Co., and H. D. Easton, instructor in the Illinois Miners' and Mechanics' Institutes. The managing committee consisted of J. Boston, chairman; J. R. Greer, secretary; J. Clarkson, C. Miller and J. Struthers.

John P. Reese, general manager of the Superior Coal Co., called the house to order at 9.30 and announced J. Boston as chairman of the day. After a short address of welcome by Mayor Rice, the individual contest started. Owing to the large number of entries and the consequent necessity of working in groups of six, this event occupied all the forenoon.

ONE-MAN EVENT

Only five minutes' time was allowed for the one-man event, which was as follows: Subject is supposed to be lying down and engaged in undercutting with a pick when he is caught by a fall of coal and has the right side of the scalp lacerated, the right ear torn off and the right jaw broken.

Few of the men were able to perform this test within the specified time. The rules of the contest allowed each man one minute in which to read the slip which stated the injuries, and then the slips were taken from the men and the word "Go" was given.

This contest resulted in four ties that were worked off immediately after dinner. The problem given for the tie was a dislocation of the right shoulder. Eight minutes' time was allowed, which was about twice as long as any of the men needed.

The winners and the prizes awarded for the individual contest were as follows: (1) Trophy cup, American Mine Safety Association medal, American Red Cross medal and $5 cash, won by J. Vrabel, Breese, Ill.; (2) Gold medal and $5 cash, won by W. B. Griffiths, Cuba, Ill.; (3) Silver medal and $2.50 cash, won by J. Struthers, Gillespie, Ill.

There were in all 18 prizes, consisting of cash and articles of utility.

TWO-MAN EVENT

Eight minutes' time was allowed for the two-man event, the following problem being offered: "While three men were engaged in taking down slate, one of them was caught and sustained a compound fracture of the lower third of the right leg, with bright red blood."

In this case also one minute was allowed each captain to read his slip, after which the first-aid work was done from memory. The allotted time proved ample.

The winners and prizes awarded in this event were as follows: (1) Two solid gold rings, presented by officials of the Superior Coal Co., and two American Red Cross medals, won by J. Struthers and W. Hood, Gillespie, Ill.; (2) Two pairs of gold cuff buttons, presented by officials of the Superior Coal Co., won by J. Easton and J. Fulton, Gillespie, Ill.

There were two other prizes, also donated by the officials of the Superior Coal Co.

Undoubtedly Gillespie stands at the very head of first-aid work in Illinois, having the greatest number of first-aid teams and of trained men. The spirit of first-aid is in the very air of the town and is evidenced not only by contests, weekly meetings of first-aid societies, etc., but also by practical results obtained by its application in the mines.

BOYS' EVENT

After the two-man event, J. Boston introduced his boy team, comprising R. Harris, captain, age 12; J. Bergen, age

12; P. Shanahan, age 11; J. Shanahan, age 9; Willie Carroll, age 11; Walter Carroll, age 8.

The first problem given the boys was that of a simple fracture of the right femur, a simple fracture of the left forearm and a scalp wound on top of the head. The second problem was that of a fracture of the left collar-bone and shoulder.

These small boys performed their work so well that it looked as though they would prove dangerous rivals to teams composed of grown men. On Dec. 3, Thomas English, of the Illinois Mine Rescue Station Commission, examined these boys and they passed the state examination in first-aid in a creditable manner. Oscar Cartlidge, manager of the commission, presented the state diplomas and first-aid buttons to these boys at the contest and commended them for the excellent showing they had made in their examination. It is unusual for youths of such tender age to pass state examinations of this kind, but after witnessing their exhibition work it was evident to the spectators that they are well qualified and worthy of such an honor.

DISCOUNT OR DEMERIT LIST

The discounts in use are worthy of consideration, as they differ somewhat from those in Miners' Circular 15 of the Bureau of Mines, and perhaps suggest more mature consideration. As J. P. Reese and Dr. R. F. Knoefel, past and present presidents of the American Mine Safety Association, respectively, were both prominent in the program, the meeting was evidently official, and the discount list must have the support of leading officers of the association.

The last item in the list is entirely new. This refers to controlling hemorrhage. The 14th and 15th items, which also relate to blood control, are given increased weight, as is also "ineffective artificial respiration" and "incorrect treatment." "Failure to be aseptic" and "unclean first-aid material" are less heavily penalized. On the whole, we believe all these changes are good. Another improvement is an increase in penalty for splints improperly padded or applied.

We have added, for comparison, to the list given below the old National Mine Rescue and First-Aid Conference's discounts. The Gillespie demerits are the outcome of discussion of these earlier attempts at a fair assessment of defects in treatment, and we think show a big improvement. The changes in many cases are such as have been advocated editorially in "Coal Age." We have added the Utah Fuel Co.'s scale for comparison. It should be stated that not only the discounts, but their description and order have been changed. Hence, only the Gillespie counts are stated with verbal correctness in the table:

COMPARATIVE DEMERIT LISTS

	Gillespie Meet	Miners' Circular 15*	N.M.R. & F.A.C.†	U.F.C.‡
1. Not doing the most important thing first	6	5	2	5
2. Failure of captain to command properly	1	2	2	2
3. Slowness in work and lack of attention	2	4	2	2
4. Failure to entirely cover wound or ignorance of location of injury	4	4	2	2
5. Ineffective artificial respiration	11	10	2	5
6. Splints improperly padded or applied	6	2	2	2
7. Tight, loose or improperly applied bandages	5	6	2	2
Insecure or "granny" knot	4	5	2	2
Unclean first-aid material	3	5	..	..
Failure to have on hand sufficient and proper material to complete a dressing	3	5	..	..
Lack of neatness	2	2	..	2
Awkward handling of patient	4	5	2	2
Assistance lent by patient	3	5	3	3
Tourniquet improperly applied	7	5	3	5
Failure to stop bleeding	8	5	5	5
Not treating shock	5	5	5	5
Failure to be aseptic	7	10	10	5
Incorrect treatment	12	10	..	..
Failure to temporarily control hemorrhage until tourniquet is applied	7	..	..	..

*Published August, 1913, by the Bureau of Mines.

†Schedule of National Mine Rescue and First-Aid Conference, Sept. 28, 1912.

‡Utah Fuel Co. meets at Castle Gate, Utah, July 24, 1914, nd Price, Utah, Sept. 26, 1914.

FULL-TEAM EVENT

The team contest closed the afternoon program. The nine ams, each consisting of five men, one of whom was the tient, were handled in groups of three. The problem was: motor has "jumped" the track, knocking out the leg of a mber set and allowing the timber and slate to fall. The ip rider is caught under the slate and is found between e rails and in water. On examination it is noted that his right hand is cut off at the wrist, the fifth, sixth and seventh ribs of the right side are fractured and the outer third of the right clavicle has a compound fracture. The patient is in shock and is spitting blood.

After allowing 1½ min. for the captains to read their slips, 15 minutes' time was given for the work, and this proved more than was needed. In this event the captains retained their slips.

The winners and prizes were as follows:

(1) Superior Coal Co. trophy cup, five American Mine Safety Association medals, five American Red Cross medals, $20 cash donated by Local Union No. 730 of Mine No. 1—Won by Gillespie First-Aid Association No. 3 Team; F. Fulton, captain; J. Aitken, J. Fulton, F. Fulton, Jr., and S. Trainer, patient.

(2) Five gold medals presented by the Superior Coal Co. and $15 cash donated by Local Union No. 730 of Mine No. 1—Won by Cuba, Ill.; T. B. Trigg, captain; W. B. Griffiths, G. H. Trigg, J. Griffiths, and K. Hogan, patient.

(3) Five silver medals donated by the Superior Coal Co. and $10 cash given by Local Union No. 730 of Mine No. 1—Won by Farmington First-Aid Team; W. Brown, captain; W. Prosser, W. Crane, W. Watson, and R. Connell, patient.

There were four other prize-winning teams.

EVENING SESSION

At 7 p.m. the prizes were awarded by Dr. C. W. Hopkins, John P. Reese and others. The crowd was so great that it became necessary to close the doors of the opera house before the evening sesion began. The U. S. Bureau of Mines' kinematograph of coal-mining operations was a great drawing card. However, there was much interest shown by the public during the day and the house was full throughout the afternoon as well as in the evening.

The Superior Coal Co. trophy cup was awarded by Mr. Reese, who stated that this is the third and last contest for the cup. The present winners are to have possession of it for one year and then it becomes the property of the State of Illinois and is to be kept on exhibition at the Springfield Mine Rescue Station. It was first won Dec. 10, 1912, by Superior Team No. 1: J. Weir, captain; C. Miller, J. Cowden, J. Struthers and W. Hood.

It was won Dec. 9, 1913, by the Cuba team: T. P. Trigg, captain; J. Cooper, J. H. Trigg and W. Griffith.

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A Miners' Co-Operative Store

By H. D. Easton*

The Gillespie Coöperative Society, of Gillespie, Ill., had a formal opening of its $1400 store building on miners' election day, Dec. 8, 1914. This is said to be the first miners' coöperative store in Illinois. The Scotch bandsmen made a picturesque feature with their pipes and kilts while furnishing the music for the occasion.

John H. Walker, president of the Illinois State Federation of Labor, was the speaker of the day. He enlarged upon the coöperative plan and encouraged the present society to look forward to the extending of their activities until a series of such stores are built over the state and all of these units do their purchasing through a coöperative wholesale house. This store, the first of the series, has already been occupied for a few weeks, but the formal opening was deferred until the day of the Gillespie first-aid meet. The speaking was in the Clan McIntosh Hall.

The store is of brick, two stories high, and has a large basement. The ground floor is used for groceries and foodstuffs in general, the second story is for dry goods and the basement for general storage. The building occupies a corner site on the main street which makes possible excellent window displays.

No One Can Hold over $25 of Second-Mortgage or over $500 of First-Mortgage Obligations

The Gillespie Coöperative Society was organized Apr. 21, 1913, with a capital of $1600. There are about 118 local members. To become a member, the applicant must buy a share at $5; each member is limited to five of such contributions. The money thus raised is called *share capital.* Each member is given a book with a number, on which his name does not appear, so that the private affairs of the shareholders are not divulged should anyone find the book.

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*Instructor, Illinois Miners' and Mechanics' Institutes, 1142 West Monroe St., Springfield, Ill.

After a member has purchased his five shares, he is allowed to deposit money which is called loan capital; but of this he is not allowed to obtain more than $500. These two forms of capital are somewhat like common and preferred stock; the share capital draws 5 per cent. interest and the loan capital 4 per cent., each being paid quarterly. In case of financial difficulty, the loan capital has first claim on any available assets.

The division of the net profits, after paying all running expenses and the interest on the two forms of capital, is proportioned according to the amount of purchases made by the members. A member buying $100 worth of goods would receive twice as much dividend as another who had purchased but $50 worth. Of course, none but members participate in this dividend.

A STORE ERECTED BY MINERS TO SUPPLY THEIR OWN NEEDS, GILLESPIE, ILL.

DETAILS OF MANAGEMENT

Quarterly meetings are held and each member is fined 25c. for failing to attend a meeting. There is a board of directors consisting of nine men, three of whom are elected each quarter. There are three auditors, one of whom is appointed each quarter by the directorate. This plan always leaves experienced men both on the board and acting as auditors. A manager, the present incumbent being Herman Sies, is hired by the directorate. He, through the board, employs the necessary assistants.

The society plans to handle practically everything that a family needs and to carry none but first-class goods with prices according to value. No prices are to be cut. At present, the second story of the store is devoted largely to ladies' coats; there is to be special attention paid to certain lines in season and then, as the members become stocked up with the particular line, other goods will be taken up in the same manner.

CREDIT GIVEN WITHIN $10 OF HOLDING

The system of bookkeeping is greatly simplified by allowing and encouraging each member to purchase on credit goods of a value aggregating $10 less than his total capital. Fifteen dollars must be invested before credit can be given. As stated, a capital of $15 allows a $5 credit.

Many of the members prefer to invest their savings in loan capital rather than to leave the money in a bank. The Society not only allows 4 per cent. interest but compounds this increment quarterly.

The present board members are: Peter Harris, Jim Harris, Clyde Bernard, David Shaw, Doctor English, Mike Blaske, John L. Templeton, William Osborne and L. P. Preston. The other officers serve for one year and are: David McKaig, president, James Cowan, vice-president, Robert McKechan, secretary, and W. E. Schmidt, treasurer. Both the board members and officials are eligible for reëlection but cannot serve for more than two consecutive terms. The auditors' report shows the number of meetings attended by each official.

The coöperative plan is not new but is being followed with success especially in some colleges and universities. It is a long step from the old-time company store to the coöperative, but a step in the right direction. When miners become active in keeping up their own first-aid societies, coöperative stores, etc., they will have acquired an interest in local affairs that will lead very naturally t owning their own homes. All these movements favor th building up of a community of earnest, contented me and that in turn brings much help toward gaining peac and prosperity for both operators and miners.

SOME DETAILS AS TO FINANCE

[The auditors prepare a full and detailed report eac quarter. From it we learn that $2802.25 of share capita is owned by 118 members, making an average $23.75 pe member, which closely approximates the maximum pos sible holding of $25. The loan capital amounts t $3111.15 and is held by 91 members, making an averag of $34.18 per loan holder. The largest holding is $325.8 and the smallest $0.11.

The grocery stock is valued at $2772.45, the dry goo at $2121.67. The cash on hand and balance in bank tot to $2526.65. The total resources were $7921.44. The are $1374.14 of outstanding bills. The quarterly intere on shares and loan capital aggregated $46.63; the div dends on purchases for the quarter amounted to $423.4 The total sales are not given but the purchases of t store are recorded as $7702.68 in the three months pa During that same time $850.25 was paid for salaries a delivery of goods.

The figures are not large but the showing is commen able and it must be remembered that it closes already t fifth quarter of trading.—EDITOR.]

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The number of coal mine disasters in the United Sta decreased 38 per cent. in 1913 according to the Fourth Ann Report of Joseph A. Holmes, director of the United Sta Bureau of Mines. "Although there was a slight increase the number of fatalities in coal mines," says the rep "owing to two large disasters, it is gratifying to know t there was a reduction in the number of accidents. Duri the calendar year 1913 there were eight disasters in wh more than five men were killed, as compared with 13 simi disasters in 1912, a reduction of 38 per cent.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 20—I want to suggest, in connection with the discussion of mining laws and legislation, that law makers can do much to increase safety in mines, if they will take up the matter of the fireboss and the shotfirer, and read into the mining laws of the state, a more definite statement of what these officials are expected to do during the working shift.

My observations lead me to the conclusion that, in many mines today, the fireboss and shotfirer have more work to perform than they can do properly in the time allotted them. In other words, they are unable to fulfill the requirements of the Coal Mines Regulation Act, in these circumstances and under the prevailing conditions. Such a state of affairs can only be remedied by a law fixing some standard amount of work that must be performed during the shift and which cannot be exceeded. In other words, the work a shotfirer is expected to perform should be so limited by law that it can be properly executed. If this matter be given proper attention by legislative bodies, I believe it will have a far-reaching effect and be of incalculable value in promoting safety in mines.

"Safety First" has become a very familiar phrase; and many large coal-mining companies are making it their slogan, for which they are to be commended. They reap the benefit, however, of their efforts in this direction quite as much as their employees. On the other hand, there are companies that do not push the "Safety First" proposition. I will not say that they do not favor it, however; but under the conditions so common to coal mining; such as a poor quality of coal, difficult mining conditions, keen competition in the markets and other causes, the adopted slogan "Safety First" is replaced by another, which is kept continually before the eyes of every mine official.

The cry is constant, "Coal! coal! coal!" No matter *how*—coal must be produced at the lowest possible cost, the only alternative being to close the mine. The company does not say "Take any and all risks to attain this result." But that is practically what it means. The factor of safety is almost wholly eliminated from the proposition. Consider, for a moment, the case of a fireboss in such a mine. His responsibilities, I venture to say, are equal to those of any other mine official. He is often required to fulfill the duties of both fireboss and shotfirer, in which case his responsibilities are increased three- or four-fold. In such capacity, he is called upon to fire all the shots in his section and to look after the general safety of all working places, traveling roads, ventilation, etc., as required by the Coal Mines Regulation Act.

It is easy to understand, that, in order to do this work conscientiously and properly, the fireboss should have a limited number of places in his charge or a certain number of men. I have known cases where the fireboss had a larger territory than was possible to examine in strict compliance with the requirements of the act, within the time at his disposal. I have known such men to give up their positions, on that account, rather than be compelled to face the chance of a possible accident, for which they would be held responsible and the later investigation of which would result in their being deprived of their fireboss papers and stamp them as unreliable men.

In such cases, the position is again quickly filled, probably by a man who has recently succeeded in getting his papers and is elated at obtaining and anxious to hold the position he secures. It is this that makes him willing to take the chances mentioned. The miners and other workmen in the mine know well enough that the law is not being carried out, and they, in turn, get careless likewise.

Obviously, the result is bad and the moral seems to be quite clear, "If the boss does not enforce and carry out the Coal Mines Regulation Act himself, how can he expect his men to do so?" This condition naturally continues until the headlines of the daily papers announce the occurrence of a disastrous explosion. The later investigation fails to discover the actual cause of the disaster, though many theories are advanced to explain the mystery.

VIGILANT.

British Columbia, Canada.

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Humidifying Mine Air

Letter No. 1—Referring to the interesting inquiry, in regard to the humidifying of mine air, COAL AGE, Jan. 2, p. 29, the statement of "Miner" that the humidity imparted to the air current by the exhaust steam is practically lost at a distance of 600 ft. from the bottom of the downcast shaft, shows that he is not putting enough exhaust steam into the air passing down the shaft, to produce good results at all times.

My own practical experience has taught me that, with the winter temperatures one may expect in Ohio, it will require 1 hp. of exhaust steam for each 1000 cu.ft. of air entering the shaft. This will, of course, depend, to a certain extent, on the distance it is necessary to convey the exhaust steam before it reaches the downcast shaft. No doubt the amount I have mentioned will seem excessive; but when one considers that the thermometer often registers below zero, and that it is necessary, therefore, to regard such conditions, it will be readily seen that the amount is not in excess.

I would recommend that "Miner" increase the amount of exhaust steam delivered to the air current; and make frequent tests with a sling psychrometer, until the readings show, say 93 per cent. relative humidity in the live workings, which he states are 4000 ft. inby from the downcast shaft. Such relative humidity should be obtained when the outside temperature is at or near the freezing point; and, then, if the temperature should drop for a few days, there will no doubt be sufficient moisture in the mine to tide over this condition.

I would also recommend the placing of a two-way valve on the exhaust header, so that it will be possible to regulate the supply of steam according to the requirements. When the steam supplied to the intake current is sufficient one should be able to notice a steam fog or mist for a distance of at least 1500 to 2000 ft. inby from the shaft, days when the outside temperature is zero or thereabouts. If necessary, a 1½-in. live-steam line could be connected with the top of the downcast shaft, for emergency use in extremely cold weather.

A very good test, for observing the dust conditions in the mine, is to place sheets of white paper at various points in the entries and the workings; and observe how much dust collects on these, in a certain time, say weekly. I feel certain that if "Miner" will work along these lines, he will be amply repaid.

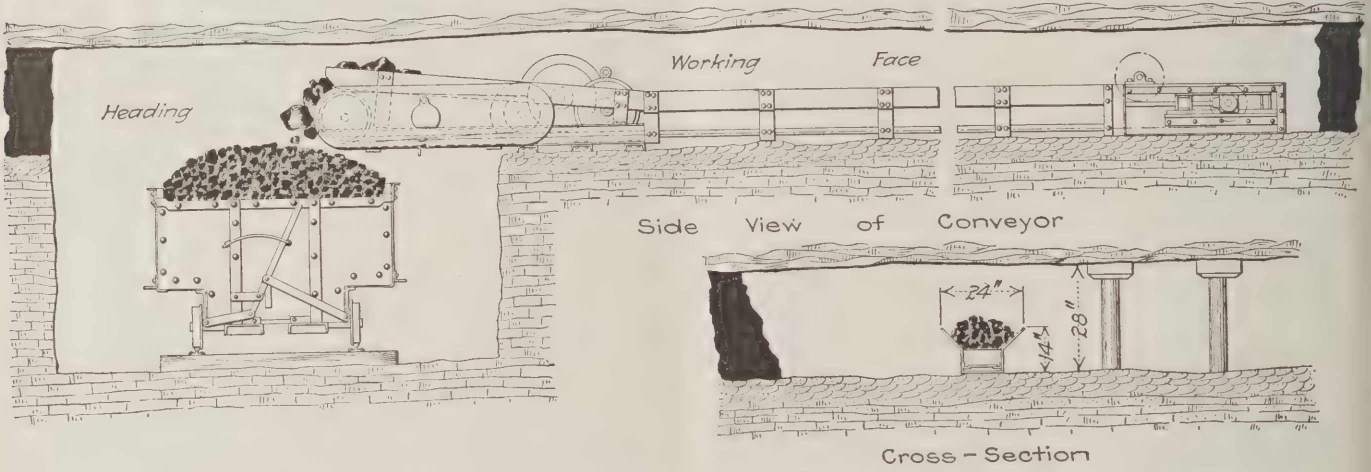
George Morris,
Mining Engineer.

Ralphton, Penn.

Loading Coal by Machinery at the Face

I believe the inquiry of John Harvey, Coal Age, Dec. 5, p. 920, refers to a mechanical coal conveyor, to be installed along the coal face, in a thin seam where it is impossible to take the cars because of a lack of headroom. As I have had considerable experience, in Scotland, in the handling of coal by means of the Blackett coal conveyor, at the working face of a thin seam of coal, I thought the following description would be of interest to Mr. Harvey and others.

This conveyor, which was 300 ft. long, was installed at a cost of $2000. I believe the seam of coal described by correspondent is admirably adapted to the use of a conveyor, as the most important consideration when installing such a machine is a good roof and bottom that will allow sufficient open space for its operation, so that the conveyor will not be impeded by unnecessary timbers and fallen coal. The hard sandrock floor and limestone bottom will require little timbering in the open space along the face of the coal. I have seen the conveyor worked successfully in a seam 2 ft. thick.



Sectional View and Cross-Section at Longwall Face, Showing a Link-Belt, Loading Conveyor

The Blackett conveyor required two men, at the loading end of the machine, for topping and switching the cars as they were loaded and for operating the conveyor. The machine was run by a 7-hp., three-phase, alternating-current motor. The mine cars held only 8 cwt., or 896 lb. (taking the cwt. as 112 lb.). When running the conveyor at its full capacity, we could load 60 of these cars per hour; but this supply of coal could not be maintained throughout the day. The 10 men working on this 300-ft. face of coal would average from 230 to 240 cars of coal per day or, say something over 100 short tons; but this would run the conveyor scarcely four hours.

In the seam to which I refer, before the installation of the conveyor, the men averaged only 3 tons of coal per man per day. By means of the conveyor, this output was increased to from 8 to 10 tons of coal per man per day. Again, previous to the installation, it had been the custom to pay for the mining and hauling of the coal to the side track, a distance of ¼ of a mile, a rate of 62c. per ton. Boys were employed for this purpose, except where the grade of the road was too steep for them to handle the cars, where men had to be used. This rate for mining and hauling the coal to the side track was reduced by the installation of the conveyor to 31c. per ton.

I may say that this installation was made in a seam 4 ft. thick, having a dip of 1 : 6, which was increased in places to 1 : 4. The levels were driven on the strike of the seam, about 300 ft. apart, cutting off the rooms driven up from the level below. Main headings were maintained every 300 ft. apart, and these were equipped with a drum and brake operated as a self-acting incline.

When it was decided to install the conveyor at the face, this was straightened and opened to a width sufficient to admit the conveyor line and still give room for the mining of the coal. For this purpose, the roof required to be supported temporarily by timbers, and "chocks" were built below the line of the conveyor. From 3 to 4 ft. of bottom had to be lifted on the main heading to permit the mine car to pass under the loading chute at the end of the conveyor. In this system, as the longwall face advanced, the temporary timbers were removed at the face and the conveyor moved forward.

The advantages claimed for the conveyor and verified, in our case, are the following:

1. A largely increased output of coal, per man per day, as the miner having no cars to handle, devoted his time wholly to the production of coal.

2. Decreased cost of maintenance and operation, per ton of coal mined.

3. Better working conditions and less timber, rails, etc., required, owing to the more rapid advance of the working face.

4. A more satisfied class of workmen, because the laborious handling of cars is avoided in this system.

THOMAS MULHOLLAND.

Ensley, Ala.

[In response to our inquiry, in reference to the installation of longwall conveyors, in the working of thin seams of coal in this country, the Link-Belt Co. has kindly sent photo of this machine, which we have reproduced, together with the following information:

Two of these machines were installed in the 28-in. veins of the Pennsylvania Coal Co.'s mines, at Dunmore, Penn., last April. These machines were set up on 250-ft. centers, in 16-ft. sections. The conveying medium consists of a single strand of H-type chain, having a 5-in. pitch and being 9 in. wide. The chain, which conveys the coal along a trough as illustrated in the accompanying figure, is operated at a speed of about 90 ft. per min. This machine was installed on a contract guaranteeing a capacity of 10 tons of run-of-mine anthracite per hour, with uniform loading. Each machine is equipped with a 7½-hp., back-geared electric motor, the gearing being provided with metal guards. As the coal face advances, the machine is moved forward by hand, using crowbars, chain blocks, or other simple means.

Two similar machines were also installed at the Hillside Coal & Iron Co.'s mines, at Mayfield, Penn., last September. The machines are in constant operation and giving good satisfaction, by accomplishing the work for which they were designed.—EDITOR.]

The Foreigner in Mining

Letter No. 12—The recent discussion of the foreigner in coal mining has been of great interest, particularly to the foreigners themselves—those who could read and understand English. There are many such among COAL AGE readers and they have read every word thus far written. I am one of these and was glad to notice Mr. Lantz' suggestion, in Letter No. 10, COAL AGE, Dec. 26, p. 1035, that the views of foreign-born mining men who have become Americanized and have adopted American standards of living would be interesting and valuable.

My practical experience in coal mining, during the last 20 years, has shown me that there is much unfair treatment of the foreigner in mining and that he is not given the same chances to advance and improve himself that are afforded American miners. As an illustration of this fact, I will cite one particular case in which a few native-born foreign boys had attended a night school where they studied for fireboss certificates. They, later, passed the examination successfully, received certificates of competency and filed their several applications for the position of fireboss, in the mine office. When there was an opening, however, the mine foreman sent for a few good American-born men; and the superintendent, who was a college-educated man, but knew little more of mining than an ordinary wood-chopper, was induced to appoint the newcomers, instead of the foreign-born boys who should have stood the first chance. In this way, the mine foreman actually put one over on the mine superintendent when he shoved these men back who were in every way competent to fill the position and brought new men to the mine to fill the places.

One may ask, "What chance does that give a foreigner, or what encouragement does it offer him to educate himself?" Had the mine foreman, in this case, been square and the superintendent a man of experience, and these men had been shoved along as they were able to go, they, in turn, would have started a hundred others on the same track, as it would have proved the benefit they had received from their education. But, I have not told all; the worst was yet to come. Later, when hard times occurred, the foreigners and their boys were laid off entirely. The mine foreman had no work for them: but single men—Americans—were kept at work, while these married foreigners, many having large families, were thrown idle. The boys who had studied were ridiculed by their less ambitious fellows, who taunted them with, "Well, aren't you fools; never going to get a job of firebossing; youse won't never be American citizens—not with such dirty officials as we have to work under"; and other like remarks.

I want to say, in closing, that many coal operators make a mistake in their treatment of the foreigner, and particularly the native-born foreigner. It is a fact worth observing that the children of these foreigners are being educated. They are ambitious; many of them are looking forward to a college education, and are making rapid progress. Few of them, indeed, will be contented to draw coke or dig coal all their lives.

It would be interesting and instructive to know what percentage of English, German, Swedish and Bohemian miners has been killed in the mines, during the past year. I believe they are the best class and highest grade of miners now employed in the mines of this country.

A FOREIGNER.

Mt. Pleasant, Penn.

Letter No. 13—I have been much interested in the discussion now in progress in COAL AGE, regarding the education of the foreigner. Inasmuch as one correspondent invites the opinions of foreigners, I am induced to break into the discussion.

As one who came from Europe, direct to the coal fields, several years ago, I have an intimate knowledge of the character, habits and aspirations of those humble persons now arriving from the Continent in such numbers. I have been in close working contact with many of this class, who, like myself, have become more or less Americanized. Also, having previously had many years' practical experience in educational matters, especially the education of workingmen, I have unconsciously formed the habit of observing and comparing the educational standards of the communities in which it has been my fortune to dwell. In this respect, I have had many opportunities of comparing the general education of the foreigner with that of the American workman in the coal fields of this country. I regret to say that the result has not always been to the credit of the American miner.

Many of the aliens who come direct to the coal fields from the mining countries of Europe are experienced miners and possess a good rudimentary education. But, the American miner is very prone to look upon even these with disdain, simply because they do not speak the language or understand what is said to them. There are besides, of course, a large number of a lower grade of foreigners, who reach the coal fields from the farming districts of Europe. As a rule, these gravitate to the coal fields from the larger cities where they have been long enough to obtain a fair knowledge of the country and the language. The most of this class do not aspire to enter the mines; and only do so because of their need of work or at the solicitation of friends already in the mines.

What the foreigner most needs is to learn the language sufficiently to enable him to speak it and understand what is said to him. They pick up this knowledge more rapidly in their daily work than by attending educational classes. In my opinion, any further education given them should be in the nature of acquainting them with the dangers of mining and the duties and responsibilities of citizenship in this country. The work of making a good citizen out of the foreigner is too often neglected.

Anyone familiar with the situation knows that far too many foreigners come to this country for the purpose of making easy money in a short time. They are sending this home to pay for the farm that they are anxious to go back and work. It would be better for the coal districts and the country at large if the foreigners we employ were given to understand that they must get their families here and be naturalized within a given time, say a year. It is not wisdom to have so many of these men crowded into the mining camps and living in the most degraded manner possible—often like hogs. The general tone of the camp is lowered because of their inordinate desire to save money and send it home. The natural result is to prejudice the mind of the American workman, who fails to realize that this is not their normal habit of life when in their own country.

To force this class of foreign labor to *declare their intention of becoming citizens of this country, within a year,* would probably mean a reduction of their number in the coal fields; but the grade of labor remaining would be of a far superior quality, and the talk of their education would be unnecessary.

It has been my observation that where the population in the coal fields consists of foreigners who are married and settled with their families, in their own homes, the workers prove to be the most reliable and respectable it is possible to employ. I believe, therefore, that everything should be done, in the way of education, to persuade or even compel this class of labor coming into the country to declare their intention of settling here and becoming good citizens. In closing, I may say that, while I believe in education, I am convinced that the foreigner needs no more attention, in this respect, than the average American workman.

WESVANIA.

———, W. Va.

* * *

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

CENTRIFUGAL PUMPS

The low cost of electricity and its increasing application for power and lighting, in mining work, together with the ease of installation and the flexibility and small expense for maintenance of the system has resulted in the development and successful adaptation of the centrifugal pump to mining conditions and requirements.

The centrifugal pump is, by its very nature, an electrically driven pump, owing chiefly to the high speed of rotation required for the development of its centrifugal force, and the same high speed of rotation is the prime feature of the dynamo or electric motor.

Efficiency—Motor-driven pumps of the centrifugal type present features capable of developing high efficiencies. It is now possible, by the improved design of the impeller and its casing, to obtain the same high efficiencies for all heads up to 250 ft., which fact alone adapts them to mining use.

What is generally understood as the "pump efficiency" is the **ratio of output to input;** which in centrifugal pumps is the ratio of the work performed (ft.-lb. per min.) to the brake horsepower reduced to the same basis. The "overall efficiency," which is a term sometimes used, includes the combined efficiencies of the motor and the pump. It is the ratio of the work performed (ft.-lb. per min.) to the kilowatts delivered to the motor reduced to the same basis. The efficiencies of the better class of these pumps vary from 45 to 78 per cent., depending on size of pump and head.

Rated Size of Pump—Centrifugal pumps are rated, in respect to size and capacity, by stating the diameter, in inches, of the discharge. Thus, an 8-in. centrifugal pump is one having a discharge connection 8 in. in diameter. This is also called a "No. 8 pump."

Size Required for Given Capacity—It is possible to estimate approximately the size or number of pump required to deliver a given quantity of water, G (gal. per min.), on the basis of an assumed average velocity of discharge of, say 12 ft. per sec., for heads varying from 80 to 90 ft.; and assuming, further, that this velocity will vary approximately as the square root of the head.

For example, calling the required diameter of discharge d, in inches; the desired capacity of the pump G, in gallons per minute; and the given head h, in feet, the calculation is as follows, on the basis of a velocity of 12 ft. per sec., under an average head of 85 ft.:

$$G = \frac{60 \times 12 \times 12\,(0.7854\, d^2)}{231} \sqrt{\frac{h}{85}} = 3.186\, d^2 \sqrt{h}$$

and, for the required diameter of discharge,

$$d = 0.56 \sqrt{\frac{G}{\sqrt{h}}}$$

However, since the sectional area of the volute, at the cut-off, is the factor determining the discharge, the above formula, at times, gives rise to misunderstanding.

The Coal Age Pocket Book

The Single-Stage, Centrifugal Pump—There are two general types of centrifugal pumps; namely, **volute and turbine** pumps. The "volute" type receives its name from the spiral form of casing that surrounds the impeller and conducts the water flowing from the impeller to the discharge pipe or nozzle. Volute pumps are generally single-stage pumps. The volute is the standard type of centrifugal pump, for all capacities and for all heads up to 250 ft.

The accompanying figure shows an outside view of a 10-in., double-suction, volute, motor-driven pump. All centrifugal pumps have the following essential elements or parts that combine to form the pump proper: **1.** A shaft that transmits the power from the motor to the pump. **2.** An impeller mounted on the shaft and rotated by it at a high speed. **3.** A casing that surrounds the impeller and confines the water within the pump till it is finally discharged at the nozzle or into the column pipe leading to the surface.

CAMERON TEN-INCH, DOUBLE-SUCTION, MOTOR-DRIVEN, CENTRIFUGAL PUMP

Advantages of Centrifugal Pumps—In this type of pump there is the entire absence of complicated parts such as valves, pistons, etc. Less floor space is required; cost of installation and maintenance is lower for the same service; and the action of the impeller is continuous, producing a steady discharge and eliminating shock and noise. The interior of the pump is readily accessible for inspection without disturbing any pipe connections or the alignment of the pump.

Inquiries of General Interest

The Simple Vernier

What is the principle of a simple vernier, by which it is possible to read with accuracy to a smaller division than that on the scale? Are all verniers constructed and read alike?

SURVEYOR.

Bethlehem, Penn.

The principle of the vernier depends on its divisions being less or greater than the divisions of the scale, by a certain fractional or decimal part of the scale unit. There are two kinds of verniers—the *direct* and the *retrograde*. In the direct vernier, the divisions on the vernier are shorter than those on the scale. In the retrograde vernier, which is not so common as the direct, the vernier divisions are longer than those of the scale.

A scale may be graduated for any unit of measure; as, for example, feet, inches, degrees, etc. The vernier may, then, be so divided as to read any fractional or decimal part of such unit.

Referring to the accompanying figure, the divisions of the scale marked 1, 2, etc., may represent feet or inches. These being divided, in this case, into ten smaller divisions, this scale is a decimal scale and each of the smaller divisions marks $\frac{1}{10}$ of the scale unit, whatever this may be.

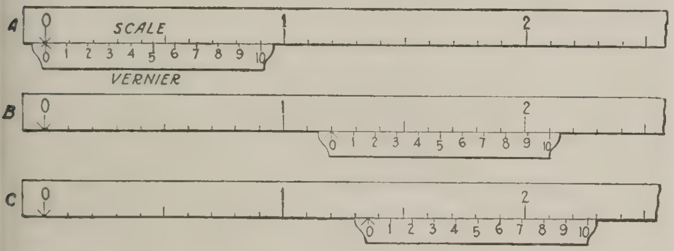


DIAGRAM ILLUSTRATING THE SIMPLE VERNIER AND SHOWING THREE POSITIONS ON THE SCALE

Now, in order to divide these smaller divisions again into ten parts, each of which will measure $^1/_{100}$ part of the scale unit, it is necessary to so graduate the vernier that ten divisions shall be equal to nine divisions of the scale (direct vernier) or to eleven divisions of the scale (retrograde vernier).

The vernier shown in the figure is direct, ten of its divisions corresponding to nine divisions of the scale, as shown at *A*. This makes each division of the vernier measure $\frac{9}{10}$ of a division of the scale. In other words, each vernier division is $\frac{1}{10}$ less than a division of the scale; and this difference measures, therefore, $^1/_{100}$ of the scale unit.

When reading, the position of the index of the vernier is first read on the scale. In the figure, the vernier is shown in three positions; at *A*, the vernier index reads zero; at *B*, the vernier index reads 1.2; at *C*, the vernier index reads something more than 1.3; and the excess must be read from the vernier, by observing the lines of coincidence where a vernier division exactly corresponds to a division of the scale, which is here the sixth division of the vernier. Since each vernier division is less than the scale division by $^1/_{100}$ of the scale unit, it is evident that the vernier index has advanced $^6/_{100}$ of the scale unit beyond the reading 1.3; and the full reading, in this case, is therefore 1.36.

It is important to notice that a direct vernier must be read forward, in the same direction as the scale is read. In a retrograde vernier, the vernier index is at the other end of the vernier, and the vernier is read back from this index or in the reverse direction from the reading of the scale.

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Problem in Surveying

Kindly explain how the horizontal and vertical distances are calculated from the pitch distance, in surveying a breast or heading in an inclined seam. For example, if the heading has a pitch of 45 deg. and the measurement is 200 ft. on the pitch, what is the corresponding horizontal distance and the vertical rise?

ROBERT KRAMER.

Trevorton, Penn.

It is customary when surveying on steep inclines to make all measurements on the pitch or the dip of the seam, as the case may be. In order to reduce pitch or dip measurements to the horizontal and vertical distances, it is usual to employ a table of sines and cosines. For example:

$$Horz.\ distance = pitch\ distance \times cos\ \ pitch\ angle$$
$$Vert.\ distance = pitch\ distance \times sin\ \ pitch\ angle$$

The sine and cosine of 45 deg. are each 0.707, as given by the table of sines and cosines. Therefore, for a distance of 200 ft. measured on the pitch,

$$Horz.\ distance = 200 \times 0.707 = 141.4\ ft.$$
$$Vert.\ distance = 200 \times 0.707 = 141.4\ ft.$$

Since the angle of inclination or the pitch angle, in this case, is 45 deg., the three lines representing, respectively, the pitch, the horizontal and the vertical distances, form a right isosceles triangle, the horizontal distance being equal to the vertical distance, and the pitch distance being the hypotenuse. In this case, therefore, the square of the pitch distance is equal to twice the square of either the horizontal or the vertical distance, according to the rule, in geometry, that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the two sides, which gives, in this case, the two sides being equal,

$$Horz.\ or\ vert. = \frac{pitch}{\sqrt{2}} = \frac{200}{1.414} = 141.4\ ft.$$

Also, since the sine of 30 deg. or the cosine of 60 deg. = 0.5, the vertical distance on a pitch of 30 deg. is always one-half of the pitch distance; and, likewise, the horizontal distance on a pitch of 60 deg. is one-half the pitch distance.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—Calculate the following notes taken from a "level book"; and give the elevation of each station referred to the bench mark, whose elevation is 20:

Sta.	B.S.	I.S.	F.S.	Remarks
B.M.	6.70	....	....	Elevation of bench = 20
1	....	3.40	....	
2	....	4.20	....	
3	....	2.80	....	
4	....	5.70	....	
5	....	1.80	....	
6 T.P.	....	....	2.90	Sta. 6 = turning point
	8.30	....	....	
7	....	7.40	....	
8	....	6.50	....	
9	....	2.80	....	
10	....	8.40		
11	....	3.50		
12	....	2.40	....	
13	....	4.70	....	
14 T.P.	....	....	1.80	Sta. 14 = turning point
	5.40	....	....	
15	....	2.20	....	
16	....	6.80	....	
17	....	4.30	....	
18	....	....	3.82	

Ans.—In leveling, the backsights (B.S.) are all plus (+) sights, and must be added to the elevation of the bench mark (B.M.) or turning point (T.P.) on which the rod is held. The intermediate sights (I.S.) and foresights (F.S.) are all minus (—) sights and must be subtracted from the height of instrument (H.I.) to find the elevation of the station, which gives the following:

Sta.	B.S.	I.S.	F.S.	H.I.	Elevation
B.M.	6.70	....	....	....	20.00
1	....	3.40	....	26.70	23.30
2	....	4.20	....	....	22.50
3	....	2.80	....	....	23.90
4	....	5.70	....	....	21.00
5	....	1.80	....	....	24.90
6 T.P.	....	....	2.90	....	23.80
	8.30	....	....	32.10	....
7	....	7.40	....	....	24.70
8	....	6.50	....	....	25.60
9	....	2.80	....	....	29.30
10	....	8.40	....	....	23.70
11	....	3.50	....	....	28.60
12	....	2.40	....	....	29.70
13	....	4.70	....	....	27.40
14 T.P.	....	....	1.80	....	30.30
	5.40	....	....	35.70	....
15	....	2.20	....	....	33.50
16	....	6.80	....	....	28.90
17	....	4.30	....	....	31.40
18	....	....	3.82	....	31.88
	20.40		8.52		

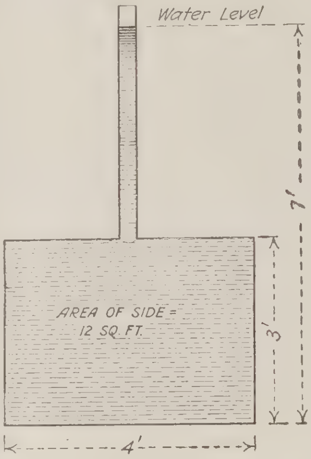
Proof 20.00 + 20.40 — 8.52 = 31.88.

Ques.—Explain how it is that finely pulverized clean coal ash when mixed into a stiff paste to which some common table salt (NaCl) is added makes a very good temporary substitute for fireclay.

Ans.—Ordinary coal ash contains dioxide of silica (SiO_2), sesquioxide of iron (Fe_2O_3), oxide of alumina (Al_2O_3), oxide of calcium (CaO) and magnesium oxide, (MgO). The addition of common salt or sodium chloride (NaCl) and water (H_2O) provides all the constituents of plastic fireclay, except the oxides of sodium and potassium, and the latter is often present either as the monoxide (K_2O) or the unstable peroxide (K_2O_4). There is therefore formed, by the addition of the salt and water, a mechanical compound closely resembling fireclay.

In the case of an ash from which considerable clinker has been sifted, we find also sulphate of lime ($CaSO_4$) and phosphoric acid in some of its forms, all of which deteriorate the value of the clay. Fireclay can thus be made for emergency use, for temporary repairs to fireboxes, etc.

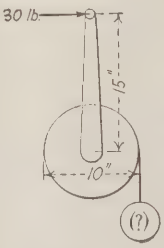
Ques.—Find the total pressure on the vertical side and total pressure on the bottom of the rectangular tank illustrated in the accompanying figure. The size of the tank is 4x4 ft. on the bottom and it is 3 ft. high. Into the top of the tank, which is closed, is inserted a pipe. Water is poured into this pipe and fills the tank, and also the pipe to a depth of 7 ft. above the bottom of the tank.



Ans.—The area of the vertical side of the tank is 3 × 4 = 12 ft. The water pressing on this vertical side has a mean head equal to the depth of the center line of this side below the level of the water in the pipe, or 7 — 3/2 = 5½ ft. The total pressure on the vertical side is, then, 12 × 5.5 × 62.5 = 4125 lb.

The area of the bottom of the tank is 4 × 4 = 16 sq.ft. The head of water pressing on the bottom is 7 ft. The total pressure on the bottom of the tank is, then, 16 × 7 × 62.5 = 7000 lb.

Ques.—What weight will a man be able to lift with a windlass, by exerting a constant force of 30 lb. on the handle? The radius of the handle is 15 in. and the diameter of the windlass barrel 10 in.



Ans.—In this case, the lever arm of the force exerted is three times that of the weight lifted, the former being 15 in. while the latter is one-half the diameter of the drum, or 5 in. Therefore, the weight lifted will be three times the force exerted, or 3 × 30 = 90 lb.

Ques.—A certain volume of air is under a pressure of 15 lb. per sq.in., at a temperature of 36 deg. F. What temperature will be required to increase the pressure of this air to 23 lb. per sq.in., assuming the volume remains unchanged?

Ans.—Assuming that the given pressures are the total pressures above a vacuum and remembering that, for the same volume of air, the absolute temperature varies directly as the absolute pressure exerted on the air and *vice versa,* which makes the absolute-temperature ratio equal to that of the absolute-pressure ratio; and calling the required temperature of the air *t*, we have

$$\frac{460 + t}{460 + 36} = \frac{23}{15}$$

$$t = \frac{23\ (460 + 36)}{15} - 460 = say\ 300°\ F.$$

Coal and Coke News

Harrisburg, Penn.

Three indictments, with a total of 126 counts, charging the Philadelphia & Reading Ry. Co. with violations of the interstate commerce laws relating to the transportation of anthracite and bituminous coal between Philadelphia and New England points were found by the Federal Grand Jury on Jan. 7. No date has as yet been fixed for the trial of the case.

Fifty-one counts in one indictment charge the railway company with failing to file with the Interstate Commerce Commission schedules of its rates and charges for coal transported over the Philadelphia & Reading transportation line of barges and tugs, which it owns, running between the coal fields in Pennsylvania and New England ports.

The indictment covers a period from Oct. 1, 1913, to Apr. 1, 1914, and involves continuous shipment of anthracite from St. Clair and Schuylkill Haven, Penn., to numerous points, including Boston, East Cambridge, Charleston, Brookline, Milton and Salem in Massachusetts and to Portland, Gardiner, Rockland and Bar Harbor, Maine.

There is also a charge against the company that it favored some of its shippers, especially the Philadelphia & Reading Coal & Iron Co., by granting them privileges and facilities in transportation that were not accorded to their competitors.

By its ownership of mines and rail and water lines the component parts of the Reading system have obtained a large control over the supply and output of coal through all of the New England territory. This power of control is largely attributed to the fact that the railway company is not dependent upon the rail routes to New England for service in carrying the coal but through its ownership of the barge line it is enabled to transport anthracite to New England at a cost lower than that imposed upon its competitors.

The railway company has never regarded its barge line to be within the regulations of the Interstate Commerce act, and upon this theory, has never filed with the commission tariffs showing its rates of transportation over the water route.

Should it be decided by the court that the barge line rates and charges must be published in tariffs and filed with the commission, all shippers will be given the privilege of using the barge line under exactly the same conditions as are now enjoyed by the Philadelphia & Reading Coal & Iron Co.

In the second indictment the railroad is charged with granting concessions to favored coal shippers by failing to collect demurrage charges on carloads of coal that have been held in the railway's yards more than 48 hours after the cargo reached Port Richmond. For 48 hours after a shipment reaches the point of destination it is held by the railway without charge to the consignee. For each succeeding day a carload is held in the yards, a demurrage of $1 is to be charged, according to the regulations of the Interstate Commerce Commission.

The indictment cites 50 instances where favored shippers had their cars detained at Woodlane yards, 8 miles from Port Richmond for many days beyond the time limit allowed for discharging the cargo, but the railway company made no claim for demurrage.

The period of these alleged violations is from Mar. 1, 1913, to Apr. 1, 1914, and are connected with bituminous coal shipped from West Virginia to Port Richmond, for transshipment to other points. Among the shippers alleged to have been favored by this method are the Mosco Iron Co.; the Glen Brook Coal Co., and the Hutchinson Coal Co.

Competitors of these companies, it was said, were not allowed these concessions, but were compelled to take their cargoes at their destination in Port Richmond, and if delay occurred necessitating a detention of 48 hours they were compelled to pay the demurrage charges.

The third indictment is substantially of the same character as the preceding one. It charges that between July 1, 1913, and Apr. 1, 1914, the railway company failed to collect demurrage on 25 rail shipments from mines to Port Richmond.

Whitney & Kemmerer, Blair Parke Coal & Coke Co., and the Maryland Coal Co. are cited as being favored also by the railway company in being relieved of demurrage charges.

After finding the indictments, it was stated that the aggregate of fines that could be imposed should the Government prove its charges would be $1,650,000, but it is not likely that the court would go to that extent in inflicting punishment.

It was stated that the questions of law involved in the cases are very interesting, and of importance not only to the railway company, but to the public as well. They concern the shipment of both anthracite and bituminous coal from points along the lines of the Reading railway and its connecting carriers to points along the coast of New England.

PENNSYLVANIA

Anthracite

Nanticoke—The distinction of having the greatest output of coal of any breaker in the anthracite region for the year 1914, is held by the Truesdale colliery of the D. L. & W. R.R. Co. The Prospect colliery of the Lehigh Valley Coal Co. ranks second in the list in coal production and is closely followed by the Woodward colliery of the Lackawanna company. The figures for the production in 1914 are as follows: Truesdale, 1,152,201; Prospect, 1,097,973; Woodward, 1,053,461. A feature in regard to the success of the Truesdale colliery is that it is the second colliery in the anthracite region to be electrically operated.

Scranton—Arrangements have been completed by the Delaware, Lackawanna & Western Coal Co. to give moving picture shows to all the employees, depicting safety means and methods and showing the right and wrong way of doing work in the mines. The company thinks by this method all the employees can be sufficiently schooled and educated as to the right way to prevent accidents and also how to act in case of accidents. Prizes amounting to over $100 will be given by officials of the company to employees at any of its collieries who submit the best suggestions for the promulgation of the safety movement. These suggestions must be written and handed in before Mar. 1, and each contestant is limited to 1000 words.

Avoca—That the property and employees of the Pennsylvania Coal Co., at its No. 6 colliery, are well protected from fire, was shown on Jan. 9, when a fire drill was held at 10:09 a.m. Forty-eight seconds after the sounding of the five short calls of the Erie system, several different plugs were opened, the hose stretched and ready for service and the entire 187 men and boys of the breaker were out in the open. This is the fastest time yet made. This is the same set of fire fighters which last year made the record of 53 seconds to prepare for action and this time was never equaled until they lowered it themselves. The test was an unexpected one, it never being thought that with the frigid weather a call would be made.

Hazleton—Cold weather found most of the springs and bore holes dry with no possibility of reopening until the frost leaves the ground in the spring. Mines are hampered for lack of water to run their boilers and pumps and devices to melt snow and ice are being installed at many collieries. With business brisk at the mines, suspension because of drought would mean heavy losses.

Silver Brook mine covering an area of 7½ square miles and containing several beds of coal, aggregating 22 ft. in thickness, which have never been touched, may be opened by the Lehigh Valley Coal Co. The property which was leased to the J. F. Wentz Coal Co., of Philadelphia, was abandoned and filled with water in 1906. It is stated that the coal deposits have been merely scratched and the resumption of operation will mean the employment of 1500 men.

Harrisburg—It is stated that the action in equity involving construction of the term "miner" in the Mine Foreman's Certificate Act, is to be appealed to the Supreme Court. Judge McCarrell, of the Dauphin County Court, declined to enjoin Chief of Mines James E. Roderick from issuing certificates to men who have not served five years as actual diggers of coal, holding that the Legislature did not make that a requirement.

Wilkes-Barre—When a half dozen employees at the Henry colliery of the Lehigh Valley Coal Co. at Plains were unable to show their union buttons recently, 700 men and boys, members of the United Mine Workers of America, declared a strike, and operations at the colliery came to a standstill.

Bituminous

Uniontown—Henry Ainsley was instantly killed and Harry Capitol was severely injured, Jan. 8, when the insulation on a 550-volt wire in the Evans No. 3 mine wore off and charged an electric coal cutter. When the men started the machine, Ainsley was thrown to the floor of the mine and came in contact with the rail which had been also charged. Capitol was burned on hands and arms.

Washington—Following the settlement of the action brought by the employees against John M. Greek, president of the Greek Coal Co., operating near Washington, for failure to pay his employees their wages, it was recently announced that the mine would reopen, giving employment to about 75 men.

Connellsville—It is expected that the coke industry will shortly reflect the pronounced improvement which has already taken place in the steel trade. Connellsville coke is now showing but little change over former figures, being approximately on a basis of 200,000 tons weekly, production and shipments being about equal.

Charleroi—Announcement was recently made that the Eclipse and Alice mines of the Pittsburgh Coal Co. would be started in full shortly, giving employment to 500 to 600 men each. Various factories and mills, as well as other industrial works, some of which have been shut down for months, are resuming operations.

Fredericktown—There does not seem much chance of Vesta No. 5 mine resuming operations for some time. This mine is one of the largest along the Monongahela River and is operated by the Jones & Laughlin Co. Commissaries have been opened to relieve the suffering of the poorer families. This mine when in operation employs between 1000 and 1200 men.

Monongahela City—The local Pittsburgh Coal Co. officials have received notices that mine foremen, firebosses and other minor officers shall at once sever their connections with the so-colled "booze clubs" or resign their positions.

Martin—The Martin mine of the Republic Iron & Steel Co., which has been on fire since Nov. 4, 1914, has as yet not been drowned out, though the pumps have been almost continuously in operation.

WEST VIRGINIA

Bluefield—Many Italians are making their way to Norfolk and other seaport towns, from whence they will sail to the Old Country or go to some other part of this, where they can secure employment. It is understood that some of the coal companies in the nearby fields, are unable to give all their men work, and this is probably the reason that so many are leaving this region.

Fayetteville—One of the largest mortgages ever placed on record in this county, was filed recently. It is from the Sunday Creek Co. to the U. S. Mortgage & Trust Co. and consists of 160 pages. It is issued for the purpose of refunding indebtedness represented by unpaid bonds, amounting to $3,838,000, issued in April 1910. Interest unpaid on these bonds amounts to $95,950 and the amount of the new bonds issued is $3,934,000. The bonds are to run 34 years at 4% interest. Coal lands and property in Ohio and West Virginia are covered by this issue.

Charleston—Advance pages of the biennial report of Earl A. Henry, chief of the Department of Mines, show that the production of coal in West Virginia, for the fiscal year ending June 30 last was the greatest in the history of the state. From 1005 mines in 33 counties there were produced during the year 65,783,088 tons of coal, as compared with 61,770,352 tons for the previous year. McDowell County led in production, although the output there showed a decrease from preceding years.

Huntington—The Lorain Dock & Coal Co., which has heretofore been one of the largest operators in the eastern Ohio field, announces the purchase of 14,000 acres of coal land in Logan County, which it intends to begin work upon at once. Reports vary as to the company's plans with reference to its eastern Ohio properties, J. W. Johnson, general manager, being quoted as saying that the company will not permit them to remain idle any longer than necessary by reason of the labor trouble, while it has several times been declared that the company will remove all equipment possible to its new West Virginia properties. In connection with the latter report, it is stated that the company will lease its Wheeling Creek and Lansing mines to the Youghiogheny & Ohio Coal Co., which owns adjoining properties, and which will operate the mines named from its own openings.

VIRGINIA

Bristol—With apparent prospects for a revival in the industrial world, there are evidences of renewed activity in the Virginia and Kentucky coalfields. In eastern Kentucky, the mining plants of the Consolidation Coal Co. and the Elkhorn Mining Corporation working in the field contiguous to the Virginia line are resuming operations, and it is expected that all the mines in that region will be in full operation within the next month or thereabouts. Hundreds of men have been added to the mining forces, and the number will be largely increased. It is said that already the railroads are realizing a large increase in the coal tonnage.

TENNESSEE

Jellico—The East Tennessee Coal Co., which a few months ago started a coal development at Lothair, in Perry County, Ky., announces that it will begin shipping coal Jan. 20. This new plant is one of the largest in the Perry County field. A connection with the Louisville & Nashville main line has just been completed, and put in operation. Several hundred men are being given employment.

Knoxville—The annual meeting of the Southern Appalachian Coal Operators' Association will probably be held on Feb. 2, according to announcement made here. At this meeting the election of officers will be the principal matter of business. Knoxville operators report that mines in this part of the state are under way again and that the recent cold weather greatly reduced the retail stocks on hand in this section. Business conditions are improving and the general tone of the market, it is said, is much better than it was 30 days ago.

KENTUCKY

Williamsburg—The Watts Creek Coal Co., operating mines at Woffard, Ky., north of here, has been sold to W. L. Moore, a local capitalist, for $4205. Mr. Moore will reorganize the company, which has been in the receiver's hands for some time and which was sold by the country commissioner, and expects to begin operating on the first of February.

Greenville—Charging that he was the victim of an unprovoked attack by employees of the Bevier Coal Co., and that he suffered 50 gunshot wounds in the side and back, Will Vance, himself under indictment for alleged participation in a "possum hunter" raid, has sued the coal company and a number of its employees for $5000 as damages. One of the defendants is J. P. Cox, who, as leader of a group of the company's employees, returned the fire of the raiders who attacked the company's store in which they were barricaded.

Frankfort—Some hope is expressed by interests which favored the Kentucky Workmen's Compensation law, that the Court of Appeals may reconsider its finding in that case. This hope is based only on the grant by the court of an additional 20 days in which the attorney general of the state may file his petition for a rehearing or modification of the court's opinion in the case. Three members of the court, one of them now chief justice, held in a dissenting opinion that the law was constitutional although the majority of the court ruled otherwise.

Harlan—The Haggin interests of Lexington and New York have bought a one-fourth interest in the Asher Coal Mining Co. of this section. The company's capital stock is $2,000,000 and the Haggin interests are reported to have paid $500,000 for their share. Judge T. J. Asher retains the remaining three-fourths. The company controls all the Asher land in Harlan and Bell counties, several thousand acres.

OHIO

Cleveland—Eastern Ohio coal operators, at a meeting recently held here, decided to open their mines under the open shop plan. Striking miners who have been idle since Apr. 1 last will have first opportunity under the scale offered by the operators. Notices that the mines in Belmont, Jefferson and Harrison counties will resume on a date to be selected later will be posted at virtually all of the operations in the eastern Ohio field. Should the strikers refuse the rate offered, they will be served with notices to vacate the coal companies' houses, failing in which eviction proceedings will be started.

Martins Ferry—Upon the settlement of the coal strike in eastern Ohio depends the opening of a mine in Jefferson county, which has been closed down for the past 7 years. This is the Royal Coal Co.'s mine located at Tarrs Run. It is stated that should the strike be settled, this mine would reopen immediately, giving employment to at least 400 men.

Carbon Hill—A new mine will be opened in the vicinity of Carbon Hill, Ohio, by interests from Nelsonville. It is planned to give employment to 50 men. Willis Ross and George Ridenhour are in charge of the project.

Marietta—A vein of coal has been opened on the William Covey farm located near the county infirmary of Washington County. The vein is 3½ ft. thick of good quality.

Columbus—The United States Supreme Court rendered a decision recently upholding the constitutionality of the Ohio workmen's compensation law. This measure was enacted several years ago and had been fought by certain interests. The decision upholds the right to classify employees with the provision that the operation of the law is to be limited to employers working more than five persons.

ILLINOIS

Marion—The axle or shaft on the top of the tipple, of the Big Muddy Fuel Co.'s mine, near here, recently broke squarely in two while the cages were midway between the bottom and the surface. Fortunately, no miners were in them, and when they went to the bottom no one was injured. The cables, in going down, tore away part of the upper portion of the tipple, necessitating a suspension of several days.

Danville—What is considered as remarkable among medical men is the case of Frank Partari, a coal miner, who suffered a broken back in a mine accident at the Carrier Mills, Saline County, more than a year ago, and who died on Jan. 2, at St. Elizabeth's Hospital here. He suffered absolutely no pain until the final week. This case attracted considerable attention in the medical world.

Harrisburg—Officials of the State Mine Rescue Commission have perfected plans for a rescue station here. This follows closely on the establishment of a relief or substation at Herrin.

Chicago—The Illinois Coal Operators' Association recently appointed a committee to consider methods of standardizing the sizes of bituminous coal to be mined and sold in the state. At the present time there are five sizes in common use. Operators in Indiana, Ohio, Pennsylvania, West Virginia and Kentucky have advocated the adoption of standard sizes for coal.

Willisville—The Willisville coal mines south of Sparta have reopened. These mines employ about 300 men and shut-down several weeks ago, when a race riot broke out and two Americans and two Italians were killed. In the reopening, both Americans and Italians got their old jobs back.

ARKANSAS

Russellville—Under a decree of the Chancery Court the property and lease of the Arkansas Anthracite Coal Mining Co. have been sold to satisfy a judgment for $16,500, rendered against the operators in favor of W. F. McBride, a miner who was injured while digging coal in the mines in March, 1913. The property was sold to the plaintiff who transferred his lease to the Southern Anthracite Coal Mining Co. which will operate the property for the remaining four years of the lease.

TEXAS

Albany—Announcement has been made of the discovery of a bed of coal 5 ft. thick on the ranch of S. Webb. 6 miles northeast of Albany. An oil well was being sunk on this land and at a depth of 675 ft. coal was encountered. Investigation showed the measure to be 5 ft. in thickness. Previous attempts to locate coal have resulted only in finding strata not more than 20 in. in thickness.

COLORADO

Denver—Fearing an attack by union miners on the jail at Walsenburg, Sheriff Farr, on Jan. 9, sent an urgent call for aid to Governor Ammons and a company of 70 militiamen in command at Captain Hill were placed on guard around the jail. There were about 15 strikers in jail charged with murder, conspiracy, and other crimes as the result of mine battles last spring. It has been predicted for some time that as soon as the Federal troops left the state trouble would start. The last of the regulars departed recently.

FOREIGN NEWS

Fernie, B. C.—One man was killed and two others severely injured as the result of a recent explosion occurring in the Coal Creek mine just before the men went down in the morning. Government Inspector of Mines Evans, who went below immediately after the explosion, was overcome by gas, as were his companions, Superintendent Caulfield, and Robert Adamson. Caulfield and Adamson were revived by the use of oxygen apparatus, but Inspector Evans failed to respond to this treatment and died in the afternoon. Two men who were near the entrance of the mine when the explosion occurred were badly injured, but aside from these no one was hurt.

PERSONALS

E. B. Lewis has been made traveling sales agent of the Philadelphia & Reading Coal & Iron Co., at Toledo. He formerly represented the company at South Bend, Indiana.

J. M. Roan, chief mine inspector of Ohio, is recovering from a severe illness, in Mt. Carmel Hospital, Columbus. Recently he returned from a trip in eastern Ohio and was threatened with diphtheria.

H. G. Davis, general superintendent of district No. 4, of the Delaware, Lackawanna & Western Coal Co., including all that territory in Wyoming Valley south of Kingston, on Jan. 6, tendered his annual banquet to all mine foremen of his district, and the event proved even a happier one than any heretofore given.

P. A. Coen has resigned his position as Northern sales agent for the Rail & River Coal Co., with offices in Toledo, to accept a position as general sales manager for the Sunday Creek Co., Columbus. Mr. Coen has already gone to Columbus to assume his new duties. He is widely acquainted with the coal business both in the mining and marketing departments. He has held many prominent positions throughout the country and was in charge of the Pittsburgh Coal Co.'s exhibit at the Louisiana Purchase Exposition in St. Louis.

PUBLICATIONS RECEIVED

Department of Public Works of the Province of Alberta, Annual Report for 1913. Two hundred and fifty-five pages, 6x9 in.; unillustrated.

Illinois Coal Mining Investigations, Bulletin No. 8; "Coal Mining Practice in District Six," by S. O. Andros; 49 pages, 6x9 in., illustrated.

Illinois State Geological Survey, Bulletin No. 28; "Oil and Gas in Bond, Macoupin and Montgomery Counties, Illinois"; by Raymond S. Blatchley; 51 pages, 7x10 in., illustrated.

The Oregon Bureau of Mines and Geology, "Petrology and Mineral Resources of Jackson and Josephine Counties," by A. N. Winchell. Two hundred and sixty-five pages, 6x9 in.; illustrated.

The University of Illinois, Engineering Experiment Station, Bulletin No. 76—"The Analysis of Coal with Phenol as a Solvent," by S. W. Parr and H. F. Hadley; 41 pages, 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey; "The Production of Natural Gas in 1913," prepared under the supervision of David T. Day, by B. Hill; 96 pages, 6x9 in., with many tables.

Department of the Interior, U. S. Geological Survey; "The Production of Petroleum in 1913," by David T. Day; 355 pages, 6x9 in., with numerous tables and an insert showing the petroleum production of various countries.

Department of the Interior, U. S. Geological Survey; "The 35th Annual Report of the Director of the U. S. Geological Survey to the Secretary of the Interior for the Fiscal Year, Ending June 30, 1914"; 163 pages, 6x9 in., with numerous tables.

Department of the Interior, Bureau of Mines, Bulletin No. 85; "Analysis of Mine and Car Samples of Coal Collected in the Fiscal Years 1911 to 1913," by Arno B. Fieldner, Howard I. Smith, Albert H. Fay, and Samuel Sanford; 444 pages, 6x9 in., with many tables.

TRADE CATALOGS

The Armstrong Cork & Insulation Co., Pittsburgh, Penn. "Nonpareil Insulating Brick for Boiler Settings." Fifteen pages, 3½x6 in., illustrated.

The Hitchcock Manufacturing Co., Pittsburgh, Penn. "Turnouts, Switches and Frogs." Fifteen pages, 6x9 in., with many illustrations, tables and other information.

CONSTRUCTION NEWS

Typo, Ky.—W. R. and C. P. Pense, of Philadelphia, Penn., have leased a coal boundary on First Creek and plan to begin development work immediately. It is said that an electrically equipped plant will be installed and that a daily output of 100 tons is planned for the beginning.

Floodwood, Ohio—Howard D. Manington, in charge of the construction of the power plant at Floodwood, Ohio, says the construction work has been delayed because of inability to secure materials promptly. The first turbine will be installed in January and it is expected that it will be making current by Feb. 1. Contracts have been made to supply the current to many mines in that section as well as to cities and towns. Athens, Nelsonville, Glouster, Albany, Buchtel and Murray City will be supplied with current.

Norton, Va.—The contract for the construction of the first post office building to contain provisions for a mine rescue station has just been awarded, and the structure will be erected immediately at Jellico, Tenn., in the mining region of that state. Another such post office building is under consideration for Norton. Norton is in the same general mining district, and not far from Jellico, but on the opposite side of the mountain range. It is the plan to equip both stations with mine rescue apparatus similar to that of numerous other stations already established in the mining regions,, From these points as headquarters relief can be sent quickly to the scenes of accident.

NEW INCORPORATIONS

Philippi, W. Va.—A. T. Thompson has incorporated with a capital stock of $100,000 to develop coal mines.

Cambridge, Ohio—The Coal Run Coal Co., of Cambridge, Ohio, has filed amended articles of incorporation increasing its capitalization from $5000 to $60,000.

Cincinnati, Ohio—Papers have been filed with the secretary of state increasing the authorized capital of the Reliance Coal & Coke Co., from $100,000 to $150,000.

Booneville, Ind.—The Boone Coal Co. has been organized with a capital of $15,000 to mine and sell coal. The directors are L. T. Shaw, C. E. Doane, William T. Shaw and others.

Charleston, W. Va.—Notice of an increase in capitalization from $500,000 to $1,000,000 was recently filed with the Secretary of State by the Main Island Creek Coal Co., of Logan County.

Wilburton, Okla.—The Wilburton Coal & Mining Co., of Wilburton, has been organized with a capital stock of $1000. The incorporators are James T. Katigan, Annie Katigan, of Wilburton, and John Campbell, of Ritchie, Mo.

Charleston, W. Va.—The Imperial Coal Sales Co., of Burnwell, in Kanawha County, was recently granted incorporation papers. This company is capitalized at $5000, and the incorporators are Quinn Morton, of Brunwell, W. S. Wood, Geo. S. Couch, Jr., S. B. Richmond and Charles Rumbaugh, all of Charleston.

INDUSTRIAL NEWS

Dayton, Tenn.—It is believed that the present mine inspectors, of Tennessee will not go out of office before the first of June unless the fever of "turn the rascals out" gets extremely high. It is not thought probable that this will be the case.

Wellsville, N. Y.—The New York office of the Kerr Turbine Co. will henceforward be in charge of Benjamin G. Fernald, recently appointed district manager. The office will remain in the Singer Bldg., but will be removed to Room 108 in the annex, or No. 45 Liberty St.

Pittsburgh, Penn.—From all parts of Pennsylvania come encouraging reports of renewed industrial activity, of men returning to work, and renewed confidence on the part of capital. This is to be noted especially in the steel and coal industries, two vital branches in the state's business.

Boston, Mass.—All the floating equipment of the Consolidation Coal Co. has been taken over by the Consolidation Coastwise Co. of Massachusetts. It was decided some time ago to divorce this department from the coal company, and the new concern was formed with the parent concern the principal stockholder.

Huntington, W. Va.—Figures recently given out by the Chesapeake & Ohio R.R. show that the coal and coke loadings in West Virginia and Kentucky coal fields increased 188.2% in the last ten years. Loadings for 1914 were 22,431,445 tons or an increase of 16.9% over the previous season. It is believed that 1915 loadings will exceed these figures.

Pittsburgh, Penn.—Reports are current that negotiations have been practically completed between J. V. Thompson, of Uniontown, and interests believed to represent the United States Steel Corporation, for the sale of the major portion of 200,000 acres of coal land in Greene County, Penn. It is variously estimated that the transaction involves from 18 to 34 million dollars.

Pittsburgh, Penn.—Ten towboats were started south with coal on the Ohio River Jan. 10, the total shipment aggregating about 2,000,000 bu., or in round numbers 80,000 tons. This shipment about cleaned up the anchorages of coal in the local harbor, much of which had been tied up since the middle of last summer. Some of the towboats will turn back after getting below Wheeling.

Pittsburgh, Penn.—The total shipments of coal for 1914 from the Monongahela River mines passing through Lock No. 4 were 170,278,500 bu., or a decrease of 39,998,500 bu. from the total shipments for 1913. This decrease in shipments during the past year is attributed to low water preventing the return of boats from Southern ports in sufficient quantities to keep the mines in operation.

Morgantown, W. Va.—It has been announced by J. B. Hanford, of the Elkins Coal & Coke Co., that his firm has just closed a contract of 20 years' duration to furnish the Lehigh Coal Co., of South Bethlehem, Penn., 600,000 tons of coal annually. This contract is one of the largest ever handled by the company, and means that all the mines in this section will run on full time for years to come.

Boston, Mass.—The Darrow - Mann Co., an old house here and latterly the local factor for the Caperton interests in the New River field, has been absorbed by the New England Coal & Coke Co. The larger company will be sales agent for the same coals handled by the Darrow-Mann Co., and will also operate the sea-going tugs and the larger barges that have belonged to the Commercial Tow Boat Co., a concern that was closely allied with the Darrow-Mann Co.

Columbus, Ohio—No bids were received by receiver Charles Cohenour, of the Maple-Gallia Coal Co. when the property of the defunct firm was offered for sale at the Court House, Columbus, Jan. 9. The property, which consists of two mines in Athens and Vinton counties, was appraised at more than $36,000. The capacity is about 800 tons daily. Negotiations are now pending to sell the property at private sale and the court will be asked for instructions.

Columbus, Ohio—Of interest to the coal interests of Ohio is the announcement that all of the operating offices of the Toledo & Ohio Central, the Kanawha & Michigan and the Zanesville & Western railroads will be consolidated in Columbus. Frederick B. Sheldon, former president of the Kanawha & Michigan, has been made vice-president of the Toledo & Ohio Central and the Zanesville & Western, which are subsidiary lines to the New York Central system. The general and operating offices of the companies have in the past been located in Toledo but the lease on the offices expires in May.

Philadelphia, Penn.—The official decision of the Public Service Commission ordering a reduction of anthracite freight rates from the Pennsylvania regions to this city gives the companies until Jan. 18, or six days longer than was originally expected, in which to apply for a rehearing before the commission or make a direct appeal to the Dauphin County Court. The original tentative announcement made in the anthracite rate case bore the date of Dec. 12, 1914, and therefore it was believed to take effect Jan. 12. Copies of the final decision, however, which have been sent out by the commission within the last few days bear the date of Dec. 18.

Somerset, Penn.—According to Baltimore & Ohio railroad men there is no longer any reason to doubt that there is a genuine boom in the coal business. Many of the mines in Somerset County, which have not been operating above nominal repair work for months, are now on full time and considering the advisability of putting on extra shifts to keep up with their orders. The Somerset transfer yards for the past week have been jammed with loaded coal cars going out and with empties coming in. The coal is going east to Tidewater, west to the Mississippi and north to Canada. Some of the orders are said to be for European fleets.

Coal Trade Reviews

General Review

Anthracite under heavy pressure with operations rigidly curtailed. Bituminous steady and showing occasional gains. Stocks reduced by the holiday curtailment. Urgent business in the Middle West.

Anthracite mining has slowed up appreciably under the influence of the milder weather, and the trade is distinctly flat, with a marked tendency toward heaviness. Most of the large companies are cutting down running schedules, and those continuing on a full-time basis are only doing so in order to accumulate a surplus against some possibly severe weather and a consequent slow movement. The market is entirely lacking the customary midwinter snap.

The Eastern bituminous agencies report a very slight improvement, which is due to a restriction in operations rather than any increased demand. The surplus tonnages at Tidewater seem to be substantially reduced as a result of the curtailed output over the holiday period, and there is no pressure to move demurrage coal. Even though this change for the better be scarcely perceptible, sales agencies are showing a greater confidence in preliminary negotiations on new contracts, while spot prices are slightly firmer. It is highly probably that the abnormal vessel rates will cause such an irregular movement in the Coastwise trade that the market may be subject to more or less violent fluctuations.

The marked improvement noted in the Middle Western field for the past several weeks has reached to the Pittsburgh district, where the industrial demand is decidedly better, though still substantially below normal. There has been considerable coal taken off the spot market, while operations are slightly heavier and show indications of a sharp increase. While nothing in the nature of a boom is anticipated, it is thought in all quarters that there will be a gradual and strong improvement along conservative lines from now on.

The improvement in Ohio is confined more particularly to railroad buying, and has not attained to large proportions. In domestic circles the approach of spring is already becoming a feature in the situation, and dealers are showing a tendency to be more conservative regarding their purchases in order to avoid the possibility of carrying over any large surpluses. What few contracts have come up have been closed at last year's figures. The Southern market is obviously overstocked and has failed utterly to respond to the improved conditions noted in other directions. Domestic consumers are not buying to the extent anticipated, and dealers are restricting their orders to the minimum.

With the exception of occasional spots where the effects of the warmer weather are being felt, the Middle Western market continues to broaden out in a most satisfactory manner. Numerous orders have been placed for rush shipments, while certain sizes have shown an unexpected strength, and price advances have met with no resistance, but apparently created a heavier buying movement. The railroads seem to be coming into the market stronger, and spot prices are in some instances higher than contract quotations for the first time in a long period.

ATLANTIC SEABOARD

BOSTON

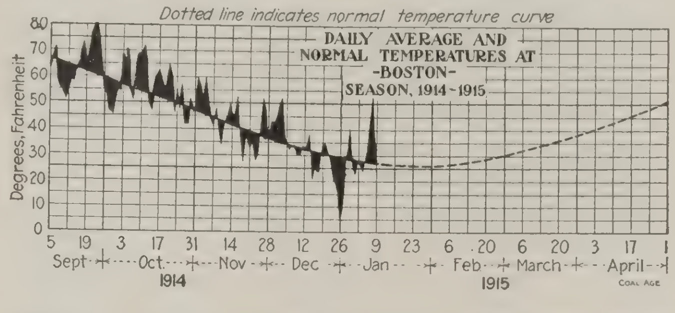
Improvement continues but very slowly. The mild spell slows up the buying and prices on Pocahontas and New River are practically without change. Receipts here still light on account of slow movement of transportation.

Bituminous—While there is undoubtedly an improvement in the situation on Hampton Roads coals, the progress is very slow. It is the restriction of output, however, and not an enarged market that causes the improvement. The expected renewal of inquiry off-shore has not at yet developed into any proportions and it is still a hand-to-mouth market in New England. Contract demand is generally better because of recent interruptions to shipping. Preliminary talk on contracts he coming season shows more confidence on the part of the ales agencies than a month ago; current views of the probable state of prices are a notch higher than was the case then.

The spot market, on the other hand, is very little firmer than in November and December; $2.70 is about the upset price for the favorably known grades f.o.b. the Virginia terminals, the price at which the Panama Railroad contract was awarded. This is a season when sales of cargo lots are very infrequent in this territory but all the shippers are pressing for orders and the feeling is general that prices would be made to suit the buyer who happened to be in the market. The number of such, however, is very small.

The surplus of coal at all the distributing points is rather less than has lately been the rule. "Market cargoes" are less frequent and prices more even; $3.68 is still the minimum price f.o.b. Boston but with trade rather slow.

Georges Creek demand is still constant, the shippers being well supplied with business. In order to get forward coal in sufficient volume a number of sailing vessels and outside barges were chartered to make up for light receipts due to bad weather along the coast a fortnight ago.



The choicer Pennsylvania coals enjoy a fair business on the basis of restricted output but the ordinary grades are rather druggy. There seems nothing better in sight until Hampton Roads shippers get higher prices.

Anthracite—Orders are beginning to come in freely now to most of the wholesalers. Retail trade is good in all directions. All sizes are in good supply and the only delay in loading has been due to weather interruption in the movement of boats.

Prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.00	2.70@3.20	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.60@2.75
Boston†	....	....	....	3.68@3.78
Providence†	....	....	....	3.63@3.73

* F.o.b. †On cars.

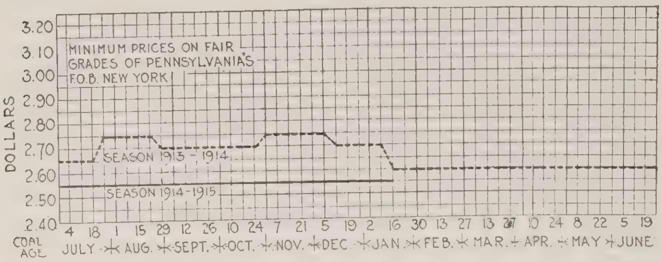
NEW YORK

Bituminous still marking time though stocks are somewhat reduced as a result of the curtailed operations over the holidays. Heavy reduction in working schedules the feature of the anthracite trade.

Bituminous—As a result of the curtailed operations in the bituminous fields over the holidays, stocks are somewhat lighter and the operators continue cheerful over the outlook. Some operators report the December tonnage as the best they have had for a long time, one large company in particular claiming it to be their heaviest month since March. Current operations also seem to be slightly increased. Occasional odd tonnages are still heard of on demurrage, but there is no general pressure on consignment coal.

The continued advance in vessel rates is creating much interest in the trade. If the situation becomes much tighter in this respect, the difficulty in obtaining vessel tonnage will make the movement irregular and must inevitably result in a fluctuating market. There is nothing much of interest developed so far, on new contracts, but the outlook is not at present regarded as favorable. At no time since last April has the spot market been at a higher level than contract figures, and it is clear that buyers will be conservative about new contracts. Any advances are, of course, not being considered, but, on the other hand, the agencies will make a determined fight for the same prices as last year, though concessions will no doubt be necessary.

The New York market is quotable on the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.



Anthracite—The return of more moderate temperatures has caused a slowing up in the hard-coal trade. At this time the market is more or less controlled by weather conditions, and prices fluctuate accordingly. The situation was so slow last week, that the Reading Co. reduced operations to only three days, other companies curtailing likewise, though not to such an extent. A few of the companies are producing in excess of the market requirements in anticipation of a heavier demand and slower movement should the weather become severe as is liable to be the case at this time.

The steam sizes are in fairly good demand, especially the higher grades, while pea coal is rather short. Chestnut is in good demand, with shipments slow in the line trade, but prompt at Tidewater where the companies are drawing on their storage supplies. There is not much individual nut coal in evidence. Stove coal is bringing the full circular, and the demand and supply are about equally balanced.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.25@5.35	5.30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite trade continues to lack tone. Curtailed operations still effective. All sizes in easy supply. No immediate improvement noted in bituminous, although prospects look better.

Anthracite—The unseasonable weather of the past week has proved a further drawback to the anthracite trade. It was confidently expected that the beginning of the new year would see good business, but the weather has been against this, and partial operations at the mines have been the rule rather than the exception. Judicious distribution of the output has been necessary in order not to crowd any one point with a surplus and even with this, it is understood that considerable coal is nearly on demurrage at Tidewater. All sizes are in good supply. The market is still slow on broken, and it is understood the reduction of this to smaller sizes has been necessary, in order to provide a disposal for it. Egg is also long. There appears to be a slightly better call for pea and buckwheat; in fact, it is understood that stocks are being drawn on for the latter. The requisitions for rice are about equal to the output.

The trade as a whole requires the stimulus of cold weather, and without this, is likely to drag.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75
Stove	5.00	5.00
Chestnut	5.25	5.00@5.10

BALTIMORE

Anthracite demand quite brisk, and dealers experience a general activity. Slow betterment evident in the bituminous trade. Export movement only medium, and subject to delays.

The December consumption of anthracite was quite heavy, and January is seeing a vigorous call from many quarters. The small trade is particularly bright. In the soft-coal trade there is a slow betterment, but the general business world remains cautious. The producers now have their mines generally down to a much reduced basis, and the return to full capacity operations will only be done when business of a favorable nature develops.

Spot business generally is about fair. Some of the better Pennsylvania coals showed up a little stronger the past week, sales to the trade at the mines being made around $1.35. Lower grades ranged from 95c. to $1.10 or $1.15. In West Virginia the demand remains poor for gas three-quarter with the price around 90c. The export movement continues about medium. A few charters are being announced, principally to Cuban ports. The fact that the allied navies continue to stop many vessels at sea has caused several delays in the reporting of steamers destined for the foreign coal trade.

HAMPTON ROADS

Movement for week fair. Government taking coal by colliers and barge schooners going into the export trade.

The movement from Tidewater for the week was about the average. Some large cargoes have moved to New England and there has been some coal taken by the government. The export and bunker movements have not been so heavy as at times during last month; however, the dumpings for the first ten days of the month they will run considerably in excess of those for the same time during December.

Prices remain at circular with a poor demand for spot coal. The accumulation at Tidewater is somewhat lower than it has been for some weeks, although there is ample on hand to take care of any call that may be made.

A number of the coastwise steamers which have been trading from Hampton Roads are now in the foreign trade and barges and sailing vessels are taking their places in the coastwise business. Schooners are also being pressed into the export coal trade, two of them having been loaded during the week, one for Porto Rico and another for Rio de Janeiro.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Edward H. Cole		Norfolk	Rio Janeiro	1395	$5.25
Kenwood		Baltimore	Cienfuegos	797	
Blackheath	British	Baltimore	Alexandria	2978	7.40
Ubbergen	Dutch	Baltimore	Preston and Banes	1150	
Thomas F. Pollard		Baltimore	Texas City	617	1.15
Hugh Kelly		Baltimore	Texas City	698	
Josephine		Baltimore	Galveston	842	
Angiolina	Italian	Baltimore	Italy	2262	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN FREIGHTS

Rates continue at previous high levels and there are no indications of any immediate relief.

A steamer was chartered during the past week for case oil, from here to Brazil, at equivalent to $9.60 on coal, and steamers are now offering for coal, from north of Hatteras to Buenos Aires or Rio at $9, and intimating that they will accept less. A large steamer was recently chartered for coals to Alexandria at $10.80 and steamers are offered at $9.60 to the West Coast of Italy. Freight market conditions are practically the same as a week ago. We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana*	$2.00	Guantanamo	$2.50@2.7
Cardenas or Sagua*	2.50	Demerara*	4.50
Cienfuegos*	2.50	Bermuda	2.40@2.5
Port of Spain, Trinidad	2.75@3.00	Vera Cruz*	2.50
St. Lucia	2.50@3.00	Tampico*	2.50
St. Thomas*	2.50	Rio*	8.40
Barbados	2.75@3.00	Montevideo, Buenos Aires or La Plata*	7.20@8.4
Kingston*†	2.50	Mediterranean	9.60
Curacao	2.25@2.50		
Santiago	2.50@2.75		

*About. †Small boats to Kingston $2.50@2.75. W. W. Battie & Co.'s Coa Trade Freight Report.

BUFFALO

Slow improvement in bituminous, but trade is very hopeful Manufacturers increasing operations. Anthracite continue rather dull.

Bituminous—There is a slow but steady improvement al along the line, which is expected to continue, but is not likel to develop into a boom. Shippers say that they get a goo day or two occasionally, which is the usual way that an in creasing trade manifests itself. At this rate prices will advance slowly, but there is some profit now and the increase volume will help materially.

The feeling in railroad circles is good and there is mor buying from that source than for a long time. As a rul railroad men state that they are expecting a good year, an if they do it will help the coal business.

The coal movement is steady. Nobody complains of de murrage charges and the snow and severe weather have n in any way interrupted deliveries. If there is no new di turbance in the situation there will be a good volume of bus ness doing in a month or two. The market is a little strong week by week, on the former basis of $2.80 for best Pittsburg lump, $2.70 for three-quarter, $2.55 for mine-run and $2. for slack. Allegheny Valley sizes are 25c. lower than Pitt burgh, with slack on a par with it.

Anthracite—The market is good at retail but shippers do not find it as active as formerly, though it is reported that sales from the Upper-Lake docks are good. The influence of the heavy summer sales is still felt and this may last all winter. The weather is not as cold as formerly, but the consumption to date has been decidedly greater than in any former winter for a long time. The disappearance of most of the snow has left the streets an almost solid sheet of ice, making it almost impossible to deliver anything with horses, but the automobile truck moves as readily as usual.

Loading cargoes for winter storage in the harbor has ceased for the time. There are ten large cargoes in the winter list, but the supply of coal to be handled in that way is short. It is likely that the trestles will again become active before spring, as it is desirable to put a good amount afloat in order to begin the shipping season as usual with a strong movement.

OHIO VALLEY

PITTSBURGH

Some new demand and increased requirements against contracts. Mines working at over 50% of capacity. Prices less irregular.

The demand for coal has continued to improve. For domestic purposes there is somewhat better call, while for industrial uses the demand is very decidedly improved, though it is still far below the average or normal. The increased industrial requirements do not reflect directly in the market for the reason that they apply almost wholly to shipments under regular contracts, but by giving the mining companies better shipments they decrease somewhat the insistence with which free coal is offered in the spot market. This week the coal mines of the Pittsburgh district are operating at 50% of capacity or more, and prospects are that there will be a further increase. There is now no question that the low point in operations was passed a few weeks ago, when the rate was less than 40%.

There has been a limited amount of contracting for the calendar year, in connection with inquiries that have been coming out as noted in the last report, but not a great deal, since the bulk of the contract tonnage runs to Apr. 1. The market for slack shows still more firmness, and many producers are holding out for $1 on prompt lots, though contracts are made at 90c. when running over the twelvemonth, and sometimes at a shade less. In mine-run and screened coal there is less irregularity and the market now has a semblance of steadiness on the basis of $1.15 for mine-run, the usual asking price on contracts being $1.20. We quote prompt coal as follows: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

TOLEDO

Toledo a weather market. Ohio operators to open mines under open-shop policy. Many leaving the state altogether.

The local coal situation remains practically unchanged. Conditions are regulated almost entirely by the weather, which has not been wholly favorable. There has been a hange in prices and some weakness is being shown in certain grades. Fine coal is a trifle stronger, but this is due to the act that slow production is bringing about a shortage in hese grades. Coal men here are optimistic and point to the mprovement among the railroads since the rate increase as ndicating that business is bound to be better a little later on. Local dealers will not be particularly affected by the mining ituation in Ohio. Those operators who have not concluded to leave the state altogether are going to reopen their mines nder the open-shop policy.

COLUMBUS

Steady business is reported in domestic lines. Prices are generally well maintained and a better feeling is evident in most localities. The steam business still slow. Production ight.

The coal trade in Ohio has been progressing steadily during the past week. Domestic trade is fair and orders are coming in better. Slowness still characterizes the steam trade. The tone of the market is a little better and most of the coal men are united in saying that future prospects are brighter.

Domestic sizes are about holding their own in the local trade. Dealers' stocks ran down to a pretty low point during the holiday and inventory periods and as a result the demand is better. There is a fairly good demand for West Virginia plints and Pocahontas. Anthracite is also moving fairly well. Retail prices are steady at the levels which have prevailed or several weeks.

Production has not increased materially although more steadiness is reported in most fields. The Hocking Valley produced about 65% of the usual amount and the same in the Crooksville, Jackson and Cambridge districts. The Pomeroy Bend field is producing about 80% of the average.

Strength is still shown in the small sizes. This is due to the continued low production of lump and the closing of the Lake trade. Nut, pea and slack is sold at 60 to 70c. and coarse slack is about 10c. less.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.60	....
Inch and a quarter	1.45	1.50	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.65	0.75	0.60
Coarse slack	0.55	0.65	0.50

CLEVELAND

Warm weather and a large amount of coal have kept the market heavy. Consignment coal coming in and having an adverse effect.

Fine coals are being sold at $1.70 to $1.75 with a more liberal supply than is necessary for the demand. Brokers and operators are putting as much coal in on contracts as the consumers can stand. This has had a bracing effect, but the cost of the coal is so near the selling price there is no chance to cut quotations.

Some three-quarter West Virginia No. 8 is coming into the market on consignment and prices range as low as $1.95 on track here with $2.05 the top. There is little demand for coarse coal anywhere. The warm weather has reduced the retail demand and the trade has not had to buy more than a car or two to keep stocks up.

CINCINNATI

Slower buying due to usual slowing up at the beginning of the new year. General conditions fair and improvement is considered certain.

Business has been rather dull, due to the usual new year slowing up. The weather has been all that could be asked by the trade, but buying has been in relatively small volume. On domestic coal this seems to be due to the lateness of the season.

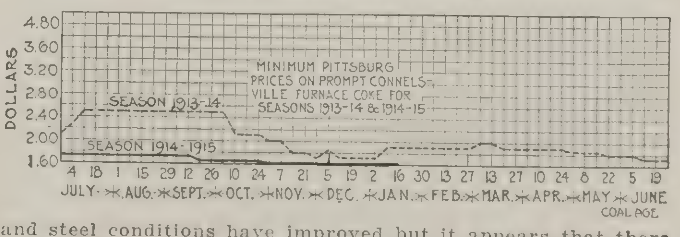
As heretofore reported, stocks were heavily drawn upon during the severe weather of December, but now that a new year has begun, most of the retail trade seems to be determined not to stock any considerable supply. The remarkably good transportation conditions have been a real handicap to business, as it has been possible at all times for retailers to secure supplies immediately on demand. If this were not the case stocking would undoubtedly be more liberal. Prices have been maintained at a fair level, as a rule, save in the comparatively few cases where distress coal has been thrown on the market.

COKE

CONNELLSVILLE

Coke market stagnant, contracts being closed and further activity awaiting the blowing in of additional blast furnaces. Production and shipments slightly decreased.

The coke market is decidedly quiet, as it has been since the contracting movement slowed up just before the holidays. Here and there negotiations have been in progress on small lots for various periods, but in general the market is stagnant, awaiting a fresh demand through the blowing in of additional blast furnaces. Of this there is no immediate prospect. Iron and steel conditions have improved but it appears that there was an excess of production when demand for iron and steel was at its lowest. There have been occasional purchases of prompt furnace coke, and a little prompt foundry coke is moving all the time. The market is quotable as follows: prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2@2.20; contract foundry, $2.15@2.25, per net ton at ovens.



The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 2 at 202,497 tons, a decrease of 5633 tons, and shipments at 201,712 tons, a decrease of 5568 tons.

BUFFALO

Coke is moving much as before, with prices still at the bottom. This is not much confirmation of the general belief that business is better and will resume its old activity. There are reports of iron orders given and furnaces running stronger, but they can hardly do a much increased business till there is more demand for coke. Prices continue to rule quiet on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

CLEVELAND

For several weeks coke has been low and the demand small, but the trade is taking it in much larger quantities than heretofore, and the prices are firmer than they have been. This fuel goes to foundries and the trade that is supplied by foundries is a good criterion of the business improvement.

COLUMBUS

There is a better demand for coke in Columbus and central Ohio territory. Shipments are coming in regularly from Pennsylvania.

CHICAGO

Increased inquiries are noted for furnace and foundry coke to be taken under contracts for the first-half of the year. Very few contracts have been executed, and the presumption is that producers do not wish to commit themselves at this time. Prices are as follows: Byproduct, $4.75@5; Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.75; gas coke, $4.25@4.35.

THE STEEL INDUSTRY

Situation unchanged though operations are very slightly increased. Rail purchases continue light.

Steel works are increasing slightly their rate of operations and for this week a number of large companies are running at 40 to 50% capacity. The Steel Corporation's percentage is 45 and it may be able to increase this shortly to 50, as specifications are rather better.

Taking the trade through, the first half of January has brought no new turn. The railroads naturally require some time to canvass and finance their needs and have so indicated in response to intimations that early and very considerable buying was now expected from them.

It is not decided how much of the 150,000 tons the Pennsylvania Railroad has definitely decided to buy will be given out this month. The New York Central has placed a part of the 40,000 tons on which it asked prices on Jan. 4. The New Haven is to buy 18,000 tons and the Boston & Maine 15,000 tons. Western roads have given little sign of their probable wants. —"The Iron Age."

SOUTHERN

LOUISVILLE

Market continues heavy in spite of the optimistic reports from all quarters. Dealers carrying full stocks.

In spite of reports from the mining sections to the effect that the mines are getting under way again, the Kentucky coal trade is mostly in a pessimistic frame of mind. Steam coals are undoubtedly in better demand, but there is almost no call for domestic sizes notwithstanding the fact that December was unusually cold. This means that the production of steam coals is more costly.

Though some operators are selling for such prices as they can get, quotations generally on block coals are from $1.50 up; egg coals are hardly salable at even $1, while nut and slack ranges from 35 to 75c., according to grade, all prices f.o.b. mines.

MIDDLE WESTERN

CHICAGO

Activity characterizes general market. Normal winter weather maintains prices. Demand for Western coals brisk. Good undertone in Eastern coals and anthracite strong.

Increasing strength is noted in the local market, and a tendency toward development of trade on a broadening scale.

The continued cold weather has been a considerable factor toward further improvement. There has been a better demand for domestic coal and steam sizes with prices well maintained. It was thought that the holiday period would see the usual slackening up of orders but it was quite the reverse. Chicago yards have had a busy week, and have placed numerous orders with the operators for rush shipments.

Unabated activity continues in screenings although if the demand for domestic coals presists it is not unlikely that the fine grades will soften before long. Some of the best informed agencies believe that screenings will see a general reduction of from 10c. to 15c. per ton before the end of January.

The cold weather has served to increase orders for Franklin County domestic sizes, which have shown great strength. The increased circular prices from this district have apparently only resulted in a heavier demand. A number of shipments of domestic lump have been made at $2 and screenings are still firm at around 85 cents.

Circular prices are strongly adhered to in the Springfield district. While the demand for screenings from this section has slowed down slightly, the price has not declined.

One producing company in the Carterville field has held domestic lump firm at $2, and made no shipments under that figure during the past week.

Considerable eastern Kentucky coal has been sold in this market recently at full circular prices, and the tone is strong.

Hocking grades have been doing fairly well, although several shipments of consignment coal have been sold at comparatively low levels.

Smokeless is fairly steady. There has been some price cutting by Chicago retailers, but this is not of much consequence.

The situation in anthracite is practically unchanged from last week; the market is neither strong nor weak. Chestnut is short, and egg and stove shipments about equal the demand.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.75@2.00	$1.50	$1.75	$1.50@1.65	$1.75@2.00
4-in. lump..	....	....	....	....	....
Steam lump	....	1.15	....	1.20	....
2½-in. lump.	....	....	1.60	....	....
1¼-in. lump.	....	....	1.35@1.50	....	....
Mine-run...	1.25	1.10	....	1.10	....
Egg........	1.75@1.85	....	....	1.40@1.50	....
No.1washed	....	....	....	....	1.75@1.85
No.2washed	....	....	....	...	1.60@1.75
6x3-in. egg.	....	1.50	....	....	1.75
Nut........	....	1.35	....	1.25	....
No. 1 nut..	1.85	....	....	....	....
No. 2 nut..	1.60	....	....	....	....
Screenings..	0.85@0.90	0.75	0.75@0.85	0.75@0.85	....

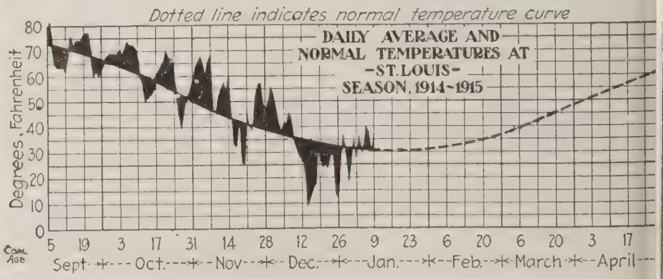
	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.75	$1.75@1.90	....	....	....
1¼-in. lump.	....	....	....	....	$1.50@1.60
Lump & egg	...	....	$2.00@2.25	$2.25	....
Mine-run...	1.20	....	1.25@1.40	1.25@1.40	1.15@1.25
Egg........	1.60@1.75	1.50@1.75	....	....	....
No. 1 nut..	1.75	....	....	....	....
No. 2 nut..	1.40@1.60	....	....	....	..
Screenings..	0.85	....	....	....	....

Greene County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40; 5-in. egg, $1.25@1.35; 3-in. egg, $1.30; mine-run, $1.10 screenings 80 cents.

ST. LOUIS

Warmer weather has caused the market to slow up again Situation steady and will improve rapidly with lower temperatures.

The local situation is not as encouraging, as the marke has been somewhat heavy and dull on everything. Warme weather, instead of creating a better demand for steam sizes has reversed conditions, and screenings from both fields ar weakening. Washed coals from the Carterville field are i good demand; as a matter of fact, these are the only sizes tha are keeping up in price. But indications are good for col weather and there is every reason to believe that with th next touch of winter the market will be in a healthy condition.



In the Standard field there is no change to speak of, with the possible exception that some grades of Standard lump have been occasionally offered as low as 90c. With this condition existing, screenings dropped from 50 to 60c., with a promise of going to 45 or as low as 40c. Colder weather is the only hope for the Standard field right now.

Anthracite coal is not as strong as at the first of the year. There is very little demand at all for smokeless.

The prevailing prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	....	....	$1.25	$0.95@1.05	$1.05@1.10
3-in. lump	....	....	1.40	....	....
6-in. lump	$1.35@1.65	....	1.50	1.20@1.30	1.20@1.30
Lump and egg	1.85@2.15	$2.00	....	....	1.35
No. 1 nut	1.15@1.35	....	....	0.90@0.95	....
Screenings	0.50@0.55	....	....	0.55@0.65	0.55@0.60
Mine-run	0.95@1.05	....	....	0.85@0.90	....
No. 1 washed nut	1.65@1.75	....	1.60	....	....
No. 2 washed nut	1.35@1.40	....	....	....	....
No. 3 washed nut	1.10@1.15	....	....	....	....
No. 4 washed nut	1.05@1.10	....	....	....	....
No. 5 washed nut	0.75@0 80	....	....	....	....

PORTLAND, ORE.

Milder weather again prevails and the demand is less.

The first shipment of blacksmith coal by way of the Panama Canal was made here a few days ago when the steamer "John T. Scott" arrived from Baltimore with 500 tons consigned to the Pacific Coast Coal Co. The steamer also took a shipment of coal to Seattle. A shipment of some 500 tons of anthracite from Philadelphia is due to arrive in a few days on the steamer "Cricket," which is now en route. It is said that this coal will be retailed for about $14 per ton.

FOREIGN MARKETS

GREAT BRITAIN

Shortage of supplies and prices irregular. Government cuts insurance rate.

Jan. 1—The London coal trade is largely affected by the holiday influence still, but the orders have come in freely during the week. Considerable disappointment is felt at the nonarrival of supplies. Some depots are absolutely clear of stock coal and the shortage is becoming serious. Colliery prices are irregular. Official lists are largely withdrawn.

The past week has brought forth further proof that, given adequate tonnage at reasonable rates, business could not be other than distinctly healthy. As was only to be expected, a holiday tone dominated the markets, and actual transactions were accordingly of a small character. The difficulty of obtaining supplies owing to the scarcity of wagons has developed into serious dimensions.

The United States Government has presented a protest to Great Britain, complaining of the treatment of American shipping by the British navy.

The Government rate of insurance of cargo against war risks has been reduced from 1½ guineas to 1 guinea per cent. The Colliery Guardian."

Coal Contracts Pending

Contracts listed in this department are authoritative in very respect except where the source of information is uestionable, in which event it is noted. All contracts re listed promptly on receipt and only repeated when dditional information becomes available or in the last ssue previous to the day on which bids will be closed. iberal remuneration will be paid for all legitimate otices of this kind sent in.

Contract No. 41—New York—The bids on this contract (p. 8), which provides for furnishing and delivering anthrate broken coal to the Brooklyn Bridge, were as follows: ohn F. Schmadeke, $3282; Charles D. Norton Co., $3342; Sterns ros., $3504. Address Department of Bridges, Municipal Building, Manhattan.

Contract No. 46—New York—Sealed bids will be received y the Board of Health until 10:30 a.m., Jan. 22, for furnishing d delivering white ash anthracite coal, as required, to the rious office buildings, clinics, hospitals, day camps and disinfecting stations of the Department of Health, in the different Boroughs of New York, and the tuberculosis sanatarium at Otisville, Orange County, New York. No bond will be required with the bid, but upon awarding the contract, a bond of 30% of the amount of the contract will be required. Deliveries are to be made between Jan. 1 and June 30. Blank forms and further information may be had at the office of the Chief Clerk, Department of Health, Centre and Walker Sts., Manhattan. S. S. Goldwater, M. D., is president of the board.

Contract No. 47—Batesville, Ark.—The Municipal Electric Light & Water Plant of Batesville will be in the market for 1800 tons of mine-run coal on Feb. 1. The approximate price is $3.35 per ton, and the coal is bought on a competitive basis, the usual test being the cost of evaporating 1000 lb. of water at the company's boiler plant. Address W. H. Walkup, superintendent, Batesville Water & Light Plant, Batesville, Ark.

Contract No. 48—New York—Sealed bids will be received by the Commissioner of Docks, Department of Docks and Ferries, until noon, Jan. 21, for furnishing and delivering coal. The amount of security required will be 30% of the total amount for which the contract is awarded, and deliveries are to be concluded in 90 days. Blank forms and further information may be obtained at the Department of Docks and Ferries, Pier A, foot of Battery Place, North River, Manhattan. R. A. C. Smith is Commissioner.

Contract No. 49—Harlan, Iowa—The Municipal Electric Light Plant of Harlan will be in the market for 2800 tons of coal about the first of next month. They commonly use Colfax (Iowa) steam coal, and the contract is let on a competitive basis, usually about Feb. 1. Address C. D. Lutton, superintendent, city of Harlan Light Plant, Harlan, Iowa.

Contract No. 50—Cleveland, Ohio—Sealed proposals will be received until noon Jan. 21 by the Commissioner of Purchases and Supplies for furnishing coal for the garbage reduction plant. Specifications and bid blanks may be obtained at the office of the Director of Public Service, Room 204, City Hall. A. R. Callow, Room 511, City Hall, is Commissioner of Purchases and Supplies.

CONTRACTS LET

Contract No. 28—Brooklyn, N. Y.—This contract (pp. 1009, Vol. 6, and 108, Vol. 7), which provides for furnishing and delivering anthracite coal to the various public buildings, baths, courts and comfort stations, Borough of Brooklyn, under Schedules Nos. 1, 2 and 3, has been awarded to Thomas W. Woods' Sons. Address Bureau of Public Buildings and Offices, Room 1003, No. 50 Court St., Borough of Brooklyn, New York.

Contract No. 30—New York—This contract (pp. 1009, Vol. 6, and 108, Vol. 7) has been awarded to Charles D. Norton Co., at $2.21 per thousand pounds. Address Department of Parks, Municipal Building, Manhattan.

Contract No. 35—New York—This contract (pp. 1048, Vol. 6, 108, Vol. 7), which provides for furnishing 7000 tons No. 1 buckwheat, 700 tons pea coal, 800 tons No. 1 buckwheat and 750 tons No. 1 buckwheat, has been awarded to Charles D. Norton Co. Address the Auditor, Bellevue Hospital, 400 E. 29th St., New York City.

Contract No. 36—Pittsburgh, Penn.—This contract (p. 1048, Vol. 6), which provides for furnishing the state penitentiary with its fuel supply for one year, has been awarded to the Youghiogheny Coal Co., of Pittsburgh, Penn. The grade used is nut and slack and deliveries are to be made at the rate of 20 to 35 tons per day, depending upon the season of the year. Address John Francies, Warden, Western Penitentiary of Pennsylvania, Pittsburgh, Pennsylvania.

Contract No. 37—New York—This contract (p. 1048, Vol. 6), has been awarded to the Consolidation Coal Co., Inc.; 14 Wall St., New York. The bids were as follows: For furnishing and delivering 150 tons of bituminous coal in Manhattan, $1155; for 150 tons in the Borough of Brooklyn, $1230; for 25 tons in the Borough of Richmond, $190. For furnishing and delivering 75 tons in the Borough of the Bronx, the Consolidation Coal Co. and Olin J. Stephens bid alike at $577.50, and there has been no award on this section of the contract. Address Robert Adamson, Fire Commissioner, Fire Department, 11th Floor, Municipal Building, Manhattan.

CONTRACT NOTES

The Consolidation Coal Co., Cumberland, Md., has recently received a contract to supply 60,000 tons of Fairmont 1½-in. double screened West Virginia steam coal to the Egyptian State Rys.

The Highland Creek Coal Sales Co. is reported to have received a small contract from the Egyptian State Ry. calling for 5000 tons of coal to be delivered during the months of December and January.

Financial Department

The Colorado Fuel & Iron Co.

President J. F. Welborn reports, in part*, for the year ended June 30, 1914, as follows:

Gross earnings from operation were $17,803,025.21, a reduction of $6,512,862.50 as compared with the previous year. The reduction in sales of iron and steel was $3,505,497.93 and of fuel, $3,007,364.57. Operating expenses were $16,729,255.25 and net earnings from operations $1,073,796.69, being a reduction of $2,546,496.38. Of this decrease, $1,325,176.19 occurred in the iron department and was due primarily to the general curtailment of steel business throughout the country. The decrease of $1,221,320.19 in the fuel department was caused mainly by the direct and indirect effects of the strike, though without the strike there would have been a substantial reduction in these earnings. Income from other sources was $577,477.39, making a total net income of $1,651,247.35. Bond interest, taxes, sinking funds and other charges against income amounted to $2,557,215.78, resulting in a deficit of $905,968.43.

STATEMENT OF PRODUCTION FOR YEARS ENDING JUNE 30

Short Tons—	1913–14	1912–13	1911–12	1910–11
Coal	2,428,992	4,091,667	4,038,852	4,233,756
Coke	535,274	784,627	777,993	753,192
Iron ore	614,039	853,878	813,728	841,699
Limestone	376,226	485,756	459,913	425,704
Pig iron produced	268,883	416,467	426,659	397,701
Finished iron and steel	352,929	458,521	485,743	424,421

RESULTS FOR YEAR ENDING JUNE 30

	1913–14	1912–13	1911–12	1910–11
Iron department	$12,085,037	$15,590,535	†$15,140,523	†$13,775,664
Fuel department	5,717,988	8,725,353	†9,127,929	†9,159,021
Total gross earnings	$17,803,025	$24,315,888	$24,268,452	$22,934,685
Iron department	$1,569,288	$2,894,464	$2,766,775	†$2,502,566
Industrial dept. (fuel)	loss 495,518	725,802	†1,005,507	†975,783
Total net earnings	$1,073,770	$3,620,266	$3,772,282	$3,478,349
Add—inc. from secur.	391,229	563,439	526,270	535,672
Interest and exchange	186,248	192,190	150,423	135,927
Total net income	$1,651,247	$4,375,895	$4,448,975	$4,149,948
Deduct—				
Bond interest	$2,021,103	$2,026,780	$2,039,622	$2,091,610
Taxes	293,580	243,722	226,737	214,785
Real estate	99,221	142,531	138,317	151,263
Insurance, sociological, personal injury, etc	55,128	50,082	64,105	233,602
Equipment renewal	43,016	120,000	120,000	128,106
Loss on Col. and Wyo. Ry	....	....	....	b10,005
Loss on Crystal R. RR	36,000	36,000	36,000	36,000
Prospecting	18,168	29,588	22,965	24,904
Preferred dividends	c........	c(4) 80,000	(5) 100,000	....
Total deductions	$2,557,216	$2,728,703	$2,747,745	$2,890,276
Balance, sur. or def	df.$905,969	sr.$1,647,192	sr.$1,701,229	sr.$1,259,672

b Includes traffic contract guaranty at $25,000 per month ($300,000), less earned from traffic, as per contract for year, $289,995 in 1910-11 and $105,309 in 1908–09. c The dividend above deducted in 1912–13 is the 4% ($80,000) paid July 1, 1913; there was also declared at the same time a dividend of 4%, which was paid Jan. 1, 1914, and deducted from profit and loss. An extra payment of 35% ($700,000) was also made Mar. 20, 1913, on account of the 74% then accumulated dividends, leaving about 39% still due.

† Figures so marked are inaccurate, comparison being changed in later years, the general results for the year, however, remaining unchanged.

BALANCE SHEET JUNE 30

Assets—	1914	1913	Liabilities—	1914	1913
			Common stock	$34,235,500	$34,235,500
Properties and sec.... Equipment..	$62,677,522	$62,210,218	Preferred stock	2,000,000	2,000,000
			Funded debt	x45,158,000	45,266,000
Cash on hand	3,793,195	5,280,426	Accts. and bills pay	857,585	954,982
Stocks and bonds	15,365,170	15,282,450	Hospital	15,125	23,156
Accts. and bills rec	3,232,136	3,749,457	Accrued bond interest	829,775	831,574
Subsidiary cos.	278,388	140,911	Tax payment fund	100,000	100,000
Manufac. stocks, etc	3,158,989	3,075,831	Pref. dividends	....	80,000
Stripping, etc	20,041	18,759	Sink. fd.—real est	1,573,292	1,483,071
Accr. divs. and int	139,857	84,062	Miscell. funds	315,314	287,719
Miscellaneous	155,288	152,128	Profit and loss	y3,735,995	4,732,240
Total	$88,820,586	$89,994,242	Total	$88,820,586	$89,994,242

x Includes Col. Fuel & Iron Co. 5% gen. mortgage bonds, $5,678,000; Col. Fuel Co. 6% gen. mortgage bonds, $200,000; Grand River Coal and Coke Co. 6% 1st mortgage bonds, $860,000, and Col. Industrial Co. 5% 1st mortgage bonds, $38,420.

y After deducting $80,000 dividends on the preferred stock paid Jan., 1914, and sundry amounts (net) $10,277.

*President Welborn's report was largely concerned with a review of the labor troubles in which the company has been involved. This having already been covered in considerable detail in this journal, it has been omitted here.—Ed.

CONSOLIDATED BALANCE SHEET JUNE 30

Assets—	1914	1913	Liabilities—	1914	1913
Iron, etc., lands	$53,989,009	$54,862,468	Common stock	$34,235,500	$34,235,500
Equipment, etc.	29,076,517	28,592,342	Preferred stock	2,000,000	2,000,000
Railroads	5,811,908	5,810,427	Funded debt—		
Cooperage plant	31,263	30,468	Gen. M. 5s	5,678,000	5,638,000
Timber lands, etc	87,915	84,000	Colo. Fuel 6s	200,000	240,000
Store buildings, etc	435,922	425,273	Colo. Ind. Co. 5s	33,332,000	33,437,000
Telegraph system	54,300	54,300	Rocky Mtn. 5s.	483,000	483,000
Inventories, etc.	3,881,120	3,865,644	Gr. Riv. Coal 6s	860,000	863,000
Accts. and bills rec	2,857,258	3,277,022	Pueblo Realty Tr. Co. 6s	503,098	505,398
Cash	4,073,853	5,563,138	Accts., etc., payable	1,655,703	1,952,272
Stocks and bonds	473,095	473,710	Accr. bond int.	833,800	835,599
Cash (trustees)	25,176	8,278	Accrued taxes.	113,500	113,500
Reserve funds	98,841	99,341	Preferred dividend	....	80,000
Accrued interest	16,113	16,487	Balance	21,069,289	22,827,646
Royalties in adv	51,600	48,015	Total	$100,963,890	$103,210,915
Total	$100,963,896	$103,210,915			

Note—For the previous annual report of this company see Vol. 5 p. 550.

*

Virginia Iron, Coal & Coke Co.

President John B. Newton reports, in part, for the yea ended June 30, 1914, as follows:

The mines have produced 1,988,000 tons of coal at a profi of $449,775 as against 1,840,213 tons at a profit of $353,65 the preceding year.

The modern all-steel tipple at Toms Creek colliery has been completed and in every way fulfills our expectations i improved facilities for handling a steadily increasing produc tion. Further to increase the efficiency of this colliery, w are constructing a washery with a capacity for washing 200 tons of slack coal per day to wash the slack from whic your coke is manufactured, thereby improving substantiall the quality of same. We expect to complete this plant b Dec. 1.

EARNINGS FOR YEAR ENDING JUNE 30

Operation of—	Year 1913-14 Gross	Year 1913-14 Net	Year 1912-13 Gross	Year 1912-13 Net
Furnaces	$1,743,405	$11,075	$1,986,679	$185,82
Foundries and shops	95,293	def. 7,689	102,555	1,18
Coal mines	1,815,190	449,775	1,616,465	353,65
Coke ovens	428,341	28,561	444,729	35,86
Saw mills	150	....	296	....
Grist mills	180,129	6,689	180,539	5,30
Total	$4,262,508	$488,411	$4,331,263	$581,83

INCOME ACCOUNT

	1913-14	1912-13	1911-12	1910-11
Net earnings from operation	$488,411	$581,830	$278,517	$336,23
Farms and farm rentals	3,351	16,145	9,822	6,18
Miscell., mdse., dis., etc	20,348	18,922	23,820	29,31
Total net income	$512,110	$616,897	$312,159	$371,74
Deductions—				
Taxes	$61,225	$57,337	$57,069	$50,50
Bond interest	259,856	262,688	264,513	265,63
Insurance	34,049	28,191	23,792	22,34
Expenses of idle plants	68,317	71,439	65,490	51,75
Depreciation of idle plants	122,516	126,359	91,155	60,69
Depreciation of active plants			29,048	53,59
Interest and discount	73.484	103,160	112,809	90,51
Dead rents and contracts	2,433	2,674	13,111	14,19
Miscellaneous	75	302	168	24
Development	7,761	2,838	28,044	25,04
Total deductions	$629,716	$654,988	$685,199	$634,52
Loss for the year	$117,606	$38,091	$373,040	$262,78

Operating, etc., accounts were charged during the yea with $349,737 for depreciation, viz.: Depreciation of coal land $120,729; depreciation of ore lands, $4066; depreciation improvements to leased properties, $53,730; depreciation improvements to owned properties, $171,108; depreciation quarries, $104; also with furnace repairs, $31,985.

BALANCE SHEET JUNE 30

Assets—	1914	1913	Liabilities—	1914	1913
Real est. & plant	$12,420,405	$12,595,009	Capital stock	$10,000,000	$10,000,0
Equipment	476,738	411,147	First mtge. bonds	4,787,000	4,835,0
Securities owned	197,363	197,363	Prior lien bonds.	384,000	398,0
Sales ledger bal.	351,118	747,169	Unpaid vouchers	249,281	251,8
Bills receivable.	82,055	104,142	Unpaid pay-rolls	54,887	89,1
Cash	50,302	57,346	Accts. payable	8,509	9,8
Materials	2,169,939	1,753,755	Bills payable	1,683,855	1,522,0
Miscellaneous	86,832	95,401	Interest acrued.	84,517	85,2
Profit and loss	1,378,517	1,229,804	Furnace-repr. fd.	11,220	......
Total	17,213,269	17,191,136	Total	17,213,269	17,191,1

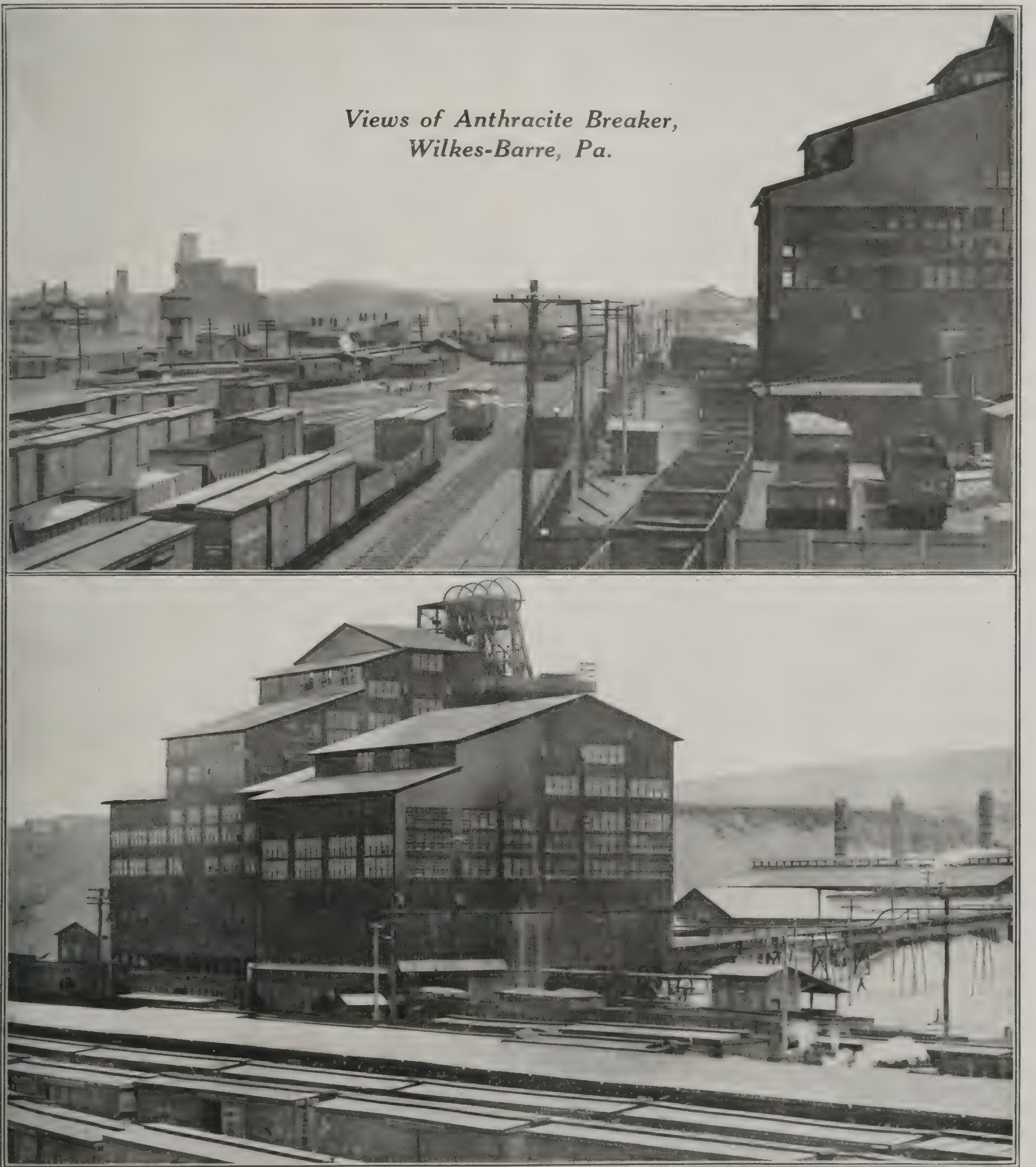
Note—For previous annual report of this company see Vol. 5, p. 112.

COAL AGE

Volume 7, No. 4
Issued Every Saturday
Hill Publishing Company

NEW YORK, JANUARY 23, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page



Views of Anthracite Breaker, Wilkes-Barre, Pa.

"Do You Know Why Every User of the Barsteel Is a Booster?"

"It's because **Barsteel** locomotive features meet every coal mining demand.

"The **Barsteel** construction concentrates strength at points where there is greatest stress. Consequently, a frame **never has been broken on any locomotive in service.**

"The service record of the commutating-pole motors cannot be equalled. From a standpoint of maintenance they show better than all others.

"The large bronze motor bearings with oil and waste lubrication give better and longer service than any other kind. There are many cases where bearings have been in continuous service for three years.

"These, and the diagonally split motor frame, split gear case, open locomotive frame, and Vauclain removable gib make the Baldwin-Westinghouse **Barsteel** pre-eminent as the locomotive designed for mining work. Everything is simple, strong and easy to get at."

For full information address either company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

"Write to a User and ask Him about the Barsteel"

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

VOLUME 7 JANUARY 23, 1915 NUMBER 4

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Stop! Look! Listen! Some forceful, vigorous remarks on safety in coal mining by the Safety Committee of the D., L. & W. R.R. Co.

General Discussion of the Problem, "Who Gets the Promotion?": *Pages* 152-164

Nearly 200 answers were received to the question indicated in a cartoon published recently in "Coal Age." Of all these replies, nine letters were selected by five judges as being the most interesting of the lot. "Coal Age" readers are requested to vote on these nine letters to determine the winning answer. In addition to the letters that are up for public approval, more than 20 other replies dealing with the same problem are printed.

*Contentment: *Page* 164

A poem by Michael Bernard.

Coal Production of India: *Page* 164

*The Hampton Roads Coals—II: *Pages* 165-168

A description and history of the development of the Pocahontas Flat Top field are given in this installment Particular attention is devoted to a study of the quality of different coals in the field. The uses of the fuel, transportation problems and other points are also covered. F. R. Wadleigh. COAL AGE, Vol. 7.

*Check Doors: *Page* 169

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*A New Switch Point: *Page* 170

*Electric Lamp Burns under Water: *Page* 170

The Labor Situation: *Page* 171

One of the eastern Ohio mines has started operations on a scale of 58c. for lump and 22c. for slack. In 1914, $1,100,787.59 was spent in relief and benefits by the Union in eastern Ohio. COAL AGE, Vol. 7.

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NUMBER OF COPIES PRINTED THIS ISSUE, 11,000

None sent free regularly, no returns from news companies, no back numbers.

The Subscribers' Forum

Conducted by the Business Manager of Coal Age

Devoted to weekly discussions, interviews, etc. on the important subjects of your business and ours

THE New York Tribune has engaged Samuel H. Adams, the noted investigator, to write a series of articles on advertising and the following quotation from one of them is of special interest to us in the coal mining field.

"Honest goods honestly advertised, a dollar's worth for your dollar. Every man who has ever studied advertising will at once think of Marshall Field & Co.'s department store, in Chicago. Their advertising is *fact* advertising. There are no cataclysmic 'reductions in value;' no removal sales or 'selling out' of stock specially purchased for the purpose of selling out; no 'commercial' or 'trade' or other forms of near honesty. Other department stores there may be which maintain this standard—there are at least two in New York which come close to it—but I have as yet to examine any other general emporium advertising that can stand against rigid and detailed criticism.

"In specific lines there is much unimpeachable advertising right here in New York. To make up an arbitrary list from memory, I can recall, in years of watchfulness of the market, no deceptive advertisement by Tiffany, Gorham, Maillard, Budd, Simcox, Brooks, Crouch & Fitzgerald, Rogers Peet, Brokaw, Dunlap, Cross, Abercrombie & Fitch, Kaskel, Lucile, or Peck & Peck. Doubtless there are scores of others equally punctilious. In the national field, most of the standard watches, automobiles, candies, shaving soaps, talking machines, razors and many other lines are sold for exactly what they are on a basis of provable statement.

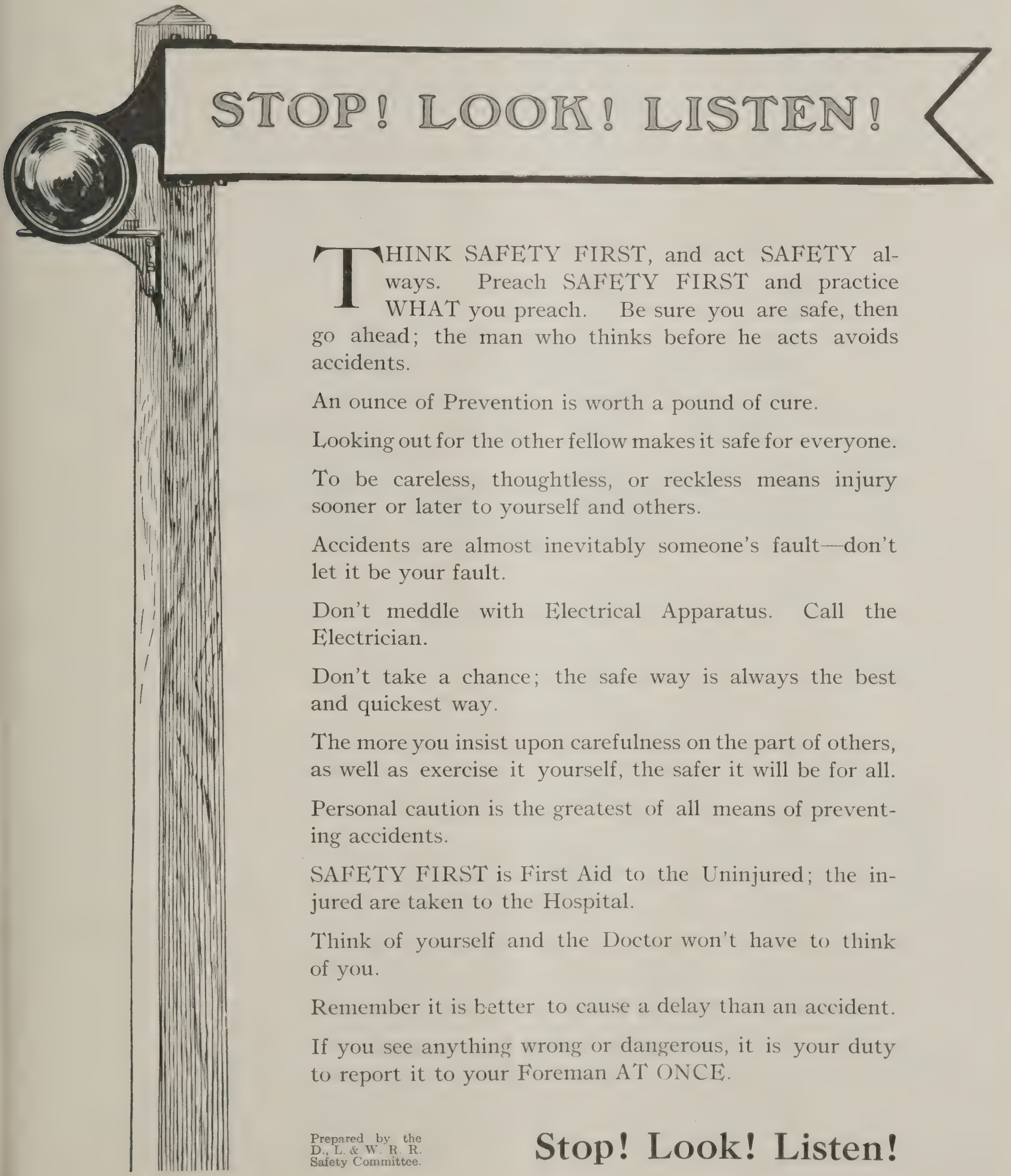
"The moral for your dollar is obvious. The most trustworthy advertising is that which confines itself either to a general statement of the nature of the merchandise offered or to description and identification of the article, with or without price stated. Goods which require the stimulus of abnormal reductions *may* be all right. Often there are real bargains arising from legitimate exigencies. But as a practicable purchasing rule, the merchant who offers you a dollar's worth for your dollar is the safest to pay your dollar to."

THE CHIEF POINT of interest to you is that the condition the Tribune is endeavoring to bring about in the newspaper field—absolute honesty in advertising—is a condition that *you* haven't had to worry about for a long time.

"Questionable advertisements," "fake claims," "exaggerated statements," "unreliable products."—We banished them all long ago and made our advertising pages a safe, profitable marketplace for everything you need to buy for your mines.

COAL AGE

Vol. 7 NEW YORK, JANUARY 23, 1915 No. 4



STOP! LOOK! LISTEN!

THINK SAFETY FIRST, and act SAFETY always. Preach SAFETY FIRST and practice WHAT you preach. Be sure you are safe, then go ahead; the man who thinks before he acts avoids accidents.

An ounce of Prevention is worth a pound of cure.

Looking out for the other fellow makes it safe for everyone.

To be careless, thoughtless, or reckless means injury sooner or later to yourself and others.

Accidents are almost inevitably someone's fault—don't let it be your fault.

Don't meddle with Electrical Apparatus. Call the Electrician.

Don't take a chance; the safe way is always the best and quickest way.

The more you insist upon carefulness on the part of others, as well as exercise it yourself, the safer it will be for all.

Personal caution is the greatest of all means of preventing accidents.

SAFETY FIRST is First Aid to the Uninjured; the injured are taken to the Hospital.

Think of yourself and the Doctor won't have to think of you.

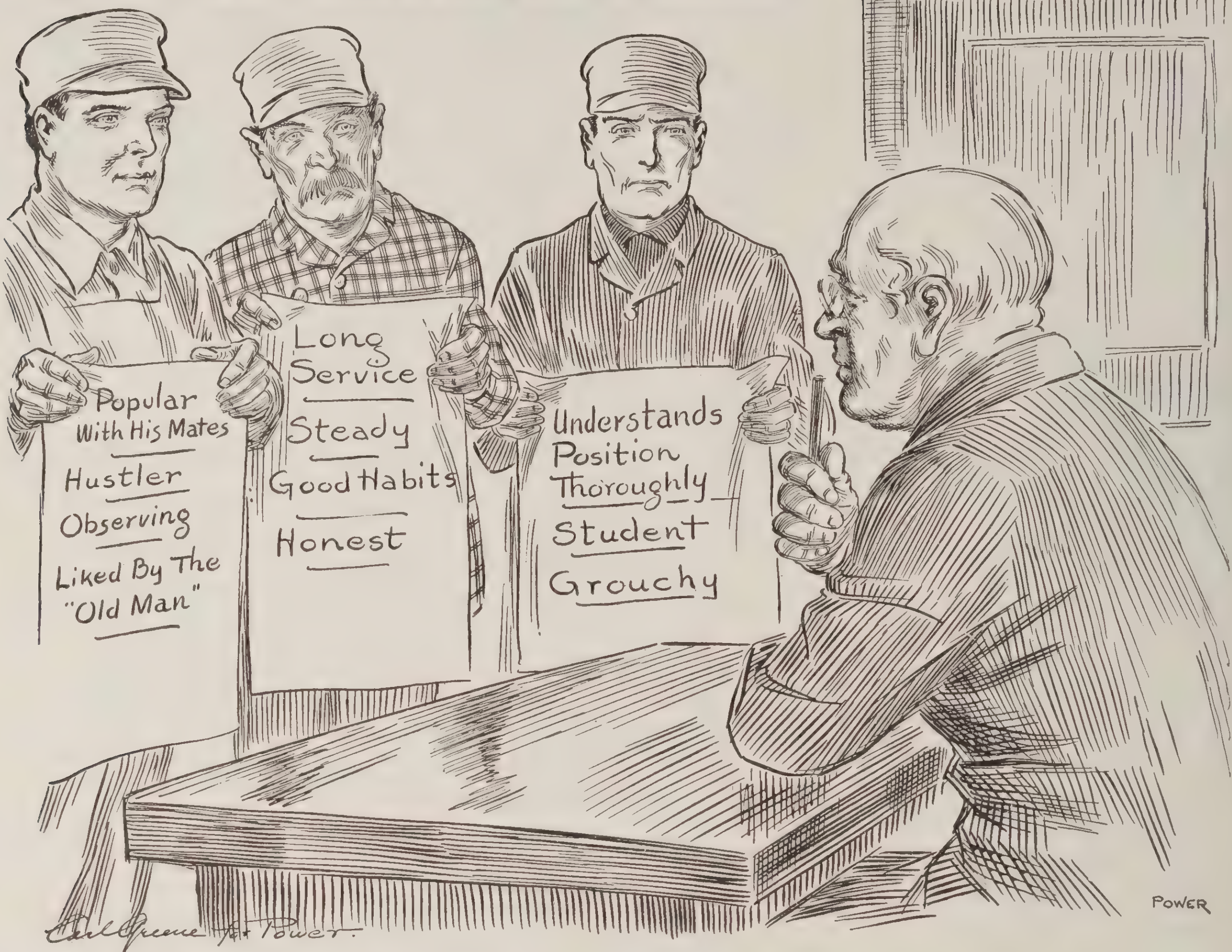
Remember it is better to cause a delay than an accident.

If you see anything wrong or dangerous, it is your duty to report it to your Foreman AT ONCE.

Prepared by the
D., L. & W. R. R.
Safety Committee.

Stop! Look! Listen!

FIVE JUDGES *were unable to agree on the winning answer to the cartoon-problem,* "WHO GETS THE PROMOTION." *It was therefore decided to let* COAL AGE *readers choose the winner. Read carefully the full particulars below and send in your selection on a postal card before February* 2. *Let us have* 10,000 *replies to this interesting question. Send your answer today.*



Who Gets the Promotion?

THE CARTOON-PROBLEM shown above was reprinted from *Power* in the Dec. 26 issue of COAL AGE. Answers to the question were invited, and the stipulation made that all replies must be in our hands before Jan. 9. Upward of 200 letters were received in response to the query.

Five judges were appointed, three of whom were editors on Hill papers. These five men selected 102 letters for careful analysis. Finally the contest narrowed down to 20 replies, and these were cut to an even dozen. But here our troubles commenced in reality, for it was evident that the problem was of such a nature that it permitted answers of great merit, although differing in choice and holding entirely divergent points of view.

The judges themselves were divided as to which man should be promoted, and this difference of opinion made a unanimous choice impossible. It was decided, therefore, to let COAL AGE readers choose the winner, and with this idea in mind, we are publishing nine letters selected by the judges as being best from the standpoints of originality and convincing arguments.

These nine letters are numbered 1 to 9, inclusive, and are not arranged in any order of merit; that is, letter No. 9 is to all intents as meritorious as letters Nos. 1 or 2. In voting, simply write a *postal card* to COAL AGE, New York City, stating the number of the letter you choose as the winner, and then sign your name. All replies must be received in this office by Feb. 2, so that the final result can be printed in COAL AGE, Feb. 6.

Let us have 10,000 replies to this interesting problem. It won't take but a minute of your time and only cost you a penny. The industry will benefit from the lessons that will be taught us all by the discussion.

There is no record of any open debate on this vital "promotion" question ever having been held before. We suggest that in all coal districts where there are mining classes, forums or institutes, the problem be discussed, for there are many men now in the employ of coal-mining companies who would thereby be awakened to opportunities at present neglected. We would be pleased to publish the results of any such discussions.

One great railroad company having heard of this cartoon-problem in COAL AGE has asked us for permission to reproduce the cartoon and publish the best answers, so as to reach all of its 30,000 employees.

If you want to have the biggest, the livest, and the most beneficial mining meeting in the history of your community, just advertise the fact that you are going to discuss the cartoon—"Who Gets the Promotion?"

The Nine Letters Selected for Popular Vote

[The following letters were selected by five judges as being the best replies out of nearly 200 answers received to the cartoon—"Who Gets the Promotion?" Note carefully the remarks on the opposite page, and send us today a postal card naming your choice of the nine letters here published. Since the discussion has exceeded all expectations, we are sure everyone will agree that it is much more satisfactory to choose the winning letter by popular vote of all Coal Age *readers. The letters here published have hardly been edited at all, and appear practically as we received them.*—Editor.]

Letter No. 1—Analyzing the qualifications of the three applicants whom we will call A, B and C, I find that A understands his position thoroughly, is a "student" and is "grouchy." Familiarity with his position is a valuable acquisition and needs no further comment. Being a student, he will perfect plans, solve problems, master details and be ready for future responsibilities. But he is grouchy—very unfortunate. Grouchiness indicates pessimism and pessimism suggests the merely commonplace in business. Grouchiness means narrow views, egotism and a lack of appreciation, suppressing hearty coöperation on the part of his helpers.

A grouch will neither have enthusiasm, nor encourage it in others, and enthusiasm is the lubricant of industry's wheels. If such a man possesses leadership it will be of the wrong kind. Discontent, leading to graver conditions, will breed under his rule.

B has "seen long service," is "steady," has "good habits" and is "honest." Long service indicates an intimate acquaintance with the mine, its possibilities and its dangers; also with the coal seam and its geological features. Being steady and of good habits, there would be no repetition of past mistakes, no radical errors, no overwhelming disasters. Ah! and he is honest, too! May one expect more?

It is not the brilliant men who succeed, but the men of character. Honesty is character's rock foundation, without which it is bound to topple. The desire to reward an old employee is uppermost. Nevertheless, he is lacking in certain requirements essential to a successful mine superintendent.

What of C? I find him to be "popular with his mates," a "hustler," "observing" and "liked by the 'old man.'" Popular with his mates, he will hold men during dull periods and attract others when tonnage is demanded. Ruling without friction or discontent, avoiding strikes and labor troubles, he will hustle sixty seconds of useful effort into every working minute, thereby producing the maximum tonnage at the minimum cost. Observing, he will stop evil tendencies, prevent accidents and ward off calamities. Being liked by the "old man" also proves him to be no narrow-minded partisan, or class favorite, but a broad-gaged, likable fellow with faith in his associates, in his employer and in himself.

Popularity is created by faith; faith gives confidence and confidence produces optimism. Altogether, they beget initiative, that quality for which the world offers its first great prizes. Also, from faith in others and confidence in self spring enthusiasm and leadership. In thought and in action he heads his procession; he sees with a clear vision; he speaks as one having authority, and he leads.

A solves problems; C grasps them intuitively by observation. B is a faithful horse, dragging his load; C is a dynamo radiating live currents.

Mining knowledge and experience; capacity and enthusiasm for the work; executive ability and leadership; these are the essential qualifications of a mine superintendent, and were I the boss I would give the office to C on points.

J. E. Butler,
Gen'l Mgr.

The Stearns Coal Co., Stearns, Ky.

Letter No. 2—Considering all the qualifications of the three applicants. I would select the man on the left. This is distinctly the age of young men, and this applicant is liked by the "old man," which indicates preferences in his favor. Being popular with his mates also will make him popular with his coöfficials and superiors.

A man who is a hustler and observing will certainly outstrip the man who has only held his position by reason of honesty, good habits and steady application. In this age of opportunity, when a man has grown old without having secured advancement from the work of a laborer to that of an official, it would seem rather risky to try him at a later stage in life, because with the constantly changing methods the younger mind is more flexible and adapts itself more readily to new conditions.

A pleasant and frank countenance is a valuable asset to any man, and for this reason I would not consider the grouchy applicant who understands his position thoroughly and is a student, because you can get more work out of subordinates by pleasant methods than by grouchy and disgruntled manners.

I frequently compare an old man placed in a new job with foreigners who come to this country at an advanced age. They show an inability to acquire a new language, and, in a similar manner, a man who is growing old can hardly be expected to adapt himself to the new ideas and working conditions which a promotion involves.

My attitude toward young men may change as I grow older, but belonging to the younger set myself, I indicate this preference.

Carl Scholz,
President.

Rock Island Coal Mining Co., Chicago, Ill.

Letter No. 3—Every mine official would do well to advance that applicant for a position who is studiously inclined and to place every reliance upon his efficiency and every confidence in his ability to grapple and surmount every obstacle. I feel assured that success would be the outcome of his promotion.

I do not desire to cast any reflections on the abilities of his two rivals in the cartoon, who, both, may be excellent men. I favor the student, however, for these reasons:

A studious man is, it is true, more or less grouchy. The application needed to master and attain superiority is severe and allows the brain no relaxation. His nervous system may naturally be as strong or even stronger than that of his competitors, but it is apt to be broken down by the demands made on it by his active mind, which is unceasingly endeavoring to meet those difficulties in his work for which usual expedients furnish no remedy and to ascertain the causes of difficulties and to prevent their recurrence by the means suggested in his keen analysis. One cannot have the favorable outcome of study without suffering somewhat from its disadvantages.

A man who makes no use of his brain power to reason or reflect for the benefit of his employer is unable to cope with the demands which his position makes upon him. His steadiness, his excellent habits and long years of service make him a methodical worker who turns out good results under normal conditions but render him as little adaptable as a machine to those unforeseen circumstances for which he has not made his experience prepare him.

The observing hustler is generally good-natured and noticed by his boss; his hustling makes him popular among his associates, and he is liked by all. But all this does not bring the efficiency which a mine official has a right to demand. The hustler has no time to ponder over the causes of troubles which arise, nor on the manner in which they can be prevented from recurring, and though his energetic nature may with keen glance overcome and smooth errors and mishaps, these obstacles will invariably return periodically, and he will meet them in the same incomplete manner.

A man who thoroughly comprehends his position also understands his responsibilities. His realization of them ever enlarges as his experience grows. His countenance may well bear some marks of the severe mental effort which the problems of the past have drawn upon it and the furrows which present difficulties are even now tracing. He not only sees the present failures, but the coming perfections, and becomes a student, often without being conscious of his ability to concentrate his mind in reflection. This concentration is often termed grouchiness. But take such a man and converse with him and his thorough knowledge will convince you of his serious disposition.

He has made friends, though he is not as popular as his competitor. He is competent, though he may not have given as long years of service. And why? Because he does not require these to form his character. When he sees errors he provides that there will be no repetition of them; he will study his problems till he is satisfied he has the correct solutions. His fellowmen must respect such a worker and will coöperate with such a superior intelligence. Thus it will be found that the student is the man whose service is most valuable to any corporation.

LEO H. MAYER.

1037 Maison Blanche Bldg., New Orleans, La.

Letter No. 4—Some of our railroads have tried to answer this question and have had it partially taken out of their hands by labor organizations, which insist on a more or less fixed rule of "seniority." This often works as badly as if there were no recognized line of promotion, but there is a principle involved which might be given more attention among coal operators.

To get the highest efficiency in labor it must be willing, interested and progressive. America is slow to recognize any fixed station in life for any individual, and no man is dropped so quickly out of consideration for promotion as the one who has "arrived," who holds a job, but is doing no more than simply what the job is supposed to call for.

On the other hand, it is too often the case that a man is not promoted because he fills well a certain place which is considered too important to risk a change, and yet of a class not admitting of an increase in pay. In order to stimulate interest, it is absolutely necessary to have a fairly well established line of promotion, and adhere close enough to the recognition of long, honorable service to put such deserving at a premium. Promotions depending absolutely on seniority soon develop a system which is simply a waiting contest with little superiority over that in which no definite promotion is in sight.

So much has been said about the popular "hustler," who elbows himself to promotion, that it sometimes seems a good idea to see if this "hustle" is just a product of recent successes, or if it is a quality which will continue through a considerable period of waiting. Strange we do not think of coupling the term "hustler" together with the quality of "long, faithful service," and apply them to the same candidate.

If I were boss and had under consideration the popular *hustler,* the steady, long-service *plodder,* and the competent *grouch,* I would send the latter to the doctor to have his liver treated, and then, consider the other two, first from the standpoint of what effect the promotion would have on my system of rewarding faithful service of all kinds, and second, as to the immediate results desired in the position to be filled. I would lean strongly toward long, steady, honest service, believing that rewarded faithfulness begets hustling, and that a little longer tryout should not stifle the ambitions of the true hustler.

In the coal business any system may have to go, however, if a "pinch hitter" is required. I might have to send for the man with the grouch.

JOSIAH KEELY,
Gen'l Mgr.

Cabin Creek Consolidated Coal Co., Kayford, W. Va

Letter No. 5—Everything else being satisfactory the man who understands a job, and has given evidence of the ability to handle it, is the natural nominee for the place. But, while technical knowledge and mechanical fitness are valuable factors in determining a man's desirability for any situation, they by no means qualify him for it.

We look for more than machine efficiency from men. Personal peculiarities have also their values and must be taken into account. The most competent workman discounts his own merits when he permits temperament or disposition to interfere with his efficiency.

No one man runs any job. He may direct or control it to a certain extent. But without the support and coöperation of every subordinate, the supervision of the most capable official is vain. And support and coöperation to be effective must be loyal and enthusiastic. Sullen service is more dangerous than active opposition.

The grouchy official can never figure on the loyalty of any man. That surly demeanor of his will alienate every friend, and cut out every ally in the struggle for results. It is the rift in the lute, the grit in the bearings of the machine that generates friction, heat and ultimate disaster. We should not hesitate to deduct a substantial ratio from the qualifying points of the grouch for his unfortunate temperamental shortcoming.

The case of the long-service, steady and honest workman is one that usually evokes popular sympathy. As there is no reference to any outstanding ability we must assume the possession of average ability only. And the honest, steady, average workman has his reward in steady work at average wages. Promotion to a position of greater responsibility or actual overseeing would be as unfortunate for him as it would be profitless and regrettable for his employers. The kindliest and most creditable act toward him would be to commend his faithfulness and industry, and increase the emoluments of his job.

Much could be said in favor of the popular, hustling, observing favorite of "the old man." We still believe in the education of the schools, and in the system and precision it evolves. But individuality is beyond its achieving. And, when all is said and done, it is the personal factor that is the determining one in human enterprise.

The popular, hustling, observing young man, of moderate accomplishments, will usually outpace and eclipse him who has a better grasp of the situation, but is lacking in tact and the knack of attracting friends and inspiring enthusiasm in others.

That hustle of his is based on a satisfactory grasp of the facilities of his task and is the issue of his habit of observation. Results will pile up and continue under his régime. His success will be a personal matter with every worker, and the smile of "the old man" will be like a lubricant to all the creaking sprockets and cogs that red tape interposes between routine and results.

J. R. ALLARDYCE.

517 S. Webster St., Saginaw, Mich.

Letter No. 6—The cartoon problem entitled "Who Gets the Promotion?" appearing on page 1030 of COAL AGE, describes clearly and with considerable force a problem that is continuously before all managers of large interests. In this particular instance, the selection of the man for promotion has narrowed down to three possibilities, each one representing an entirely different type of man. All of the applicants undoubtedly have given their best services and, considered as individuals, each one is entitled to whatever recognition in the way of promotion it is within the power of the manager to grant. But a selection must be made for this particular position, and however much the manager may feel like promoting the first man, who is popular with his mates, a hustler, observing, and liked by the "old man," he still feels that he lacks the one essential qualification for advancement.

The same is true in the case of the second man under consideration, who has been in the service of the company a long time, has always proven steady and reliable, honest and of good habits.

This, then, centers his attention on the third applicant whom he finds to be thoroughly qualified, in that he understands the duties of the new position thoroughly and in addition thereto is a student, which naturally leads to the belief that he will not let any opportunity pass by to increase his knowledge of the business.

This applicant's chief difficulty, however, is his grouchy disposition, which might prove a handicap in his intercourse with his fellow employees, but the manager finally decides that his duty to his company requires him to promote to this position a man who is fully qualified by his knowledge of the duties of that position, and decides also that, as manager, it will be his duty to take a *personal* interest in his new appointee and do everything possible to assist him in overcoming this one fault, feeling that it will be easier to do so than to promote a man who is not qualified by a thorough knowledge of the business.

A. W. CALLOWAY,
President.

The Davis Coal & Coke Co., Cumberland, Md.

Letter No. 7—If I were superintendent, the position would go to the popular man on the left, and my method would be one of elimination rather than selection. We will dispose of the third applicant, the one on the right, first. The fact that he is grouchy bars him from the place. A grouch would be the last man I would put in authority. There is scarcely a responsible position in mining in which the man who occupies it is not compelled to come in contact with men of all classes—employees, employers, buyers, sellers, etc.

And no matter to what class we belong, we are, after all, much alike, and all of us prefer the man with a pleasing personality to the grouch. It is advisable to treat employees with justice, and even though the grouch be absolutely just, his manner of dealing with his men has the appearance of unfairness. Miners are assertive. They not only ask for fair treatment, but demand it. And a grouchy man in a position of trust is a sure source of friction between employers and employees.

Employers who hold the pocketbook and know they can dispose of their foremen to their best interest, by promoting, demoting or discharging them, can get along with grouchy men. Still their intercourse will not be pleasant.

Send a grouchy man out to sell, and he cannot compete with the fellow with a smile. His product must be superior to that of his rival or the latter will get the trade.

The grouchy man may be a shrewd buyer, but he fails to gain the confidence, and at the same time, fails to secure the benefit of the experience of the man with whom he deals, and so, in spite of the fact that he is a student and understands the position, I reject the grouch.

The second applicant must also be rejected, but not so emphatically as the third. Long services, honesty, steadiness—these are weighty considerations, but they do not necessarily imply ability to fill the vacancy. A man who can neither read nor write might possess these qualities. Equipped with these good points, he could make a costly blunder every day. Now if he had the qualities needed for promotion, he would not be in competition with younger men, but would be occupying a higher position, gained during his period of long service. Vacancies frequently occur, and had he been fitted, his promotion would have come long ago.

And so I come to the first applicant, who receives the job. He is popular with his mates. Usually the man who is honest, square and sincere, who gives a fellowman a lift and has no exaggerated idea of his own importance is the man who secures such popularity. True, a man may sometimes become popular by being a spendthrift, through witty, senseless conversation and by going through life with a "devil-may-care" manner. But men of this stamp are usually seen through.

The statement that the "old man" likes him attests the character of the popularity the applicant has with his mates. The "old man" is a good judge of human nature, and he knows that the man has qualities worth-while. He wants to help the young man rise, partly for the sake of the young man himself, and also because he possesses qualities which the "old man" can capitalize.

The first applicant is observing and a hustler. He will, therefore, be a student and will soon become thoroughly familiar with the position, that is, he will soon have the qualifications of the third applicant. Only time is needed to put him on the same footing with the second applicant.

We may choose him, therefore, because he either possesses or will acquire all the characteristics that commend the other two, while neither of the others can develop the qualities of the first applicant, without special effort.

Geo. N. Lantz.

New Straitsville, Ohio.

Letter No. 8—In reply to the problem, "Who Gets the Promotion?" let us reverse the order of the cartoon and start by calling the party to our right No. 1. This man who understands the position thoroughly, a student, is grouchy. In order to be brief we shall not consider his appointment seriously, for any person who is grouchy cannot secure results from his subordinates; neither can he command the respect and confidence of his employers.

No. 2, the man of long service, good habits and honesty, is doubtless a very good follower, an exceedingly good man, and thoroughly able to perform the duties of his present position, but he would never make a successful leader. He lacks in aggressiveness and tact, and could not stand the pressure and responsibilities of a higher position. Hence, we will pass him up.

No. 3, the fellow who is popular with his associates, a hustler, is observing of the things that take place about him; he is liked by his superiors.

The days of the grouch are past. Men in responsible positions in and about coal mines cannot disregard the rights of their less fortunate brothers. Moral excellence is justly felt to be an indispensable element in the handling of all kinds of business. Men may be brilliant, clever and strong, but with all these, if they lack character they will certainly fail. The spirit of cheerfulness and good will predominates today, or should, in the transaction of business between employer and employee.

Men sometimes through personal favor and in spite of the fact that they have never manifested either ability or capacity, have been appointed to responsible positions. Such men as these invariably fail when placed in charge of important work.

Men are not always judged by their appearances and language when on duty and on their good behavior, but by what they do in their leisure hours. Someone has said that character is the invested capital of the young man. He should be an optimist and possess a cheerful countenance; he should have stability of character, aggressiveness and be filled with a determination to win.

Dean Stanley once said that every position in life, great or small, can be made as great or as little as we desire to make it. What you are settles the question of what you can do.

Therefore, if I were the boss, I would promote the popular man, who knows how to hustle.

Anthracite Superintendent.

————————, Penn.

Letter No. 9—Each of the three men is worthy of promotion at some time. The choice will depend somewhat upon the nature of the job for which the selection is to be made.

The man who understands his position thoroughly and is a student is, as far as his work is concerned, most certainly a logical man for promotion. His thorough grasp of his job will make it easy for him to direct the work of his subordinates. His being a student indicates that he will not be left behind as the methods of doing things in his industry progress and improve. However, his promotion should be deferred until he is able to overcome his grouchy disposition. Grouchiness causes unnecessary friction.

The man who is popular with his mates can usually secure coöperation, a very valuable consideration. When, in addition, he is a hustler and observing, he is desirable in any organization and is sure to win promotion at some time. However, on account of his popularity, is there not a risk that his decisions may be influenced somewhat by his opinion of their effect upon his popularity? Taking his qualifications into consideration with those of the other two, would it not be advisable to allow him to become a more seasoned worker before he is promoted?

The man who is steady and honest, with good habits, and a long record of service proves by these characteristics that his work has been satisfactory or he would no longer be with the company. Promotion in his case would be a great factor in increasing the efficiency of the entire plant, showing thereby the reward of faithful service.

No company can well afford to neglect the opportunity to show all of its workmen that it appreciates the value of dependableness, good habits and honesty. Moreover, the management is bound in justification of itself to consider favorably this man, for if a man with an apparently faultless record can render long service without chance of promotion, there is something lacking in the conduct of the business. It is likely to appear that no thought is being paid to developing the bosses of the future who must take the places of those who leave or retire.

Another point in favor of the man of long service is the stability that his continued service renders to any company. One of the greatest weaknesses of an industrial corporation is a constantly changing body of workmen. To overcome this fault and to develop a continuity of policy, nothing better can be done than to promote faithful employees deemed worthy of advancement. This will do much to correct the somewhat widely held supposition that a man must change from one company to another in order to better his position. After considering all of the above points, if I were the boss I would promote the man with a long record of service.

M. D. Cooper,
Mining Engineer.

Ellsworth, Penn.

Other Interesting Opinions on the Promotion Problem

[The following 20 letters discussing the cartoon "Who Gets the Promotion?" are of such great interest that we feel entirely justified in devoting space to their publication. A great many different points of view are expressed. There is no doubt but that some readers will find letters among those that follow which they would have selected for the final vote if they had been acting as judge. The contest, of course, is purely a friendly one, designed entirely to help all of us who are striving to advance our fortunes in the coal-mining field. This is a case where one man's opinion is just as good as that of some other fellow. Coal Age *appreciates, not only the interest, but the effort devoted to the discussion by its readers. We doubt if any paper printed in the interest of an industry such as coal mining, has ever advanced a question of this nature and met with such an enthusiastic response. It is such results as this that cause us to believe that our efforts are not wasted, when we devote them to the development and encouragement of the men in the mine, as well as to the mine itself.*—Editor.]

Letter No. 10—Which man shall I give the position? If I look too long at the men's faces I may be influenced by what appeals to my particular nature. I like the sunny atmosphere radiated by the first man; the honesty and steadfastness shown in the face of the second influences me strongly, while the sourness of the last man's countenance might make me overlook his sterling qualities. So I must try to forget personal appearances and judge on character, training, ability and general fitness.

The character of the position to be filled is not stated and thus one of the great questions to be solved, individuality harmonious with the work and men involved, cannot be decided. However, all three men are competent and thus the appointment depends upon which would serve best the corporation's interest. By "corporation's interest" the narrow view that it means making the most money in the shortest space of time is unacceptable. Rather, assume that it is a great undertaking which serves the people and will outlast the present generation of stockholders, who are broad-minded men and wish to leave to their posterity something enduring. This means "the greatest good to the greatest number."

The fact that the "popular man" is liked by the "old man" is probably generally known. If he is given the position the belief that favoritism was shown will be cultivated, thus generating the feeling among employees that there is no use trying, and that merit will not be rewarded unless one has a "pull." Some will try to ingratiate themselves by methods self-respecting men cannot countenance. A bad morale will be created.

If the "grouchy man" is given the post, true progress is impossible, for grouchiness on the part of the boss does not inspire men with good will. In some it engenders fear, which ofttimes turns to hate for those above and for the corporation. The grouchy man is apt to be selfish. First better try to show him wherein his failing lies and let him know that unless he overcomes it he cannot rise to positions his abilities could otherwise command.

The man, who through long, steady service has attained competency, who by good habits and honesty has established his character and won the respect of his fellows and superiors is *the* man. Some will say that the brightest or the hustler or the "good fellow" should have the job, but more will say that the long-service man deserved it and will feel that there *is* a chance if they work hard, because their efforts are bound to come to the attention of the "old man" and be rewarded, for the "old man" is square and doesn't "play favorites."

Thus good feeling is created, a goal is set to strive for by honesty, perseverance and ability and all good men will work for the best interest of the corporation.

Mining Engineer.

Salt Lake City, Utah.

Letter No. 11—The boss will pick the young man, not on account of his age, however, but in spite of it.

He wanted a man who was not only competent to fill the place, but was anxious to get it; so anxious, in fact, that he had manifested his wishes in the matter by preparing for it in advance. When he came to size up the eligibles, he found that only one of the three had really prepared for the place; imagine then his disappointment when he recalled that this man had been a grouch, and to all appearances was still a grouch. Think of trying to pass my enthusiasm down to my men through a grouchy assistant, thought the boss, they wouldn't recognize it when it got there. No! it isn't thinkable.

This left the old man and the young one.

Now the boss respects old age, and is always anxious to reward faithful service, but he reasoned that just because a man has good habits, is faithful and steady and has been long in the employ of a company, cannot be considered sufficient evidence that the man has ever tried to better his condition, nor that he would necessarily be a success in a higher position. Such qualifications simply bespeak a normal man who has deserved and received normal rewards and has no right to expect more.

I would be willing to take a chance with such a man if I had to, said the boss, but let's see if it is necessary.

The young man belonged to a different breed. One cannot be popular with his mates and with his boss by mere accident; he must take himself seriously, to say the least; thus reasoned the boss, and then he decided that one who is observing and is willing to hustle can make a success of most any position if he will only keep at it long enough. And so the young man was promoted, and although the boss was not able to make a sure bet, he felt pretty well satisfied with the prospects.

H. S. Geismer.

Consulting Engineer, Birmingham, Ala.

Letter No. 12—Of the three men presented in the cartoon, I would choose for promotion the central figure; the man who is "honest," "steady," of "good habits" and "long service." Leaving aside any discussion of the good qualities possessed by the other two applicants, I would give this man the promotion because I believe the first and finest essential of organization is the recognition of faithful service. Also, he must possess certain ability or he would not have been in the organization so long. To my mind, the fact that he does not yet thoroughly understand the position in question does not mean he cannot hold it. He has given a fairly good account of himself so far and he must take the new job knowing that if he can't fill it he can't have it long. That's the privilege and duty of a "boss," and I believe it is always good business to exercise it. I think some bosses fail to realize that there is such a thing as keeping a man in one place too long.

Promotion always heartens a man tremendously. A fellow must have a chance or he can't show what he can do. If he fails, then he can be taken care of elsewhere and there are always other men available. I do not think it is fair to a man or good for an organization to allow deserving men to remain in the same place or at the same pay too long. I always admired the man retained in a responsible position for years at the same salary, who wrote his boss and asked him to either raise his salary or lower it—he wanted to find what the boss thought of him.

I do not think any first-class man works for his salary alone. He will strive to prepare himself to earn more and when he sticks to any concern in this hope, he is certainly entitled to the call when the chance for promotion comes. To advance the man of good habits and steady character who has "Service" to his credit, will create a healthy feeling in the whole organization. Whether the man holds the place to which he is promoted is a secondary thing. He has been given his due and every man in the concern will feel better and work harder, knowing that the fixed policy of the "Boss" is to recognize service first.

In this case if the man after a full trial did not justify my selection I would explain to him that he could not retain the position and would put him in a less responsible place, for in a concern of any size there is always a place for a steady, honest man. I would then call up the other two men and select the better one of these for the place.

I am strongly of the opinion that any good man who serves a concern faithfully should have his chance. Where this policy is firmly established, men will work harder and feel better in spirit because they know they will be given the opportunity to develop any latent ability they may possess.

Personally, I'd rather be "fired" a dozen times than never have a chance at better jobs just because I satisfactorily filled the one I was in and I believe most men in every organization feel the same way. I don't believe you can discount faithful service, and if I were the boss I wouldn't try to.

NEILL HUTCHINGS.

Tennessee Coal, Iron & R.R. Co., Birmingham, Ala.

Letter No. 13—In order to come to a conclusion upon "Who gets the promotion?" requires a careful study of the three candidates for advancement. To quote the words of your magazine, "All are competent, loyal, of good character and good health." From the standpoint of the present, then, all are well fitted for the position. The question of the greatest moment, however, the one which confronts every man of business and on the solution of which depends his success or failure, is the question of the future. It is, therefore, by the standards of the future that we must judge the applicants.

The man on the right understands his position and is a student, but on the other hand he is a grouch, and as such would be unpopular with his men. The man in the center is steady, honest, of good habits, and has been long in the company's service. This latter consideration especially renders the company under obligation to him. But during his long term has he shown qualities necessary for promotion? If so, why has notice not been taken of him before now? He is old in the service, his habits are fixed, he cannot change his ways. His face would indicate a weak character, content to do his work and allow others to do theirs undisturbed.

The man on the left is popular with his mates, a hustler, observing, and liked by the "old man." Since he is popular he would probably be called on as foreman to arbitrate the petty difficulties which naturally arise, and the men will be likely to abide by the decision of one with whom they are on friendly terms. He is a hustler, and we may rest assured that his work will be thoroughly done. Furthermore, since he is observing, he will acquire knowledge rapidly, for to observe is to learn. He will soon come to know the shirker from the honest workman, and his observation will enable him to place men of merit in positions under him.

Now to sum up: We have learned that the man on the right is a grouch, so in view of the qualities of the others we can eliminate him from consideration. The company owes the man in the center a debt for long service, but that debt need not necessarily be paid by promotion. When not accompanied by the necessary qualifications or when over-shadowed by the ability of others, long service must be repaid by some other method than that of advancement. This brings us finally to the man on the left, who has the qualities necessary for a higher position; popularity, energy, observation, and a frank, open countenance. The "old man" with his years of experience sees the future possibilities of this man, and plans his appointment.

ROY ANTHONY.

Paulton, Penn.

Letter No. 14—

The choice of one to fill the place
Presents a very trying case,
Wherein the head and not the heart
Must calmly play the leading part.
The company expects the boss
To show a profit, not a loss,
And so his own career depends
On keeping up the dividends.

He dare not bow to sentiment,
Because it yields no 10 per cent.;
So he ignores the oldest man
In working out his running plan.
His keen and calculating eye
Dwells on the hustler, passes by,
And rests on him whose powers vouch
His fitness and his worth—the grouch!

E. KEMFER.

——, Penn.

Letter No. 15—The qualifications of the older employee are: Long service, steadiness, good habits and honesty. However, the first, rather than an asset, is a liability, because having done the bidding of others for so long a time, the subordination has stunted his self-confidence and weakened the judicial bearing needed for handling men. Past the prime of life his energy and ambition to progress have been gradually superseded by a nature set and opinionated along trivial lines and inclined to allow business to glide along the channels of least resistance.

The man on the right understands the position thoroughly, is studious and naturally progressive, but, as stated, he is grouchy. A morose disposition will not inspire men to their best efforts, but will cause good men to leave the employ of the company, while others who remain will labor with illy disguised hostility. So it is evident to the reader that the popular man approaches the ideal most closely.

THERNE V. SMITH.

La Follette, Tenn.

Letter No. 16—Any one of the three applicants pictured in your cartoon would strongly appeal to the man who has the promotion to make. Each appears competent and worthy in his present position, but there are qualities inherent in one which cannot be enumerated to the credit of either of the others.

Doubtless the man with the recommendations of long service, honesty, steadiness, and good habits, is a fit man in his present position. Experience has made him so—thus far. But new conditions are constantly arising which blind experience alone cannot surmount.

The student, possessed of thorough competency, has an advantage over his long-experienced brother. He is alert and alive to new occasions which teach new duties. Sad to say, however, he has an overwhelming drawback for "as no woman ever loved a fat man," as the legend goes, so this world has positively no use for a grouch, and we doubt whether the hereafter has either. A man with a sordid, sour countenance never works to the best interest of either company or employee, for if "it takes love even to make a donkey go," how much more so with a man. Men instinctively recoil from acid humanity and whether in work or sport seek the company of the individual worth while, the man with a smile.

The applicant of long service has undoubtedly been a great asset to the company in years past, but it is of the future that we must now think.

But the popular man, the hustler, the observing individual, who is liked by the "old man," possesses the combined requisites of his two competing brethren for the promotion in question. He has been indeed fortunate in avoiding or eschewing their faults. He is all they are and more. He is young, earnest, quick and alive to the interests of his employer, has observant eyes and is prompt to act in his hustling manner.

Popular with his mates, and liked by the "old man," what does this mean? In a word, it means better results. We all like to work for a considerate man; one whom we honor and respect, and we are far more apt to do a good day's work for such a one than for a slave-driver. Humanity ever craves some consideration, and probably will as long as its make-up is of flesh and blood. Being young and popular and observing, the man on the left is bound to grow in value to his employer and be promoted accordingly, carrying on the exacting duties of his job meanwhile with vigor, with circumspectness, with economy and efficiency, yet without that friction, which frequently mars industrial relations.

"Long Service" is a mighty good man, infinitely more to be desired than "Grouch," but "Popular with his Mates" in my opinion should receive the promotion.

JACOB ROSSER.

St. Nicholas, Penn.

Letter No. 17—Were I the boss portrayed in the cartoon, I would choose the man popular with his mates, the hustler, the observing, the one liked by the "old man."

All are competent, loyal, and have good character and health, but one of the three has more than these qualifications; he has a good disposition, with depth of character; hence his popularity with his co-workers and with the manager.

Your introductory note states that: "All of the men before him are competent, loyal, of good character and good health." This man must be steady, or loyalty could not be numbered in his qualifications; he has good and no bad habits, or his health would be impaired, and he is honest, or his character would not be good. He also understands his position thoroughly, for surely competency means no less.

He thus has all but three of the qualities attributed to his rivals, for they are all involved in those listed as his distinguishing traits. True, he has not long service as has the older rival, nor is he a student with a grouch like the third man. The claim of long service should be most certainly rewarded but not with promotion. The best years of the old man are behind him. The other man's good quality, studiousness, is entirely discounted by his tendency "to grouch." Good cheer is absolutely essential to success.

If the "popular" man gets the promotion, the boss need have no misgivings as to the wisdom of his choice. He has elected the most efficient, the best equipped and most likable of his three employees to fill the vacant position, one which is full of responsibility and demands intuition, tact and ability from the incumbent. All these three qualities are possessed by the "hustler."

READER.

——, McDowell Co., W. Va.

Letter No. 18—Of the three men available for promotion, choose the one with the characteristics "popular with his mates; hustler; observing; liked by the old man." Men of this type are generally of more value to an organization than those having the other qualifications.

The center man, he of the "steady and faithful" characteristics is, no doubt, one of the mainstays in the business, and his position is doubtless hard to fill. But although his services should be acknowledged and rewarded, he should be retained in his present capacity unless his promotion is desired for some particular reason.

Neither, other things being equal, should the studious man, the third one in the line, be promoted. It would be more advantageous to find some special work for him that is better suited to his studious and analytic turn of mind. A man of this type is rarely able to lead other bodies of men so as to reap the best results from their collective efforts. He often neglects the broader duties of his position in order to concentrate on details which should be left to the care of his subordinates.

Promote the man who is popular with his mates and with the boss and who has the hustling and observing way of doing things. Promote the optimist, for he is the man everybody likes. They like him because of his contagious happiness and enthusiasm. These qualities are irresistible; they lead us on so that we are bound to follow.

A man may be faithful and steady when things run along in the usual way, but when a particularly big job turns up he is liable to lie down. A man may be skillful and thorough, but when a particularly mean job comes along he is liable to balk. But for the real trouble-fighter choose the optimist. While the other fellow is proving to you that the job cannot possibly be done, he has made a start and is probably half finished. The fundamental virtue of life is bravery; bravery to start to do the difficult thing.

Russel S. Dart,
Mining Engineer.

44 W. 77th St., New York City.

Letter No. 19—In giving this promotion to "Long Service," I am following the plan of at least two of the most efficient organizations in the United States—a plan that has often been tried and which ultimately has proved good. The fact that this man was being considered along with two other men, much younger in years and service, shows that length of service alone is not always taken into account in the question of advancement. But in this case there is excellent opportunity to show to every man about the plant that loyalty, competence, good habits and long service will surely be rewarded.

Aside from a desire to carry out the policy of the company, there is in my decision a little matter of selfishness. While in a way I am working for the best interests of the organization as a whole, I am, in the last analysis, working for myself. I know "Long Service" well. He has his shortcomings; but so have I, and knowing each other we can do effective team work. I shall be able to anticipate his failures and so can help him before he makes any grave error. He has shown me that he will do all he can to make any good scheme of mine a better one, and, what is more important to me, personally, and also I take it, to the plant as a whole, he will, keeping his own counsel, work his head off to make any indifferent scheme of mine less of a failure.

And, as still further evidence of my selfishness, my decision retains me two other good men. Neither "Popular with his Mates" nor "Student" will resent my promoting "Long Service"; while it is possible that the first with his friends might question the advancement of the second, and it is certain that "Grouchy" would attribute the promotion of his younger fellow to "pull."

I had it in mind to wind up with a word of apology and encouragement to my two young friends; but I am so pleased with my wisdom that I feel that none of either is necessary. They will both be glad with "Long Service" and both will know that their reward will come in due season.

Colorado Engineer.

Trinidad, Colo.

Letter No. 20—The answer to the question "Who gets the promotion?" depends largely upon the nature of the position to be filled.

Assuming that the position is to be that of mine foreman or one that deals chiefly with the handling and management of men, and provided it is in direct line for a superintendency in the future, there are three main qualities essential to success; namely, energy, knowledge and the ability to control men.

All the applicants in the cartoon have important places in any organization, and either one would probably excel the others in the particular position to which he is adapted, but they are men of different natures, and therefore are not suited for the same position.

Judging from their description and appearance, I should say that the student is a man quite distant, reserved, who has spent his time gaining knowledge of other things than human nature, developing the intellectual rather than the social side of his character. His knowledge of facts and theories is indispensable, and without it but little progress would be made, but he is not suited to manage men, and should be given a technical position if possible.

The man of long service is evidently one who has not tried to develop any definite side of his nature, but has given his spare time to other things, probably his family. He has never shown any marked intellectual quality, but has been a faithful worker. Such men usually deserve better treatment than they receive.

But the superintendent of today seems to be the popular hustler, the man who can adapt himself to new methods and changing conditions, and who is capable of handling any organization of men. The man who is congenial, appreciative, impartial and courageous, and a close student of human nature, possessing meanwhile a fair amount of technical knowledge, is the man that climbs the fastest in the operating department. Such a man cannot be put aside.

Davis Read.

Sturgis, Ky.

Letter No. 21—I am afraid I shall be with the great majority if I choose the popular, observing and hustling man as pictured in your problem cartoon. In American commercial and industrial work he would probably be selected for promotion and leadership because, to be popular with his co-workers, a man must have a general education and possess some propelling personality, otherwise his companions will not look up to him for guidance. In being a hustler and observer he has two qualifications which, coupled with good judgment and common sense, would gain for him recognition in any position, even if he were not well educated.

By observation he cultivates the use of his gray matter, becomes alert, is always ready to apply new ideas for the improvement of old systems and frequently introduces original methods. By observation he naturally becomes a student, and with his ability and desire to hustle he will quickly succeed. The fact that he is liked by the "old man" sometimes overshadows any small deficiency he may have and places him in the front. The "old man" probably likes this employee because he always speaks well of his superiors as well as his subordinates and guards and weighs carefully any expressions concerning his company's affairs when talking to outsiders. He is neither loud nor positive in expressing his views and is always willing to learn.

The man who thoroughly understands his job but has the misfortune to possess a grouchy disposition is handicapped by this unfavorable trait, which mars the excellence of his work, and no doubt impairs his ability as an executive. It is not always the highly educated and studious man who makes the best employee or superintendent, and although this type of man knows how, he might lack the willingness to impart his knowledge to others. He is apt to think and express himself as knowing more than his "boss," which will eventually prove a stumbling block on the road to his success. His grouchy disposition would also tend to repulse men who would otherwise like to confide in him.

The "long-service" man with his honesty, steadiness and good habits has all the qualifications that could be desired in any man and the promotion should, by all natural laws, go to him; but his mind and life have lost their keenness and adaptability in the slow, conscientious grind of his work. Consequently he does not fit into our present-day progressiveness. Many a man of these same virtues can give instances in which he has been passed over in making decisions of this kind. Long service, although worthy of all honor, is often harmful inasmuch as it narrows a man's mind and makes it slow to receive and adopt new methods. As a rule, the "old hand" becomes touchy and resents suggestions made by younger minds. He is often tolerated because of his long service; whereas, if he were a younger employee, reprimands of no light character would be in order.

BYKEM.

Will County, Ill.

Letter No. 22—We can all think of certain phases of coal mining where the individual traits of all three contestants might be desirable, but, since we do not know in which department the promotion is to be made, we can only discuss the problem in a general way.

I am going to award the promotion, therefore, to the man with good habits, honesty and steadiness, to the man who having those qualities has been long in the service. His advancement will serve as a notice that long-continued, faithful service will not go unrewarded.

In closing, we should pay our respects to the cartoonist, Greene, who has provided his student with a "grouch." A studious nature is nearly always accompanied by this failing. It seems a sort of trick to which the fates resort to detract from the pleasures of knowledge. It places these men nearer on a level with their less erudite neighbor and preserves the equilibrium of the world's happiness.

ERNEST L. BAILEY,
Mining Engineer.

Crumpler, W. Va.

Letter No. 23—I think the man who is popular with his mates, a hustler and observing, is the one who should get the promotion. I believe this for the following reasons: The really valuable man is the one who is a hustler when hustling accomplishes something. Some people always hustle, yet when the day is done there is nothing accomplished. When I speak of hustling, I mean the real live hustler, the man who, when he hustles, put things in motion and keeps them going.

As for being popular with his mates, I consider this an essential quality in the make-up of a really valuable man. In order to keep pace with the times, a man should mingle with other men and keep in touch with what is "doing." Being friendly is a trait which costs little and secures to the man who exercises it the good-will of his fellows. Thus all will work in accord to keep their boss "on the top of the heap" when the tonnage is being compared at the end of the month.

When a man has the good-will of those about him, they take a live interest in their work, and as soon as a defect is noticed in any machine or appliance, he is promptly notified, possibly saving an hour or two of delay. On the other hand, the "grouch" who goes around all day finding fault with everybody except himself will receive similar notification only after some time, and in many cases machinery will be allowed to go to ruin, the negligence being palliated by the familiar expression, "Let him go to h—— and see things himself. He's only an old dub anyway."

Of course, popularity should not be carried to extremes; there is a limit, and any man with good judgment can readily determine the difference between friendliness and intimacy, and can seek to secure the one while avoiding the other.

I am sure all will agree that the man who wants to keep in line for positions ahead must be studious. The man who can acquire knowledge and use it to the advantage of his employer is a valuable man, but unfortunately all students are not thus gifted.

As for the man of long service, good habits, and honest, I would say that one who has spent the best part of his life working for a company should be given worthy consideration.

As for honesty and good habits, I feel that no man should be considered for promotion who does not possess these qualities.

Any man wishing to build up a good live organization should select for promotion the man who he feels can in the long run make the dollar multiply oftenest in the safest possible manner.

TIMOTHY A. RYAN.

Hazleton, Penn.

Letter No. 24—It is my opinion that No. 1 gets the promotion, he who is also characterized as a hustler, popular with his men, and liked by "the old man." Speaking from a varied experience covering many years as an employee desirous of advancement, and then again as an employer to whom the responsibility of promoting or discharging fellow employees fell, I view those three qualifications as covering a multitude of other characteristics, some among them even being qualities which may well be regarded as shortcomings in a mine official. It is a truth as many an otherwise good mining man has found out to his sorrow that the qualifications mentioned aren't such as can be dug out of textbooks, yet they are preeminent steps toward success in mine management.

Our sympathies, of course, are naturally with the man of good habits, long service and sobriety. He is of a type found at every large plant, and no doubt he has the sympathy of "the old man," too. But we must assume that his "long service," "sobriety," and general good habits are an indication that he lacks the chiefer essentials owned by No. 1, for otherwise he would not have remained stationary so long on the line to a higher position. He is a "good man," but mere goodness does not always indicate 100 per cent. efficiency, as an uptodate mine official, who, handling a composite situation, must himself be composite.

No. 3 being a man who thoroughly understands his work, but is "grouchy," nullifies by the latter quality all he gains in the former, at least where many men are employed. In my opinion no man can successfully be a chronic "grouch" and a first-class mine official. The owner, himself, may occasionally indulge in a fit of ill-temper, but even in his case, or in that of the general manager, it is a dangerous hobby where dividends are desired.

S. C. Reynolds,
Safety Inspector.

Aetna Liability Insurance Co., Houston, Penn.

Letter No. 25—If I were the boss I should not hesitate for a moment to reject the grouchy student, although he may understand thoroughly the duties of the position to which he aspires.

The "long-service" man, who is "steady," of "good habits" and "honest," would incite my sympathy and admiration and cause me to pause. After this pause, I would turn my eyes toward the observing hustler who is liked, therefore likeable, and he would be my choice for the position to which the three aspire.

The physiognomies of the men as presented by the cartoon have an immense bearing on my decision, and the kindly and hopeful spirit pictured by the face of the man of my choice impresses me with his value for present and future service. I am sure that moral suasion and kindly leadership would be his method of controlling men and producing results.

Human nature and noble manhood revolt at the driving method employed by a grouchy master, while the smile of the kindly spirit awakens ambition for faithful and effective service. Long and steady service and good habits have evidently crowned No. 2 with a high reward—the accumulations of his labor and the plaudits of his manager and mates.

The boss being responsible to the man higher up for all errors of the organization he has built cannot allow human sympathy to sway his judgment in making his selection, but must look for strength to accomplish. He can best find it in the brawny arm, the cheerful face, the hopeful eye and the ambitious heart of the man I have chosen.

Frank V. Evans.

Birmingham, Ala.

Letter No. 26—My preference is for the man of long service, steadiness, good habits and honesty.

It is difficult to realize how such a man can avoid having on his side most of the specially good points displayed by the other two candidates. Thus, he is bound to be "liked by the old man"; he surely must also "understand his position thoroughly"; and he cannot but be "popular with his mates."

Being a steady man of good habits, he will almost certainly be a reader of his technical or "trade" paper, and consequently be uptodate in his own branch of labor.

The first applicant is "popular with his mates," but in the absence of any information regarding his habits, honesty or steadiness, we fear that this trait might not always work to the advantage of the firm, if this man were placed in a position of trust.

He is also a "hustler," but nothing is given as to his knowledge or experience, consequently it is possible that his "hustle" might not always be effective.

In view of the merits of the other applicants, it would be taking too great a chance to give this man the promotion, with his habits, character and experience in doubt.

The points given in the third man's favor are depreciated by his grouchy nature, as cheerfulness and a spirit of good fellowship are essential factors in the successful official.

Wesvania.

————, W. Va.

Letter No. 27—It is stated in your article that these three employees are all competent, loyal, of good character and good health, and presumably these qualifications exist to the same extent in each man; therefore, we can eliminate two of the characteristics also given as the attributes of the employee who has seen long service, namely, good habits and honesty, for if a man has good character, it follows that he will likewise have good habits and be honest. The assets of these employees on which is based their chance for promotion are then as follows:

First employee: Popular with his mates, hustler, observing, liked by the "old man."

Second employee: Long service, steady.

Third employee: Understands position thoroughly, student, grouchy.

It is assumed that the new position will carry with it increased work and responsibilities, with fixed relationship toward fellow employees.

As a help in deciding which of the three men to raise, I have alloted a certain number of credits for each characteristic as they appear to me, disregarding the virtues they possess in common, as stated in the premises, viz., competency, loyalty, good health and good character:

POINTS FOR MERIT AND DEMERIT

Understands position thoroughly	75
Long service	40
Student	25
Observing	25
Steady	25
Hustler	25
Grouchy	25
Liked by "the old man"	10
Popular with his mates	25

It is an easy matter now to figure out for the boss which man to select from the above rating, and in so doing we find that the "popular" employee is entitled to 85 credits, the "long-service" man to 65 and the "studious" competitor to 75, the last named having sustained a demerit of 25 points because of his grouchiness.

It is to be regretted that the second employee cannot be recommended for this advancement; however, he has evidently neglected, in his long years of service, the betterment of his condition, through lack of study, observation and making himself thoroughly familiar with the different positions probably held by him. If these matters had been attended to, he, instead of the boss you have shown, would probably now be making the decision as to the man to be promoted.

It is hard to pass the third employee by, for when a man understands his work thoroughly, he is generally the right man to advance. However, this particular fellow is "grouchy," and this handicap is too big to overcome when there is more or less dependence on fellow employees for success.

Considering everything, therefore, we are recommending to the boss that he appoint the first employee to the new position, and we wish success to him.

Coal Accountant.

Washington County, Penn.

Letter No. 28—To all appearances all three are good men. First, there is the man who understands the position thoroughly and is a student but is grouchy. Such "touchy" individuals are fast disappearing from among the list of officials, for with all their knowledge they are unable to get their subordinates to coöperate with them, and nine times out of ten are desirous of filling all the subordinate places themselves, feeling that otherwise the work will not be well done. They are good workers but the mere worker is a loser.

Second, there is the man of long service, who is steady, has good habits, and is honest. This man is more liable to work for his salary than for the honor of the position. The man who works solely for his pay is a sorry workman and not much in demand as an official.

Third, comes the man, "popular with his mates, a hustler, observing, liked by the old man." In my opinion he is a man much in demand in the last few years, as all the progressive companies are looking for men of his type.

He is a man who doesn't need to be watched; he is able to get his subordinates to coöperate with him, has enough aggressiveness and will power to put things through, and he nevertheless remembers that there is wisdom in consultation even with his subordinates. Through friendly conferences he gets the good-will of the latter and this is the most valuable asset a company can have. He is the man who not only meets his troubles, but eliminates them as much as possible, and he so identifies himself with his duties that you will hear him talk of "*our* company, *our* mine and *our* tipple," and to men of his type success is assured.

C. J. Fuetter,
Electrician.

10 Ridge Ave., North Braddock, Penn.

Letter No. 29—I would first consider the "long-service" man. If he had the other good qualities, the necessary hustling and observing characteristics and understood the job, he would get the promotion. If he lacked these attributes, I should be untrue to the trust imposed in me if I promoted him.

I should feel it my duty to promote the best man for the job regardless of personal feelings, and if that man can be found among those long in service, it should be given him not only because he is entitled to it, but as an incentive to other men to work for promotion and remain in the service.

If this course is not pursued, a spirit of discontent is apt to be aroused and the employees feel there are no adequate rewards for faithful and efficient service. If the long-service man did not measure up to the requirements I would turn to the hustler provided he was faithful and honest and understood the job.

Edward H. Coxe,
Mining Engineer.

La Follette, Tenn.

Letter No. 30—You can place my vote on the "popular" man. His countenance is greatly in his favor, showing greater vigor, stamina, alertness and intelligence than the physiognomies of the other two. But his popularity is one reason for my favoring him. This quality goes with a knowledge of human nature, the essential need in the operation of any concern.

Then he is a hustler. Somehow that word does not convey a mere worker. The word hustle combines the idea "work" with "contagion." The worker works alone; the hustler charges the whole atmosphere with energy, and work that seemed laborious to his fellows now appears to be done without effort.

Further, he is observant. He can, therefore, select his men and shift troublesome workers from job to job till the job and the man are in harmony. He notes the seeds of dissatisfaction before they germinate and he has no use for the man who seeks his living in making trouble.

The man of long service has little title to promotion. It has not taken long to tell if the younger man is fit and the older unfit. Nor does the grouch receive my vote. True he may get over his bad habit in the future, but I want a man to take charge today. With a wet place and rock mixed with the coal, the miner's lot is hard enough without a grouchy foreman or superintendent to stir him to revolt.

Subscriber.

Nanaimo, B. C.

Additional Replies to the Cartoon Problem

Letters were received from the following Coal Age readers, and are given under their proper classification, so far as their expressed choice is concerned. It may be stated further, that all of these letters were selected in the first examination of the replies to the cartoon problem as being worthy of publication. It is quite likely that a different set of judges might have selected some of these letters that are not published instead of those that are printed on the preceding pages. We are sorry that a lack of space prevents our using all replies sent in. The discussion, however, is one we do not want to carry over to later issues of Coal Age. The answers below are from men in all positions from general superintendent to fireboss and miner:

For the Popular Hustler

H. B. Miller	Pittsburgh, Penn.
H. L. Fickett	Belle Ellen, Ala.
James Dickson	Nanaimo, B. C., Canada
A. N. Young	Masontown, Penn.
R. Z. Virgin	Colliers, W. Va.
John Hammond	Coral, Penn.
W. S. Dutton	Scranton, Penn.
William Derbyshire	Coal Bluff, Penn.
Miner Raymond	Tiffin, Ohio
Frank Black	Philadelphia, Penn.
W. H. Beck	Ellsworth, Penn.
John Rose	Dayton, Tenn.
Jacob Riley	Universal, Ind.
R. B. McDowell	Ligonier, Penn.
J. W. Bischoff	Elkins, W. Va.

John Neal	Dayton, Tenn.
J. H. Hall	Ensley, Ala.
W. E. Wolford	Ligonier, Penn.
G. R. Waddell	Moundsville, W. Va.
E. G. Doherty	Shenandoah, Penn.
Frank T. McGuire	Kansas City, Mo.
Robert O. Stokes	Lang, Calif.
H. A. Lehman	Bevier, Mo.
Chas. A. Waine	Allison, Penn.
William G. Watkins	Kingston, Penn.
Geo. H. Carrico	Springfield, Ill.
Oscar G. Nelson	Sykesville, Penn.
Geo. H. Northover	Holsopple, Penn.
W. K. Anderson	Colorado Springs, Colo.
Thos. Hogarth	Republic, Ala.
W. H. Clark	Bolivar, Penn.
A. T. Wade	Tom's Creek, Va.
Robt. M. Wilson	Little, Ind.
Jas. T. Reynolds	Vandergrift Heights, Penn.
C. J. Vanviette	Scammon, Kan.
William D. Thomas	Edwardsville, Penn.

FOR THE LONG-SERVICE MAN

John Sheppard	Glencoe, Ohio
C. E. Taylor	Oakman, Ala.
John Glizzoni	Wishaw, Penn.
J. H. Spence	Bernice, Penn.
C. C. Barnett	Dard, Ala.
M. L. Wells	Ballard, Ky.
Bert Thompson	Wick, Penn.
Thos. Lynch	Starford, Penn.
Jas. King	East Brady, Penn.
Frank Hutten	Van Lear, Ky.
Joseph Hallier	Birmingham, Ala.
Milton Wheeler	Republic, Penn.

FOR THE STUDENT GROUCH

J. Fuld	New Orleans, La.
John W. Gorman	Lovejoy, Penn.
Dennis Keith	Yamacraw, Ky.
James Kenniburg	Homer City, Penn.
Jas. Laughery	Independence, W. Va.
Charlton Dixon	Stewartsville, Ohio
Reuben Edwards	Philadelphia, Penn.
Robert H. Winn	Koehler, N. M.

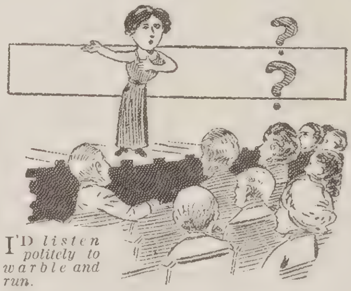
Coal Production of India

According to the daily *Commerce Reports,* the inspector of mines for India reports that in 1913 the output of coal in the whole country was 15,486,318 tons. This is an increase of 10.27 per cent. over the output of the previous year and is a record in quantity for India. At the same time the report shows a drop in the rate of increase which was 0.83 per cent., 5.80 per cent., and 16.56 per cent. for the three previous years, respectively. The drop in the rate of increase was caused in part by the flooding of mines in Bengal and Behar. Abnormal floods were experienced there.

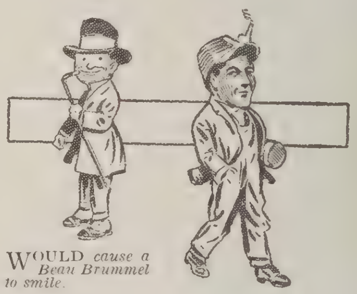
CONTENTMENT

Written Expressly for COAL AGE *by Michael Bernard*

AND *thinking alone makes me faint.*



I'D *listen politely to warble and run.*



WOULD *cause a Beau Brummel to smile.*

I'VE never been caught in society's thrall;
I'm shy of its follies and frills;
The sight of a bid to a regular ball
Would give me a case of the chills.
I think of the gowns that the women would wear,
The powder and patches and paint,
Combined with the music and perfume and glare,
And thinking alone makes me faint.

But let me clasp one horny hand
About an iron brace,
And feel the cage beneath my feet
Drop swiftly into space,
And let me smell the sooty lamps
That flicker in the murk,
And I'll not envy any man
The nature of his work.

IF some one invited me kindly to go
To hear a famed vocalist trill,
The chances are strong that I'd take in the show
Very much as I'd swallow a pill.
I'd listen politely to warble and run,
And join in applauding, no doubt,
And yet be in ignorance, when it was done,
Of what the whole thing was about.

But put me at the working face,
In some secluded spot,
Where I can smash to smithereens
The silence with a shot,
And no one on this earthly ball,
Though czar or king he be,
In satisfaction or content
Will have a thing on me!

I'M not much for fashion, I'm free to confess;
I'm woefully lacking in style;
And doubtless my nondescript manner of dress
Would cause a Beau Brummel to smile.
If any one managed, by hook or by crook,
To hang a clawhammer on me,
I'd probably feel just the same as I'd look—
Like a flounder a league from the sea.

But put me in my overalls,
Grown black and stiff with dirt,
And let me fling my shiny coat
Upon my ragged shirt,
My miner's cap set rakishly
On hair untouched by comb,
My water-bottle at my hip,
And say, I'm right at home!

The Hampton Roads Coals--II

By F. R. Wadleigh*

SYNOPSIS—A description and history of the development of the Pocahontas Flat Top field are given in this installment. Particular attention is devoted to a study of the quality of different coals in the field. The uses of the fuel, transportation problems and other points are also covered.

Pocahontas Flat Top Field

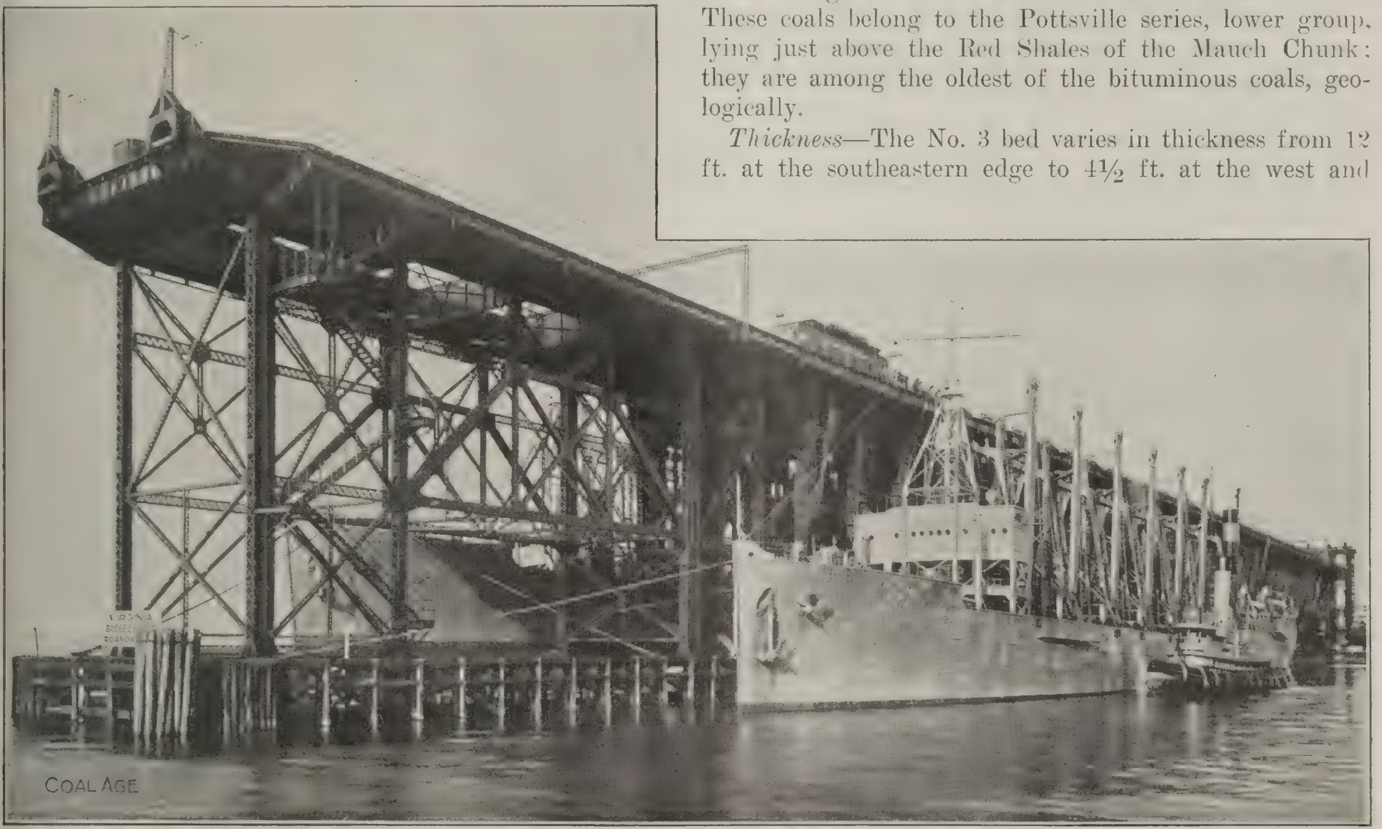
The first mine of Pocahontas coal was opened in this field in 1883, in the No. 3 Pocahontas, or Nelson bed, as it was originally called. In that year the entire output was only 60,828 tons, but at the end of 1913, 141,168,419 tons had been mined from this and the No. 4 bed. To Major Jed Hotchkiss, of Staunton, Va., is due the credit for first making known to the country, the value and size of the Pocahontas coal beds, although, for years previous, the coals had been dug out by farmers and country blacksmiths for their own use.

From the Pocahontas Flat Top field comes 87 per cent. of the commercial shipments of Pocahontas coal. It is this district that has made Pocahontas the standard steam coal of the country and the best known in foreign countries. This is largely because of its quality, but is also due in part to the aggressive and intelligent advertising and sales methods of Messrs. Castner & Curran, who were for many years the exclusive sales agents.

Coal beds—The beds mined are the Pocahontas Nos. 3 and 4, but by far the greater development is in the No. 3, about 90 per cent. of the total shipments coming from this bed; although the coal from the No. 4 is quite equal in quality to that from No. 3, the former is not so thick and its location for development is not so advantageous.

Geology—At the point where the Pocahontas measures are most extensively mined, on the southeastern edge near Pocahontas, eleven beds of coal have been found by borings from the top of Flat Top Mountain; of these, only two, Nos. 3 and 4, numbering from the bottom, are of workable thickness over the whole area. The measures all dip toward the northwest with a gradual thinning out and a change in the roof conditions in the same direction. These coals belong to the Pottsville series, lower group, lying just above the Red Shales of the Mauch Chunk; they are among the oldest of the bituminous coals, geologically.

Thickness—The No. 3 bed varies in thickness from 12 ft. at the southeastern edge to 4½ ft. at the west and northwest, the average for the entire field being 6½ ft.



General View of the Norfolk & Western Pier No. 4

Partings—As a rule, two partings are found in the seam, each varying from a fraction of an inch to two or three inches in thickness; one of these is a bony coal, carrying from 15 to 25 per cent. ash, and is of some value as fuel; the other is a hard slate, of no fuel value whatever. Both bands are rejected in mining or thrown out by the cleaners outside of the mines.

Vast quantities of this bony coal have been burnt in piles or used to fill in ravines and for other such purposes. At some of the mines, efforts have been made to burn it under boilers, either alone or mixed with the clean coal and it has also been crushed and mixed with the slack used for coke making, but by far the greater part has been a total loss.

Yet this bone coal has a distinct value as fuel. In 1907,

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*Consulting Engineer, 426 Real Estate Trust Bldg., Philadelphia.

I suggested having a car shipped to the U. S. Geological Survey Testing Plant, at Norfolk, Va. This was done and briquettes were made with 5 per cent. coal-tar-pitch binder, the briquettes analyzing as follows:

Moisture	1.71
Volatile	13.96
Fixed carbon	68.36
Ash	15.97
Sulphur	0.42
B.t.u. dry	12,938

It was stated that: "It made excellent briquettes, firm, smooth, broken with difficulty and with a close-grained fracture." Rough tests made in a stove and on a harbor tug proved that they made a good household fuel and kept up steam under boilers without any difficulty.

At the Pittsburgh Testing Station, some of this bone was also tested on gas-producer work, there being a consumption of 1.02 lb. per i.hp. per hr., the briquettes having a heating value of 12,994 B.t.u., dry coal.

No. 4 Bed—The No. 4 bed averages 5.9 ft. in thickness, as measured at the mines where it is being developed.

Description of Coal

Pocahontas coal is a bright, friable fuel, of columnar structure, ignites readily, cokes strongly, burns with a short white flame and comparatively little smoke, combustion being slow but intense heat and yields a reddish-white or brown clinker. The clean coal has a high heating value and is low in ash, sulphur and phosphorus; the fusing temperature of the ash varies considerably, some of it running over 2600 deg. F., and some as low as 2150 deg. F., the constituents of the ash also varying in their proportions.

In certain parts of this bed the fracture surfaces of the coal show a coating of thin, brownish-white scales, varying from the thickness of paper to one-sixteenth of an inch. The amount and thickness of this scale will vary at different places in the same mine. An analysis of the scale gives the following results:

Silica	3.82
Ferric oxide	0.10
Alumina	5.94
Lime	78.14
Magnesia	0.41
Undetermined	11.59

The effect of this on the fusing point of the ash is yet to be exactly determined.

While the ash, oxygen, sulphur and heat value are practically constant in the clean coal, there is considerable variation in the percentage of volatile. Starting at the southeastern edge, where the coal is thickest, the volatile decreases as the seam dips and thins out.

Taking the Bureau of Mines analyses from 67 mines, all by the same chemists and using the same method, there is a maximum variation of 7.2 per cent. in the amount of volatile, from 19.21 to 12.00; the average of all the analyses is 14.29. These Bureau of Mines analyses all show a lower volatile content than is obtained in any other set of analyses. For instance, the West Virginia Geological Survey gives an average volatile of 17.47 in samples from 38 mines. This difference is due to the method used in determining the amount of volatile.

The average volatile in samples taken from 407,000 tons shipped to the Panama Canal, samples taken and analyses made by the Bureau of Mines, was 18.25, which is considered a fair average for the Pocahontas beds.

Analyses of Pocahontas Coals

A very comprehensive analytical review of the Pocahontas coals was made in the third installment of an article I wrote on "Our Future in the Export Trade" which appeared in Coal Age, Vol. 3, p. 364. The following supplemental analyses will cover the field in its entirety:

		No. 2				No. 4				
	No. 1[1]	Average	High	Low	No. 3	Average	High	Low	No. 5	No. 6
Moisture dry coal	3.03	3.29	4.4	2.3	2.966	3.588	4.1	3.00	2.245	3.252
Volatile matter	20.30	14.56	18.00	12.00	13.85	15.22	16.00	14.00	14.90	14.625
Fixed carbon	71.43	80.89	83.10	77.50	81.50	81.11	82.40	79.80	77.255	80.76
Ash	5.24	4.53	6.20	3.03	4.70	3.66	4.39	3.07	7.54	4.60
Sulphur	0.66	0.60	0.87	0.44	0.62	0.66	0.72	0.57	0.56	0.61
Hydrogen	....	4.43	4.81	4.14	4.34	4.46	4.57	4.36	4.23	4.42
Carbon	....	86.63	88.16	84.85	86.20	87.01	88.18	85.90	82.55	86.51
Nitrogen	....	1.13	1.32	1.00	1.14	1.39	1.49	1.32	1.27	1.13
Oxygen	....	2.68	4.35	1.27	2.99	2.82	3.23	2.05	2.95	2.72
B.t.u.	....	15,088	15,440	14,810	15,090	15,269	15,450	15,100	14,492	15,079

[1] As received. Dry coal contains 5.41 and shows 14,931 B.t.u.

No. 1.—Average analysis of samples from shipment of 13,662 tons, 1909-10.

No. 2—Pocahontas No. 3 Bed—Average of 68 analyses, each analysis representing a composite of two or more samples from 68 mines.

No. 3—Pocahontas No. 4 Bed—Average of 3 analyses, each analysis representing a composite of two or more samples from 3 mines.

No. 4—Davy-Sewell Bed—Average of 9 analyses, each analysis representing a composite of two or more samples from 9 mines.

No. 5—Welch Bed—Average of 4 analyses, each analysis representing a composite of two or more samples from 4 mines.

No. 6—All Beds, Pocahontas Field—Average of 84 analyses, each analysis representing a composite sample from 84 mines.

Note—No. 1 analysis is from U. S. Bureau of Mines Bulletin No. 41 and remainder are all from Bulletin No. 22. Moisture is separately determined in all cases, the remainder of each analysis being on dry coal.

Uses

Pocahontas is primarily a steam coal, best suited for stationary plants and ships' use, but also a very good locomotive fuel, especially where freedom from smoke is desired. Its use for the latter purpose has decreased owing to the marked tendency on the part of the railroads to use higher-volatile coals, because they are cheaper, stand handling better and, it is claimed, will make more steam in a given time.

The Pocahontas product is also a strong coking coal, 79 of the 99 mines in the district having their own ovens, all of the beehive type. Twenty-eight million tons of coke have been made in this field since its beginning; the production reached its maximum of 2,084,000 tons in 1910 and has decreased since. The newer mines have not built coke ovens, though the older ones were compelled to do so under the terms of their leases; up to a few years ago, coal cars were also distributed on the basis of the number of coke ovens at each mine. But now large amounts of coal from this district are shipped to byproduct coking plants for mixture with higher-volatile coals, to give the coke a better structure.

For use in kilns or furnaces, where a short-flame coal is desired, Pocahontas is well suited. It is also a fine domestic coal, the screened sizes as well as the run-of-mine being sold largely through the Middle West for this purpose, as it is superior in heating value to anthracite and has a much lower ash content.

ANALYSES OF THACKER COALS

		No. 2		No. 3			No. 4		
	No. 1	A	B	Winifrede	Glen Alum	No. 2 Gas			No. 5
Moisture dry coal	1.62	2.86	1.10	38.9	36.9	34.8	2.4	3.1	1.84
Volatile matter	32.68	34.21	31.22	56.0	58.6	61.4	33.6	32.4	31.93
Fixed carbon	59.91	59.79	61.12	5.1	4.49	3.78	62.0	61.8	61.09
Ash	5.81	6.00	6.56	0.71	0.68	0.66	4.41	5.78	5.13
Sulphur	0.75	0.69	0.79	.....	5.19	5.24	0.76	1.22	0.67
Hydrogen	4.80	4.84	5.00	.....	82.61	82.85	4.91	4.93	.....
Carbon	79.26	85.84	80.03	.....	1.57	1.59	81.78	82.09	.....
Nitrogen	1.14	1.47	1.10	.....	.....	.....	1.57	1.65	.....
Oxygen	7.96	6.31	6.52	.....	5.46	5.88	6.57	4.33	.....
B.t.u.	13,931	14,521	14,268	14,270	14,510	14,550	14,679	14,510	.....

No. 1.—Average of air-dried samples from four mines in the Thacker bed, West Virginia. (From the West Virginia Geological Survey, Bulletin No. 2).

No. 2.—Two of the best coals in the Thacker district. **A** is an analysis of samples taken from a car of mine-run coal by inspectors from the United States Bureau of Mines. **B** is a mine sample taken by the West Virginia Geological Survey inspectors, the latter being an air dried sample.

No. 3.—Analysis of mine samples (from United States Geological Survey, Bulletin No. 541).

No. 4.—Analysis of mine samples taken from the United States Geological Survey, Bulletin 541.

No. 5—Average of six mine samples from the Freeburn (Van Lear) seam on Pond Creek (from the Kentucky Geological Survey, Series 4, Vol. 1).

Note—Analysis No. 1 is air-dried coal. In the others the moisture is separately determined and the remainder of the analysis on a dry-coal basis.

Between the Pocahontas and Thacker mines, there are also some developments in the Eagle beds, the coal being known as War Eagle. Some of this coal comes to Hampton Roads, where it is generally used for ships' bunkers, it being lower in volatile than the Thacker coals. It is a coking coal, with a structure somewhat similar to Pocahontas, although harder; it is also an excellent steam coal, especially for locomotive fuel.

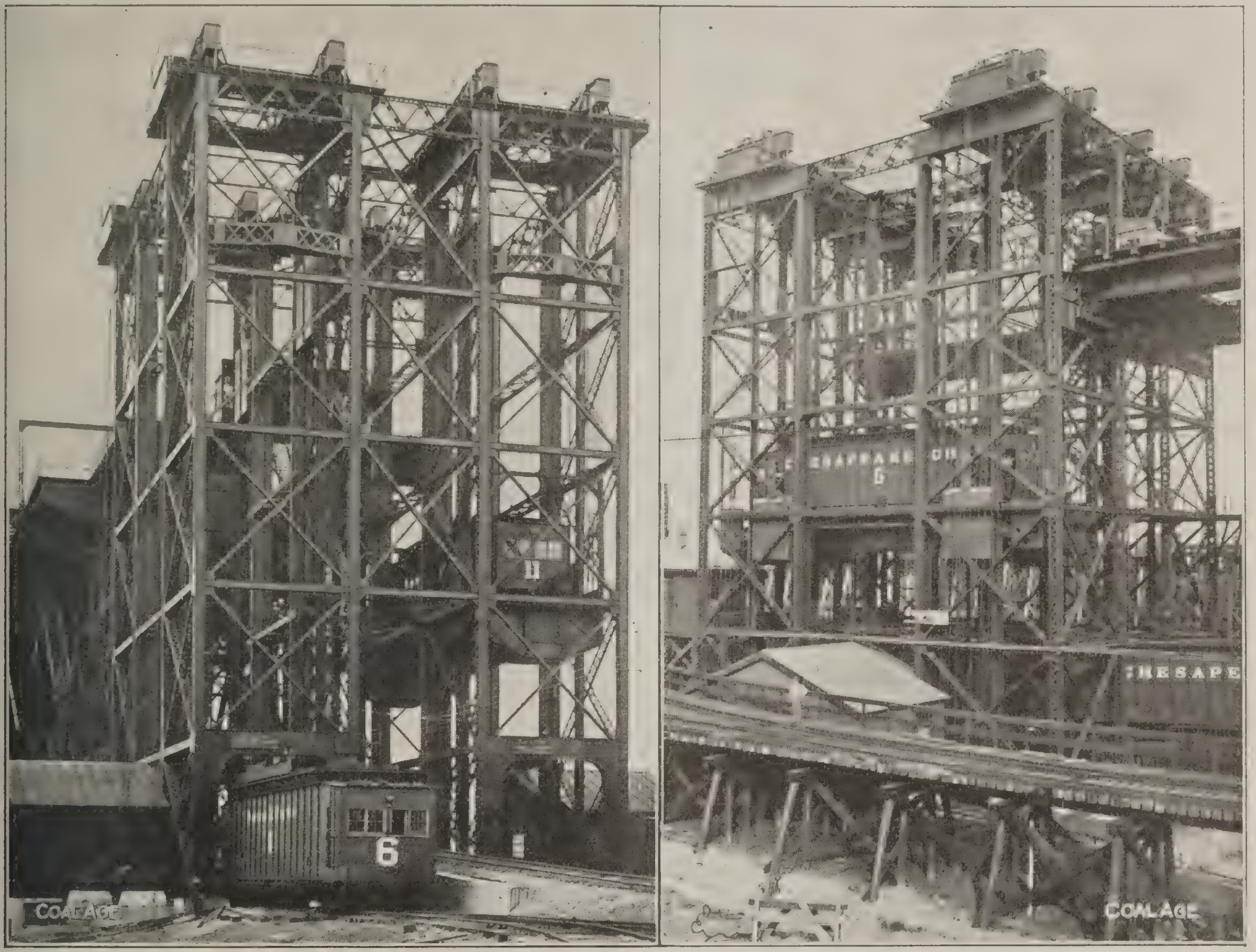
Besides the New River-Pocahontas coals, which make up over 90 per cent. of the Hampton Roads shipments, there is a steadily growing trade in the higher volatile gas and splint coals of West Virginia, Kentucky and Virginia that are shipped over the railroads tributary to Hampton Roads. These are used for gas-making plants, locomotive fuel and also, to a small extent, as bunker coals.

We give below a short general description of these coals as mined along the Norfolk & Western Ry. All of them are found in the Kanawha or Upper Pottsville series, divided into the Lower and Upper Kanawha. The coals of the former are softer and resemble the New River-Pocahontas fuels in structure, while the Upper Kanawha grades are harder splint coals with laminated structure.

Thacker District

The coals from this district, sold under the same trade name, are mined on the Norfolk & Western Ry., and shipped over the Lamberts Point piers. They are usually of a splinty structure, hard and mine out in blocks, standing transportation well and deteriorating little in storage.

They ignite readily, burn with a long bright flame and considerable smoke (under ordinary conditions), have a high ash-fusing point and usually a whitish ash. They are excellent locomotive fuels, good steam coals for general use and for gas producers and furnaces. They are confined principally to West Virginia, but there are several operations whose mines are in Kentucky while their tipples are in West Virginia, the Tug River being the boundary line between the two states.



Shore-End View of the N. & W. Pier No. 4 on the Left and the New Pier of the C. & O. on the Right

The beds of coal mined in this district are:

West Virginia	**Kentucky**
Alma (Local)	Freeburn
Warfield (No. 2 Gas)	Thacker
Thacker	Alma (Elkhorn)
Coalburg	
Winifrede	

Clinch Valley District or Field

The names of the six beds worked are as follows, beginning with the highest:

Edwards
Upper Banner
Lower Banner
Widow Kennedy
Imboden
Jawbone

All of the measures in this field are in the Pottsville group, the Norton formation containing the workable coal beds.

Edwards—This bed is not of much economic importance and its area is limited; the only developments are around Norton, Va. The thickness of the coal is about 4 ft. 5 inches.

Upper Banner—This is the most persistent and valuable bed in the field; it runs from 4 ft. to 7 ft. 10 in. in thickness, with a regular sandstone parting, usually from 1 in. to 3 in. thick; there are frequently two sandstone partings and occasionally one of shale.

The coal is a high-grade bituminous fuel, hard, with cubical fracture, comparatively low ash, low sulphur, burns with a long bright flame, intense heat and not much clinker. It is an excellent coking and gas-coal and one of the best locomotive fuels in the country.

ANALYSES OF CLINCH VALLEY COALS

		No. 2				
Moisture	**No. 1 Dry**	**A Dry**	**B Dry**	**C Dry**	**No. 3 Dry**	**No. 4 Dry**
Volatile	35.17	26.1	26.7	36.3	34.8	33.83
Fixed carbon	58.69	62.7	64.9	56.8	59.3	59.56
Ash	6.14	11.2	8.4	6.87	5.94	6.51
Sulphur	0.576	0.71	0.75	0.69	0.85	0.70
Hydrogen	5.23	......	......	4.13	5.11	5.16
Carbon	81.26	......	......	80.66	81.55	79.57
Nitrogen	1.54	......	......	1.73	1.32	1.50
Oxygen	5.25	......	......	4.92	5.22	6.46
B.t.u	14,567	13,960	14,290	14,330	14,650	14,303

No. 1.—Upper Banner.

No. 2.—Widow Kennedy bed. **A** is a mine sample from the whole bed, 2 ft. 8½ in. **B** is a mine sample from 2 ft. 3⅝ in. of the bed. **C** is a composite of two samples from another mine. All analyses are from U. S. Geological Survey, Bulletin No. 541.

No. 3—Lower Banner bed. Composite of three samples from same mine, clean coal only. U. S. Geological Survey, Bulletin No. 541.

No. 4.—Analysis of the Imboden bed.

The Kennedy Bed—This seam shows great variation in thickness, ranging from 1 to 12 ft. It seems to have been greatly disturbed and in many places it is crushed, and filled with balls and bands of clay, so that its value is greatly decreased. (U. S. G. S. *Bull.* No. 348.)

There is often found in this bed, especially where it thins out, a section of soft, impure, laminated coal, called locally "black rash." This coal, when clean, is of excellent quality, but with a low ash-fusing temperature. Its character as shown by analysis varies somewhat in different parts of the field.

Lower Banner Bed—This bed is not of as much commercial importance as the Upper Banner; it runs from 3½ to 6 ft. thick including partings. There is generally a "black rash" in this bed consisting of layers of bone and coal. The character of the coal is similar to that in the Upper Banner.

Imboden—This is one of the most valuable beds in the region, running from 5 to 10 ft. in thickness. The coal is one of the best coking fuels in the country and an excellent steam coal. Much of it is being used as locomotive fuel.

Jawbone Bed—This coal is not of much importance. It is mainly used for domestic purposes, not being as good a steam fuel as others in the district.

CHESAPEAKE & OHIO RAILWAY

In 1873, the Chesapeake & Ohio Ry. was completed westward through the New River Cañon, linking the waters of the Ohio with those of Chesapeake Bay. New River coal was then shipped east, the first mines in the Sewell Bed having been opened, soon after the completion of the railroad, at the town of Nuttalburg. This place was named after John Nuttall, the pioneer operator, along with Col. Joseph L. Beury and Capt. J. A. McGuffin. About two or three years later, the Fire Creek bed was opened up at the town of Quinnimont. Coals from the Kanawha measures were also shipped east, the Coalburg and Winifrede beds in this field having been opened in 1853-54, the entire production at that time going west by the Kanawha River.

About 60 per cent. of the New River and Kanawha coals going to Hampton Roads, a total of 3,455,114 tons in 1913, is now shipped over this road. The total coal handled last year amounted to 13,111,486 tons, so that the tidewater business is 20 per cent. of the gross shipments, 15 per cent. going east, and 58 per cent. west, with 7 per cent. to other roads.

The Chesapeake & Ohio was originally formed by a consolidation of two companies, in 1867; it extended at that time from Richmond to Covington, Va. In 1873, it was built westward to the Ohio and was reorganized in 1888, when the line to Newport News and the tidewater terminals at that point were first built. It now has a mileage of 2051, the main line proper running from while the Chesapeake & Ohio of Indiana extends from Cincinnati to Newport News, a distance of 654 miles, Cincinnati to Chicago, 283 miles.

New River Coal District to Hampton Roads—The distance from Thurmond, the center of the New River coal district, to Hampton Roads, is 381 miles with a maximum for any of the New River mines to tidewater of 413 miles.

The freight rate on New River coal to Hampton Roads is now $1.40 per gross ton, the zone of this rate extending a distance of 426 miles, and including six miles of Kanawha coals, on the Gauley River. This is a rate of 3.67 mills per ton-mile on 381 miles.

Kanawha Coal Districts to Hampton Roads—The distance from Charleston, about the most central point in the Kanawha field, to Hampton Roads, is 443 miles with a maximum for any of the Kanawha mines of 559 miles.

The freight rate on the Kanawha coals to tidewater is $1.50 per gross or 3.40 mills per ton-mile for 443 miles.

The equipment of the C. & O. Ry. on Apr. 1 of last year was as follows: 824 locomotives, 906 coal cars of 30-ton capacity, 4809 of 40-ton capacity, 599 of 45-ton capacity, 24,985 of 50-ton capacity and 1725 of 70-ton capacity. Trains of 4500 tons each are hauled to Newport News with one locomotive.

The number of mines on this road, according to districts, is as follows: New River field, 105; Kanawha, 167; Kentucky, 38.

Chesapeake & Ohio Terminals on Hampton Roads—The terminal yards at Newport News have a total capacity of 3700 cars, the yard for the new pier holding 368 loads and 390 empties.

Coal Piers—The four old piers at Newport News, the location of all the Chesapeake & Ohio terminals, are all of the incline type. The cars are pushed by locomotives, unloaded through hopper-bottom doors and returned to the yards by gravity.

The new pier No. 9 just put in service is similar to the new Norfolk & Western pier at Lamberts Point, but has two more coal chutes on each side. The slips on the sides are 1200 ft. long, and 225 ft. wide with a minimum of 34 ft. at low water. Each side of the pier has 33 bins, chutes and adjustable spouts.

The capacity of the pier is 5000 tons per hour; the dumpers and elevator have handled 40 cars per hour, each.

Check Doors

By M. D. Cooper*

For ventilating falls or long rooms, the general practice has been to hang a curtain of one or more thicknesses of brattice cloth across the entry to deflect part of the air current into the place where air is needed. In order to facilitate the passage of trips, curtains were cut into strips from 3 to 4 ft. wide, with a consequent loss of efficiency in turning the air current into the place to be ventilated. Moreover, the curtains were easily and quickly torn by passing cars so that their life was short, frequently less than one day.

A more satisfactory method of deflecting a portion of the ventilating current is to be found in the use of check doors, which, while costing more to build and to hang than brattice-cloth curtains, are, nevertheless, more efficient in operation and capable of rendering much longer service. The cost of a new door may be saved if a regular ventilating door that has become worn and leaky at the edges and no longer suitable for its original purpose is used as a check door.

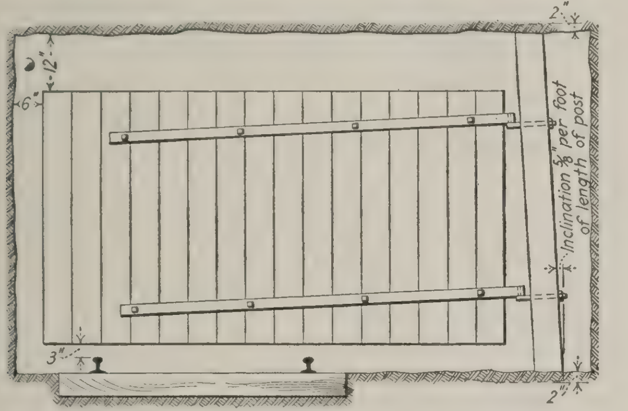


Fig. 1. General Arrangement of Check Door

The general arrangement of a check door is shown in Fig. 1. For supporting the door, a 6x8-in. post may be used. In the roof a rectangular hole the size of the cross-section of the post must be cut about 2 in. deep. A trench the width of the post must be dug in the bottom of the entry, so that the post may be first slipped into the hole in the roof and then slid along the trench to its final position. When in place, the post must be plumb in the direction of the entry while inclined from the vertical across it about ⅝ in. to each foot of length of post, in order that the door may be self-closing.

The door is built of two thicknesses of 1-in. ship-lap, on one side the boards being vertical, on the other horizontal. By using 8-d. nails and bending them over when through the wood, the boards are strongly and tightly joined together. The height and width of the door depend upon the size of the airway. It is best to have the height of the door at least 15 in. less than the height of the entry and the width at least 2 ft. less than the entry's width. When hanging the door, a clearance of 3 in. must be left above the rail to allow for any possible sag; and at the top the clearance must be about 12 in., so that the door will not hit the roof when swung full open.

The straps for hanging the door from the hooks, and the hooks for attaching the door to the post are shown in Fig. 2. The length of straps depends somewhat upon the length of the door, good practice being to make them about 1 ft. less than the length of the door. The straps, of which there must be two for each door, are made of wrought iron, 2 in. wide and ½ in. thick, and are drilled at intervals of 24 in. for ½-in. bolts. It is important to have the bolts of just the right length for fastening the nut after passing through door and strap, for if they are longer, passing cars will catch them, resulting in derailment of cars, weakening of the door, or in wrenching the door from its fastenings. At one end, the strap is bent around in a circle to allow the entrance of the ¾-in. bolt of the hook.

Hooks are made of 1-in. square wrought iron beaten down at one end to a thickness of ¾ in., and drawn out at the other end into cylindrical form to the diameter of a ¾-in. bolt, and then threaded. If a steam hammer is not available it is somewhat cheaper merely to draw the material down for a short distance and then weld a ¾-in. bolt to it. At the heavier end, the piece is punched or drilled for a ¾-in. rod, a 2¾-in. length of which is then welded into the hole. When the hooks are driven into the holes drilled through the post for them, it is only necessary to attach a nut to the upper hook.

This type of check door has proved satisfactory in service. It lasts a reasonable length of time; in fact, it may frequently be used in more than one location before it is necessary to discard it. Moreover, since it may be bumped open by a trip coming from either direction, no time is lost in opening it. As it swings closed of its own weight, it is unnecessary for the trip rider to remain behind to close it.

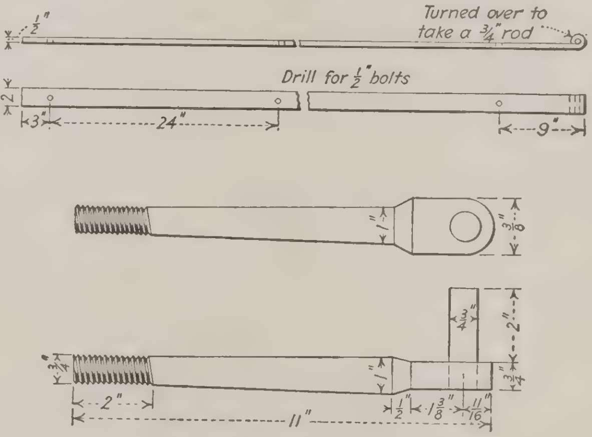


Fig. 2. Details of Check-Door Hinge

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George Otis Smith, director of the U. S. Geological Survey, says: "The ingredients necessary for producing prosperity appear at hand. The new financial system already promises more mobile credits. A more sympathetic attitude of the public toward big industrial operations is indicated. The efficiency of American labor and American engineering was never questioned. In any estimate of American ability to make the most of the present opportunities for industrial expansion, no better measure of the inventive genius of this country can perhaps be found than in a moment's review of of what is making the European war so terrible. Strictly neutral may we be, yet from the heights above to the depths below we find American inventions 'at the front'—the aëroplane, the magazine rifle and machine gun, the barbed wire, and the submarine and its torpedo. Cannot our nation lead as well in fashioning the tools of peace as in designing the machines of war?"

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*Ellsworth Collieries Co., Ellsworth, Penn.

Extracts from a Superintendent's Diary

I find that the public is always willing and ready to judge a corporation by the acts of its employees, and yet the same public refuses absolutely to judge a corporation by its treatment of, or its instructions to, the same employees.

If a coal-mine superintendent attempts to "lubricate" a railroad man, hoping thereby to get more than his pro-rata share of railroad cars during a car famine, and the railroad man decides to "squeal" (which he has a perfect right to do, and generally does do, as a matter of fact), the public does not stop to question the motive that led the superintendent into attempting so foolish an act, but instead, proceeds to damn the employer, and all other corporations in the same line of business.

If this same company decides, after careful deliberation, to adopt certain advanced ideas in its relations with its employees, be they old-age pensions, profit sharing, liability insurance, or what not, the same public refuses to believe that such acts are prompted by any other motive than a guilty conscience or some hidden selfish scheme.

I have seen the truth of this demonstrated so often that I have arrived at a state of mind where I even hesitate to invoke the loyalty of my men by reminding them that they can only prosper if our company prospers. Such a statement repeated literally by a labor agitator, with emphasis on the word company, satisfies any skeptic that we expect our employees to stop at nothing if they can only assure us of prosperity.

It certainly seems unfortunate that in the industry where coöperation between employer and employee *almost* determines the death rate such a condition has developed. I question if there is as much mistrust displayed in any other industry either from within or without.

We are just now passing through a strike and I am having opportunity to witness the effect of such feeling, as well as the reason for much of the unwarranted mistrust evidenced by the employees toward their employer.

I have always taken a personal interest in the affairs of my men, and as a result, I have often been asked to give advice on all sorts of matters, personal and otherwise. It naturally follows that, I being only a human being, some of my recommendations have not led to satisfactory results, and our union officials, being always on the lookout for arguments against the company and the company heads, have made capital of some of my mistakes in a very effective manner.

It is quite possible that the union officials think they are justified in such tactics, since to them the important thing is to array all employees on their side and "agin" the company.

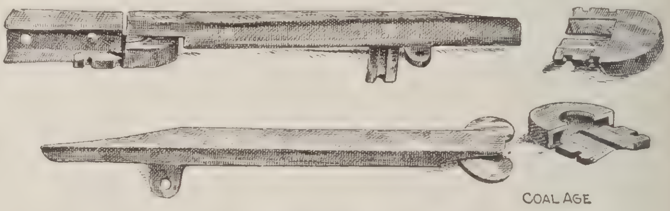
They haven't reached a state of mind yet where they will admit that all of the prejudice they kindle is bound to react against the industry as a whole and especially against the safeguarding of all employees, and so they go on untrammeled in their task of tearing down all that I have endeavored to build up through years of patient personal effort.

In fact, they are making use of many of the things which we learned through experience and experimenting together, to endanger the lives of the men who have refused to be intimidated by their threats.

And my city friends, unable to recall much about my methods except that I advocate the employment of mine guards, when occasion demands, have all but ostracized me, since our labor leader has received the encouragement of a nearby city editor.

A New Switch Point

There has always been more or less trouble with switch points which turn over and derail wagons. But still the old switches, though annoying, occasioned only a short and infrequent delay so long as the equipment was light, but now with greater traveling loads, derailments from this cause are more numerous and less easily corrected. Thus the weight of equipment in two ways has made a cure imperative. This need will be increasingly manifest when storage batteries come more generally into use and heavy locomotives are used in room headings.

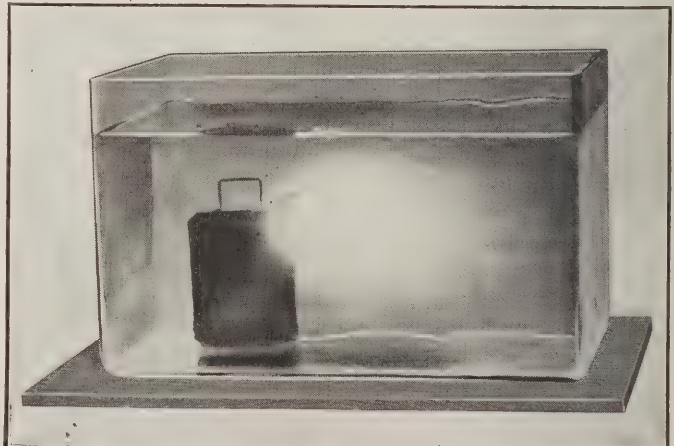


A SWITCH POINT WHICH DOES NOT TURN UNDER A LOAD

As its mode of operation is quite obvious it is hardly necessary to explain the action of the switch of the Clinton Switch Co., Clinton, Ind., illustrated in the figure. The upper right hand view shows the underside of the chair in which the switch point is turned, the lower right-hand view shows the same chair in its natural position, the lower left-hand view showing the switch with the half disk which by its secure fit in the chair prevents the heel of the switch from turning under the load.

Lamp Burns under Water

The Hirsch electric mine lamp shown above was burning continuously under water for 12 hours at the International Exposition of Safety and Sanitation, held in New York City in December. The batteries and reflectors are so constructed that they will burn under water without short-circuiting. This has been demonstrated a number of times where these lamps are used in wet shafts and in wet mines.



The Labor Situation

SYNOPSIS—One of the eastern Ohio mines has started operations on a scale of 58c. for lump and 22c. for slack. In 1914, $1,100,787.59 was spent in relief and benefits by the Union in eastern Ohio. News from West Virginia and Indiana.

During the past week several mines resumed in eastern Ohio on the "open shop" basis. Reports as to the number of miners who are employed at these mines are conflicting, but it is known that coal in limited quantities is being produced at several of the mines in Jefferson and Belmont counties. The Ramsey mine of the Roby-Somers Coal Co., located near Bellaire, was opened with 100 miners, according to the reports of the operators, and with 40 miners, according to the report of the miners' officials.

It is said that 150 tons of coal were produced the first day of operation. The company is paying 58c. for lump and 22c. for slack, which is claimed to be the equivalent of the Pittsburgh scale of 44.61c. on the mine-run basis. No violence occurred at this time, according to reports received by the Ohio Mining Department.

The following companies announce that they will start at least one mine in the near future: The Valley Camp Coal Co., at Fairpoint; The United States Coal Co., at Bradley; The Wheeling & Lake Erie Coal Mining Co., at Dillonvale; Jefferson Coal Co., at Piney Fork; Meister Coal Co., at Flushing, and the Glenn Coal Co., at Deep Run. The announcement is also made that the Rush Run mine of the Glen's Run Coal Co., will be operated as soon as it is placed in shape.

Eastern Ohio Conciliators Are Busy

In the meantime the federal investigators, Hywel Davies and Daniel J. Keefe, have been busy securing data. The first stop of the investigators was at Cleveland, where they interviewed operators. Later they met a special committee of seven representing the eastern Ohio operators at Wheeling, W. Va., which is opposite many of the mines in Ohio. Cincinnati was visited to gain more information as to mining in Ohio, West Virginia and Kentucky. The last place visited was Columbus, where the officials of the Ohio District of the United Mine Workers of America were interviewed. The investigators refused to make any statement for publication and Mr. Keefe contented himself with the following words, "We are simply absorbing information."

The belief is gaining ground in all circles that the real issue at stake is the question of honor of the officials of the miners' organization. When the Hocking Valley and other Ohio districts signed up at 47c., a promise was given that no other district in the state would be signed up at a lower rate. Now, in spite of the fact that many of the rank and file of the miners' organization are willing to return to work at 44.61c., the officials have steadily refused to allow a referendum vote.

District Convention of Union in Ohio

Another important event during the week was the annual meeting of the Ohio District of the United Mine Workers at Columbus, which consumed several days. A resolution was adopted continuing the strike in eastern Ohio indefinitely, and the statement was made that since the settlement of the Colorado strike, the finances of the organization could amply provide strike benefits in eastern Ohio.

Plans for the eviction of miners from the houses of the operators were not discussed at the meeting, it being explained that those matters were in the hands of the counsel for the miners in the various mining localities. Officials of the union specifically cautioned the men against any violence and the absence of violations of the law in the past was commented on by a resolution.

The financial report of Secretary-Treasurer Savage showed a surplus of $28,125.24, Dec. 31, 1914, as compared with $263,816.57 the year previous. The report showed that the sum of $1,100,787.59 was spent in relief and benefits during the year 1914.

West Virginia and Indiana Unions

The secretary-treasurer, James M. Z. Craigo, of District No. 17, United Mine Workers of America, reports an increase in paid-up membership since March 31, 1912, from 1667 to 7175. This district covers the unionized parts of West Virginia.

In the Indiana "bituminous-coal" district, known as No. 11, the returns of the recent election of union officials have been received. Edward Stewart, of Hymera, Ind., is elected president. The former president, W. D. Van Horn, is elected international board member. William Mitch, of Terre Haute, is elected secretary. The board members are: W. H. Ramey, of Princeton, reëlected, first district; Harry Pigg, of Jasonville, reëlected, second district; John Hessler, Hymera, third district and Peter Donie, West Terre Haute, reëlected, fourth district.

Receivership for the Josiah V. Thompson Properties

Tuesday morning, Jan. 19, the Common Pleas Court, at Uniontown, Penn., appointed receivers for the properties of Josiah V. Thompson, who has been very prominent for years as a heavy buyer of coal acreage, particularly in Greene County, representing the extension across the Monongahela River of the Connellsville coking-coal seam. Mr. Thompson's acquisitions began 15 years or more ago, in the Klondike or lower Connellsville region, and when this acreage was all taken up, he turned his attention to Greene County, in the belief that as the steel industry grew it would have to base the increased coke supply needed upon Greene County coal. The steel industry has expanded in recent years less rapidly than was expected, and has turned its attention almost entirely to byproduct coking, pursuing at the same time the theory that it was better to invest money in a byproduct coking plant than in coal acreage, as byproduct ovens can draw from a variety of sources, and depend more or less upon the current market supply of coal.

The receivers appointed are Andrew Thompson, a son, William G. Laidlaw, a business associate, and J. P. Brennan, president of the Thompson-Connellsville Coke Co., which Mr. Thompson formed some years ago to develop a part of his Klondike acreage. The receivership was upon a friendly petition brought by two large unsecured creditors. The petition stated that Mr. Thompson had unsecured creditors to the extent of $7,000,000 and creditors to the extent of $15,000,000 secured by mortgages and collateral. The value of his holdings was stated at $70,000,000. It is popularly supposed that Mr. Thompson was interested altogether in about 200,000 acres of coal. The receivership was precipitated by the closing of the First National Bank of Uniontown, of which Mr. Thompson was president.

The Crisis in South America

Seldom before have the states of South America shown less buying power than at present. It would be an error to attribute this widespread crisis to the war, as the bad times were to be seen plainly at the beginning of 1914. For illustration, the imports to the Argentines during the first quarter of 1914 fell to 171 million dollars, a decrease of 31 million. The exports, likewise, reached 213 million only, a loss of 38 per cent. from the corresponding period of the year before.

The customs entries of Brazil, also, are even worse than had been feared. The duties of the port of Rio de Janeiro, from the first of January to Aug. 30, 1914, show a total decline of 40 per cent. from the same period of 1913, the loss increasing steadily from 20 per cent. in January to 42 per cent. in July and 57½ per cent. in August. In fact, this loss in trade exceeds that experienced by some of the countries actually at war.

Note—From the "Frankfurter Zeitung." Translated by H. B. Binsse.

Editorials

Ten Months or More without Rent

We must credit the eastern Ohio operators with much patience, seeing they have permitted the men to live in the company houses for ten long months without paying any rent, while these same men were trying to coerce their employers into conceding them an increased wage.

It contrasts unfavorably with the plan the miners have at Gillespie, Ill. When you trade at the coöperative stores you are allowed credit within $10 of your capital invested—a safe and sane provision. If the eastern Ohio operators had followed it, the miners would have already spent nearly a year in dugouts and tents.

It appears, however, that the miners' union is convinced that the operators should donate the residences in perpetuity to their former employees, or at least is endeavoring to see if the courts of Ohio will not rule that the operators have only reversionary rights to the tenaments when the present occupants no longer desire to occupy them.

In fact, sometimes, we think the miners and the public confuse the Golden Rule with the Double Standard.

The Long-Service Man

Among the letters we have received on "Who Gets the Promotion" is one from a former resident of Great Britain, judging by all the many earmarks—the name, the ruled margin on the left side of the page, the careful essay-like appearance of the script, the use of the letter "u" in words like labor, and, above all, the viewpoint. He is in favor of the "Long-Service Man."

It may be stated fairly that perhaps only in the United States would the "popular" man have so many advocates as have registered their appreciation of him in this contest. It is true that he has all the advantage in the competition, as our readers have pointed out. Still perhaps in few countries but ours would he get the majority or at least a vote so overwhelmingly in his favor.

The Englishman looks almost with horror at the indifferent and almost contemptuous manner with which we cashier men who have been long in the service. It is nearly always customary in older countries to give a period as they term it of preliminary "warning" during which another berth can be sought though probably not secured.

Yet after all, our apparent lack of proper sentiment carries with it no particular hardship and works no wrong just because it is so common. In many cases, as our readers will remember, a man who is discharged is only "fired upstairs." He only finds, if he is the right kind of man, a better and more responsible position. To many men it may be said, fate has been unkind. They have clung like barnacles to a barren rock where food is scant and no kindly wave has set them free.

In Europe, however, where changes in personnel are rare, the man who is cashiered is looked on with suspicion, and he must usually start again at the bottom, for all the train of long-service men in another corporation is before him; he cannot elbow his way to the head of the queue. He has been cruelly wronged, whereas in America perhaps he would only have been ruthlessly helped.

Besides, the position of the European has been gained by influence. Even the most modest are sometimes so attained, and few men have more than a single wire to pull. This does not mark the applicant as a man without merit. Not at all; most men make their start in just that way. It is clear, therefore, that because the fall from the precipice over which "Long Service" is pushed is too great for the resilience of his bones is the very reason why that displacement is so rarely attempted. What may be a benevolence in America would be brutality abroad.

It is to be hoped that we shall always accept in a fair degree the doctrine of the advancement of the fittest, for it really works little harm and often gives the man thus cast adrift a chance to vary his experience and broaden his viewpoint. The jar also sometimes sets his brain to working.

The Grouch

It was a German and a technical man, among others, who selected the student and regarded as excusable the grouchiness of the applicant's disposition. He argues quite reasonably on the value of knowledge.

We were glad to see that he put his stress on the *value* and *advantages* rather than on the *rights* of learning. For we have never been able to see that learning has any rights other than those of utility. There are some who appear to believe in a certain fit reward for the professional man. He has expended so much money, he has labored so diligently, he has sacrificed so much happiness, and surely his reward should be considerable.

The dervishes of India have a similar claim, but one we should find it hard to admit. In fact, knowledge is only worth what it can effect. It is the service of the knowing and not their sacrifice for which we are willing to pay. By dint of study you may learn the value of pi to twenty places, that the sine of 1 deg. is 0.0174524, and that the logarithm of two on the base ten is 0.3010300 and other interesting facts, but if they will not enable you to do your work better than it can be done by a man with tables, if the facts crowd out of your mind, for instance, the wage scale you are paying your men, it is no better knowledge for you than the classics. In fact, the latter is to be preferred, for it may broaden your viewpoint, which cramming of mere figures never will.

We think this discussion on the three applicants for promotion will be valuable if it is a victory for sanity. A man may cram himself with facts till he becomes sickly and ill-tempered and loses the very reward for which he was striving. It does not profit a workingman to work longer hours or harder than his constitution will stand, nor does it pay a brain worker to put his uttermost into his work.

We have heard too often about a man doing his best. He should do that and not less. But he has body, mind and spirit, and it is merely a folly if he ruins any of the three, thinking that doing his best is promoting the interests of one to the annihilation of the others. Too many New Year's intentions are tinctured with just such folly.

Let them say rather of us that we are well knit men, neither all mind, nor all spirit nor all physical perfection, but every inch of us men. Because of such qualities we see men progressing who never made any visible sacrifices. In fact, they surrendered nothing but their vices and their follies, all their aims which did not lead to the goal and all the studies which did not aid in a solution of the problems of life.

Those little men who follow up the unessentials, who sacrifice themselves for things not worth while, will wreck their employers' industry on similar profitless purposes. The man who will give time and money to solving some purely theoretic problem is quite likely to exhaust the capital of the company in some intellectual mare's nest. And the man who seeks all his knowledge in books is lost if he cannot light on a slip of paper which will resolve his difficulties for him.

There is abundant room for the student, but he must not and need not be a grouch. He need not lose his cheerfulness of mind if he will only keep in view the fact that his manliness is the best part of him, and that what he achieves is beyond comparison more important than what he reads or has read. And he will not be suspicious and grouchy if he only realizes, as men of the workaday world do, that the best of men do not know everything, but fall occasionally into errors.

The popular man is probably well liked because he is "like other men but more so." He is what the consensus of men generally believe is normal and has some genius to boot. The scholar is often like the beauty with a harelip or a blind eye; he has all the excellencies you may desire but one, and the deficiency is so glaring as to overpower all the advantages.

There are no schools for character; no expensive advertising campaign has backed its development. Nevertheless it is as important as knowledge. Many a man who hopes to be paid because he has burned his eyes over books would have earned equal advancement had he taken a brisk walk and kept his eyes open to what was happening around him.

Workmen's Compensation and Miners' Check-off in Illinois

In connection with the request of mine employees of the State of Illinois for a revision of the Workmen's Compensation Act, which has now been operating for about two years, they ask for full compensation for all time lost on a basis of their regular earnings when idle as a result of personal injuries. The Illinois Coal Operators' Association has appointed a committee to consider this proposed revision of the law from the standpoint of the coal operator, and Carl Scholz, a member of this committee, has prepared some figures (which are remarkable in a way) showing amounts paid by the Illinois mines to the United Mine Workers of America by means of the so called "check-off," or deductions made on the mine payrolls from earnings of employees and paid to the Union.

Figures obtained from 14 representative coal companies in Illinois show that on a basis of tonnage produced in the state during the year 1914, approximately $2,000,000 was paid into the treasury of the miners' organization, or at the rate of about $26.50 per annum for each man employed. This is at the rate of 3½c. per ton for every ton of coal produced in the State of Illinois during the year 1914. The operators are going to maintain that if mine employees can afford to pay $26.50 each per annum for the insurance of wage conditions and to protect contracts in effect with their employers, they should be willing to pay a substantial sum into a compensation fund under the control of the state to insure themselves and their families in case of accident.

It is a well established fact that the larger proportion of the amounts collected by the Union in the State of Illinois has been used to carry on strikes of the National Organization, not only in Illinois but in adjoining states. Mr. Scholz feels that these figures portray impressively a situation with which the public generally is not familiar.

The table which follows shows the tonnage produced and amount of check-off paid by 14 representative coal companies in Illinois during the year 1914.

STATEMENT SHOWING TONNAGE PRODUCED AND AMOUNT OF CHECK-OFF BY VARIOUS ILLIONIS COMPANIES FOR 1914

	1914	
	Tonnage	Check-Off
Chicago & Carterville Coal Co.	442,480	$18,374.02
Coal Valley Mining Co.	211,764	8,687.34
Dering Coal Co.	714,603	31,955.79
Jones & Adams Coal Co.	479,323	13,057.14
Old Ben Mining Corporation	1,153,967	32,776.38
Peabody Coal Co.	3,283,000	106,869.65
W. P. Rend Coal & Coke Co.	425,960	19,677.18
W. P. Rend Collieries Co.	322,667	17,868.14
Saline County Coal Co.	1,096,927	30,944.71
Sessor Coal Co.	563,127	23,786.86
Sunnyside Coal Co.	309,536	10,214.95
Thomson & Burton Co.	299,696	17,900.40
O'Gara Coal Co.	2,038,252	76,276.59
	11,341,302	$408,389.15
Cost per ton		0.036

This Will Interest You

Although we publish 40 or more pages of editorial matter every week in COAL AGE, it seems that when we close each issue of our paper we have only succeeded in printing a few of the articles we had hoped to get in. A large number of our pages this week were necessarily given over to a discussion of the cartoon—Who Gets the Promotion? We are certain, however, that the evident interest in the question justified us in devoting so much space to it.

For next week, and several succeeding issues, we have the following interesting articles: "Drying Washed Coal," "A British View of Our Export Trade," "Wage Scales in Various Fields," "Mine Tracks in Coal Mines," "Rating Mine Locomotives," "Electrically Driven Longwall Coal Cutters," "Triangulation from Two Plumb Wires," "Electric-Arc Welding in Mine Repair Shops," "Electric Power—Its Generation and Transmission," "Driving Rock Tunnels in Coal Mines," "Reopening a Mine That Has Been on Fire," "A Tipple Equipment for Handling a Small Tonnage," "Signal Wires in Mines," "The New Plant of the Main Island Creek Coal Co. in West Virginia," "A Coal Conveyor and Loader System for Thin Seams," "Shipping Coal Through the Panama Canal," "How to Build Concrete Stoppings," "Electric Shot-Firing," "Underground Fans," "Rescue Station, Organization and Costs," "Operating a Mine with a Conveyor System," "A New Shortwall Mining Method," etc.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 21—In one of the recent letters discussing the question of proper mining laws and speaking of the examination papers of candidates for mine foreman, fireboss and assistant mine foreman not being returned to them, after the examination, I notice that one contributor says that the "examining boards are not instructors," which seems to imply that the papers should not be returned to candidates, because the corrections made on them by the examiners might not be accurate and would do the candidate more harm than good.

In my opinion, every candidate in examination has a right to the return of his papers properly marked as *correct, imperfect,* or *wrong,* as the case may be. This will enable the candidate to determine exactly his weak points. It would induce further study and promote education.

FRANK RUSCHEL.

Ellsworth, Penn.

Letter No. 22—Permit me to add a few words to the interesting discussion of the mine-law problem. In my opinion, our mining laws are stringent enough, especially here in Tennessee, although there are a few points that undoubtedly should be amended. I believe the law should be broadened, in many instances, to give the mine inspector more power to properly administer those laws that are already on the statute books.

Instances showing this necessity have frequently come under my observation. For example, a certain mine foreman, whose duty it is under the law to visit each and every working place once each day that the mine is running, fails to visit these working places oftener than once in two weeks. In some cases, he does not visit the inside workings except on the last day of the month, when he goes there to measure up the work.

In one case that I have in mind, the foreman acts both as mine foreman and superintendent, over a line of work extending a distance of 5 or 6 miles. This man has, legally, no assistant, although he employs a man who does not hold a certificate to act in that capacity. When the mine inspector visits the mine, this so called "assistant" acts as "boss driver."

Under such working conditions, it needs no argument to prove that were a miner known to report to the mine inspector the actual conditions existing in the mine in his absence, he would be summarily discharged. I could mention several places where it is the constant effort of the mine foreman and his assistants to hoodwink or fool the mine inspector when he visits the mine. It is not always the mine inspector's fault that he is deceived by the misrepresentations of these men.

As a rule, mine inspectors have too large a territory in their charge and are unable to give the time required for a thorough inspection of each mine. They must depend, to a considerable extent, on the statements of the foreman and the men. It is too often the case that the latter are afraid to make any statements of unfavorable conditions to the mine inspector, fearing the natural result should such disclosures become known. It is even true that some operating companies will discharge a mine foreman who continues to contend for what is lawful and urgently needed in the mine to safeguard the lives of the men in his charge.

Only a short time ago, in conversation with a general manager of a mine, I mentioned the fact that the air in his mine was such that the men were able to work only a part of each day. In response to my question as to whether he was not afraid that the mine inspector would require a better circulation of the air to comply with the mining law, this manager replied with an oath that he was running his mine and no inspector could do it for him. The foreman in charge of this mine made the statement, a little later, that as far as the law was concerned it was an easy matter to close one or two doors, hang a few sheets and boom the furnace sufficiently to show the necessary circulation of air at the points where the inspector would take his measurements, which would avoid any trouble with him. Being personally acquainted with the inspector, in this case, I am convinced that he has been fooled many times when making the inspection of that mine.

The remedy I would suggest to meet this condition is to enact a law authorizing the inspector to require of every mine foreman and assistant a sworn statement of the actual condition of the mine during the interval between his successive visits. In my opinion, the inspector should also have the power to call certain miners from the mine and demand of them a similar sworn statement of the condition of the mine in their working places during the same interval of time. By this means, the inspector should be able to determine whether or not the mine foreman and his assistants were faithfully discharging their duties as required by law. As a result, I believe there would be fewer mine accidents. Not only would such an amendment to the law be a benefit to the men, but the companies would likewise be benefited by a reduction in the number of accidents, greater economy of operation and an increased output of coal.

I would suggest that another point in which the mine law of Tennessee could be improved is to so amend the law that no mine foreman shall be employed in any mine working over 20 men, unless he holds a "Class A certificate." By the present Tennessee law, Class A certificates are required only in mines generating gas or known as dusty mines; while it is well known that gas is liable to be generated at any time, in *all* mines. Should that occur in a mine where a second- or third-grade foreman has charge, who has not the necessary knowledge of mine gases, a disastrous explosion might easily result. Furthermore, such a foreman knows little or nothing of the use of a safety lamp and would not be able to detect the presence of gas should it occur in the mine. As a consequence, some miner may be burned to death or another mine disaster go down in history.

The necessity of requiring a sworn statement of all mine officials is shown by another instance of a mine foreman who held a first-class certificate and whose duty it was to inspect the workings before the men went into the mine in the morning. This man had 4 mi. to walk to the mine; and, in reply to my remark that the work was hard for him to accomplish, he said: "I never go through the mine further than the furnace, where I stir up the fire and come back to the outside." I said, "You do not need then to carry a lamp." He replied, "No, but it helps to fool the men and make them think I have been over the mine." He said that he had little gas in the mine. I believe that a sworn statement would eliminate such flagrant breaches of the mine law.

There are many honest, conscientious mine foremen whose word can be taken at all times. Such men are safe whether they hold a certificate or not, because they have the safety and interests of every mine worker at heart. On the other hand, the falsity of other men to the trust imposed in them makes it necessary to demand of *all* a sworn statement. The employment of men, farm hands and others, who have no knowledge whatever of mining and setting them to work in the mine to dig coal is a dangerous practice and should be prohibited by the mining law of every state. Such a worker, not long ago, drilled an 8-ft. hole, at the head of an entry, in a mine generating some gas, and charged this hole with 50 in. of black powder.

As I have previously stated, the best way to prevent these dangers is to give the mine inspector greater power and to require sworn statements on the part of mine officials. Mine operators and foremen should not think, for a moment, that any legislation that tends to safeguard the men in their charge is an added burden. The result will show to the contrary. For my part, I have always been willing for an inspector to slip in and examine my work and offer any needed criticisms. I believe every conscientious foreman will gladly welcome all the assistance he can have in making things safe in and about the mine in his charge. By this means he is better able to bear the responsibility resting on him.

A. H. STANSBERRY.

Roope, Tenn.

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Loading Coal by Machinery at the Face

Letter No. 3—Referring to the inquiry of John Harvey, COAL AGE, Dec. 5, p. 920, and assuming that he has reference to the use of a chain conveyor such as is frequently used on a longwall face, in working a thin seam of coal, I would say that the scraper line used for this purpose and patented by Clarence Claghorn has been successfully operated, in many mines, both in this country and in England. There are, besides, many other similar machines used for the same purpose.

I would say that such machines are particularly adapted to longwall work. I could not recommend the longwall system for the working of the seam described by Mr. Harvey. My own experience, in this section and seam of coal, inclines me to believe that the longwall system would not be practicable in this case. While I realize the longwall method has been used with much success in certain sections, I am not favorably inclined to its adoption. The disadvantages of such a system, briefly stated, are as follows: 1. Experienced miners or men familar with longwall work are required. 2. It is impossible to isolate any section of the mine where gas may be encountered, and to control the ventilation as conditions may demand. 3. Much labor must be expended in building packwalls for the support of the roof. 4. The method is impracticable where periods of enforced idleness are unavoidable, or where faults exist in the measures.

In the working of low coal, I prefer a double-entry system and a method of working that will permit the use of shortwall machines. I would turn the rooms at right angles to the entries, on 50-ft. centers, driving them 30 ft. wide and leaving 20-ft. pillars between them. The machine should cut the rooms up one entry and down the other. This method affords a greater concentration of the work; and if two men work together in two adjoining rooms, cleaning up one room while the machine is cutting the other, there is little delay, and the wear and tear on the machine, owing to many moves, are decreased to a minimum.

I have used the shortwall Sullivan coal cutter and find it adapted to the cutting of hard coal. This machine is provided with the chain haul, for cutting across the face of a breast. The plan of working two men together in two roms, alternating between the rooms, will be found to be a great advantage and cause less delay both in cutting and loading the coal. Otherwise, two or three places will be cleaned up at the same time and the men often obliged to go home to wait for a new cut to be made in their room.

WM. H. EASH, Mine Foreman,
Wentz Smokeless Coal Co.

Hollsopple, Penn.

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Drying Washed Coal

Letter No. 3—In reply to John Hammond, COAL AGE, Nov. 28, p. 879, who asks if soft bituminous coal can be successfully washed and then dried to contain only 3 per cent. of moisture, permit me to state that, by the use of a centrifugal drier, the moisture content in the washed coal may be reduced to about 7½ per cent.; and it has been our experience, particularly in one plant where the dried coal is delivered to a system of conveyor belts and taken by them directly to the byproduct coke ovens, in the passage of the coal over the conveying-belt system where it is dropped from one belt to the other, during warm weather there is a further loss of moisture amounting to perhaps 1 or 1½ per cent. by the time it reaches the coke ovens. I believe, therefore, that if Mr. Hammond would use one of these driers to reduce the moisture down to, perhaps, 7 or 8 per cent., it would be entirely feasible to take this dry coal and handle it over a belt conveyor that would discharge at a point where a current of hot air would pass through the coal. This would unquestionably reduce the moisture very considerably, and it would probably be possible to approximate the 3 per cent. required.

It is my understanding that the 3 per cent. referred to is external moisture. We have at times in these machines reduced the external moisture to that point; but such a low moisture total is not to be depended upon and does not represent general practice. The only way that it could be secured would be with some such plan as we have suggested above.

In the use of the centrifugal drier there are required no elevators, belts or driving chains of any kind; and, in every way, this makes the simplest and most easily operated and attended coal-washing plant that we know anything about. The jigs, driers and pumps are all driven by individual motors; and, in our opinion, this system represents the best practice that has been developed in the washing of coal.

F. E. Butcher, Genl. Mgr.,
The American Concentrator Co.
Springfield, Ohio.

Mixtures of Air and Mine Gases

I have been very much interested in the recent references to mine gases, appearing in answer to an inquiry, Dec. 19, p. 998, and an examination question, Jan. 2, p. 30. I suppose that these questions and answers are published for the purpose of giving readers and particularly miners a knowledge of how such gaseous mixtures affect the life and health of those coming in contact with them and how their presence can be detected by observing the appearance of the flame of a safety lamp, and I am sure this will be appreciated by all concerned.

I notice, however, that all of the calculations are here made on the assumption that the different mixtures have been formed by adding the harmful gases to pure air. It appears to me that this assumption does not represent the conditions in which these gases often occur in the mines. Especially is this the case in respect to carbon dioxide. I understand this gas, to a large extent, is generated in mines, by the breathing of men and animals, by all forms of combustion constantly taking place, and by the decomposition of vegetable and organic matter, etc.

Now, the oxygen necessary to form this gas has been taken from the mine air; and, as a result, the free oxygen remaining in the air will be much less; and the effect on the safety lamp and on the health and life of the miners, for the same percentage of carbon dioxide present, will be quite different to what it would be if we assume that the carbon dioxide has been added to pure air.

For example, suppose the mixture has been formed by adding carbon dioxide to pure air until it contained 12 per cent. of that gas. The mixture would then contain 18.39 per cent. oxygen, 69.61 per cent. nitrogen and 12 per cent. carbon dioxide. Again, suppose the air in the mine contains 12 per cent. carbon dioxide, which has been formed by the breathing of men and animals and the different forms of combustion taking place in the mine, whereby the free oxygen content of the mine air has been reduced. Under these conditions, may I ask, could a man live or would a safety lamp continue to burn?

Estimating the atmospheric air as containing 79.1 per cent. nitrogen and 20.9 per cent. oxygen, and assuming that 8 per cent. of this oxygen is extracted from the mine air to form the 12 per cent. carbon dioxide, the air remaining in the mine would contain 20.9 — 8 = 12.9 per cent. oxygen and 100 — 12.9 = 87.1 per cent. nitrogen; and, as the carbon dioxide is generated, it would again change the composition of the mine air by mixing with it. This change I should judge would produce a mixture as follows: Nitrogen, 76.65; oxygen, 11.35; carbon dioxide, 12 per cent. This shows the oxygen in the air is reduced 18.39 — 11.35 = 7.04 per cent. I should very much like to know if this represents, approximately, the difference between adding carbon dioxide to pure air till 12 per cent. is present, and what would result if the carbon dioxide is formed by consuming the oxygen of the air, as under ordinary mining conditions.

The answers to which I have referred make it appear that the flame of a lamp and animal life can be sustained in much higher percentages of carbon dioxide than I had supposed possible. Dr. J. S. Haldane, in his flame test for oxygen, states that the light of a candle or lamp is diminished 30 per cent. by a decrease of 1 per cent. in the oxygen content of the air. This would seem to imply that a lamp would be extinguished when the oxygen content was decreased $3\frac{1}{3}$ per cent.

I have also noticed that W. Simon, in his "Manual of Chemistry," states that, in air containing 0.5 per cent. carbon dioxide, most persons are attacked by headache, and air containing 8 per cent. of carbon dioxide causes death in a few minutes. Dr. J. Harger has stated that with a reduction of 1 or 2 per cent. in oxygen with an addition of from $\frac{1}{2}$ to $\frac{3}{4}$ per cent. of carbon dioxide, firedamp and coal-dust explosions cannot occur. I have always made it a rule to demand more pure air whenever a safety lamp fails to burn freely. While it is instructive to know just how certain percentages of gas affect combustion and the health and life of miners, I think if we insist on getting enough air to make a safety lamp burn all right we will not be far wrong, except in respect to carbon monoxide.

Rees H. Beddow,
State Mine Inspector.
Gallup, N. M.

[Correspondent has raised an interesting and important question in relation to the *frequent but not general* depletion of the oxygen in mine air. This depletion of oxygen only occurs in poorly ventilated places that cannot be taken as representing "ordinary mining conditions." Whenever ventilation is "good" or "fair," depletion of oxygen cannot occur, owing to the constant replenishing of air in quantities far in excess of what is required for the ordinary forms of combustion in mines.

Correspondent's estimation of the composition of a residual atmosphere containing 12 per cent. of carbon dioxide is incorrect, however; and we are answering his inquiry in regard to this, on p. 178, of this issue.

According to the experiments of Drs. J. S. Haldane and T. L. Llewellyn to determine the effect of the diminution of oxygen on the flame of a lamp burning in otherwise pure air (*Trans.*, I. M. E., Vol. 44, p. 267), the intensity of the light diminished at an average rate of 100 ÷ 2.92 = 34.2 per cent., for each per cent. of diminution of oxygen; or 3.42 per cent. of light, for each 0.1 per cent. loss of oxygen. This would result in complete extinction of light when the loss in oxygen was 100 ÷ 34.2 = 2.9 per cent. The oxygen remaining in the air at the moment of extinction of the light is then 20.9 — 2.9 = 18 per cent. As these authorities state, however, the light can still be maintained, for a time, by raising the wick, which is done in practice, so that actual extinction then occurs only when the oxygen content has reached 16.4 per cent. (Clowes).

The statement that "air containing 8 per cent. of carbon dioxide causes death in a few minutes" is indefinite, because the percentage of available oxygen is not given. If the carbon dioxide has taken its oxygen from the air the result is a "residual atmosphere"; but if the carbon dioxide has been added to pure air the result is an "artificial atmosphere." These two atmospheres are quite different, though containing the same percentage of carbon dioxide. Their composition, together with that of a fatal artificial atmosphere, is as follows:

	O	N	CO_2
Residual atmosphere	12.90	79.10	8.00
Artificial atmosphere	19.23	72.77	8.00
Artificial atmosphere (fatal)	17.14	64.86	18.00

It may be assumed, with some assurance, that while an *artificial* atmosphere containing 8 per cent. of carbon dioxide is not fatal to life, a *residual* atmosphere containing the same percentage of that gas would be fatal, in most cases, owing to the greater depletion of the oxygen. When no carbon dioxide is present, however, the oxygen content of the air can be reduced, in most cases, to 10 per cent., before fatal results are obtained.—Editor.]

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Ventilation of Gob Areas

Letter No. 1—I wish to correct the statement of J. W. Starks, in regard to the character of the gas found in the sealed portions of Mine No. 11 of the Dering Coal Co. This area was reopened Aug. 14, 1913, for the purpose of removing the gas that had accumulated therein during the six years it had been sealed. The removal of this gas occupied six days, before the place could be considered safe.

Mr. Starks states, Coal Age, Dec. 5, p. 908, that "A pipe leading from this area showed that the gas had finally been rendered harmless by blackdamp." To show that this was not the case, permit me to say that the exploring parties were able to get a "cap" within two feet of the bottom of the cage landing; while, on the third day after opening the sealed area, the gas was so strong that a test with a safety lamp showed a "cap" at the surface landing.

These facts showed clearly that the gas had not "been rendered harmless." I would be glad to see in the columns of Coal Age, the opinions of different Franklin County operators and superintendents, giving their experience in this line and stating whether or not it is advisable, in the Franklin County field, to open old and sealed territories.

Further verification of the above statement can be had by reference to Frank Rosbottom, ex-state mine inspector; Edward Laughlin, county mine inspector; J. C. Duncan, ex-supt., Benton Mine Rescue Station; or R. M. Medill, supt. of the Dering Coal Co. All of these gentlemen were with the exploring party.

Subscriber.

West Frankfort, Ill.

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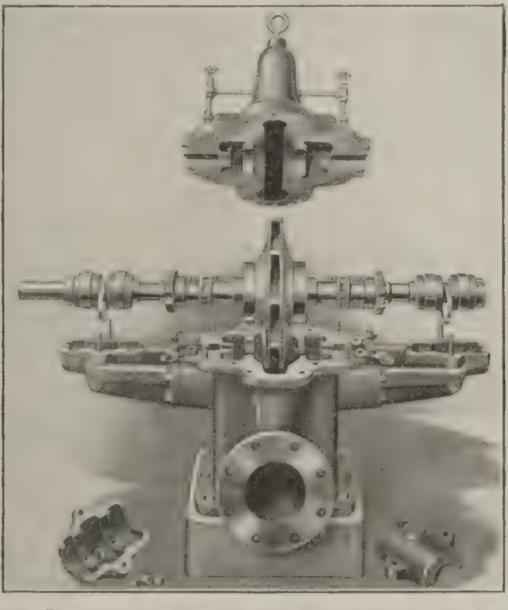
Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Principle of the Centrifugal Pump—The action of this class of pumps depends upon the centrifugal force generated by the rotation of the water passing through the pump by the mpeller. The force so generated acts radially outward, causng the water to flow from the center toward the circumference, and imparting to it the energy of the motor transmitted through the shaft and the curved blades or surfaces of the impeller. The design is to convert as much of this mechanical energy as possible into kinetic energy in the water lowing through the pump; and, then, by gradually enlarging he area of passage and thereby reducing the velocity of the water, to increase the pressure to equal the resisting head.



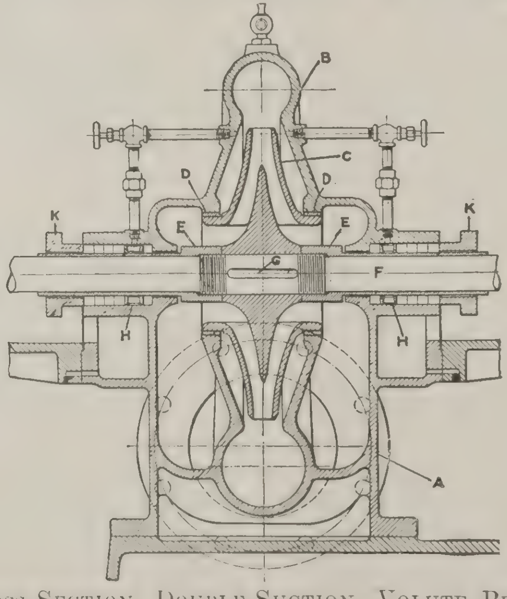
Cover Removed, Showing Interior of Pump

The above figure shows a centrifugal pump with the upper asing lifted, so as to expose to view the interior construcion. The shaft carrying the impeller is also raised out of ts bearings, for the same purpose.

The Coal Age Pocket Book

The impeller, which is known as the "inclosed type," is securely keyed to the shaft by which it is revolved at a high speed. Both the suction and the discharge openings of the pump are in the lower half of the casing, which leaves the upper half free to be removed without disconnecting the pump.

The water entering the suction end passes at once to the annular space surrounding the shaft, on each side of the pump, and thence through the radially curved passages of the impeller, to the volute space in the casing surrounding the wheel. The area of passage through the impeller and the volute casing is gradually and uniformly expanded so as to convert velocity into the pressure necessary to discharge the water against the given head.



Cross-Section, Double-Suction, Volute Pump

The cross-section shown above makes clear the relation of the several parts, which are as follows: Upper casing, A; lower casing, B; impeller, C; bushing rings, D; shaft sleeves, E; shaft, F; impeller key, G; water seal, H; stuffing-box glands, K.

Inquiries of General Interest

Calculation of a Residual Atmosphere

Will you kindly show the calculation of the composition of the atmosphere represented by mixture No. 4, given in the inquiry, Coal Age, Dec. 19, p. 998. This mixture contains air, 80 per cent.; methane, 8 per cent.; and carbon dioxide, 12 per cent. What I want to know is how to calculate the percentage of oxygen and nitrogen, respectively, assuming that the carbon dioxide in this mixture has been formed by taking its oxygen from the air contained therein.

R. H. B.

Gallup, N. M.

The first step is to observe that, in the formation of carbon dioxide (CO_2), the volume of oxygen consumed is equal to that of the carbon dioxide formed. Since 100 vol. of this mixture contains 12 vol. of carbon dioxide and 80 vol. of air from which 12 vol. of oxygen has been taken to form the carbon dioxide, the corresponding original volume of pure air in the mixture before the reaction took place must have been 80 + 12 = 92 vol.

Now, there being 20.9 per cent. of oxygen and 79.1 per cent. of nitrogen in pure air, the quantity of oxygen in the original air was 92 × 0.209 = 19.23 vol., nearly. The volume of free oxygen remaining in 100 parts of the mixture after the reaction has taken place is, then, 19.23 — 12 = 7.23 vol. and that of nitrogen, 80 — 7.23 = 72.77 vol.

Since these volumes are computed for 100 vol. of the mixture, the several volumes represent the respective percentage of each gas in the mixture. The composition of the *residual* mixture is, then, as follows: oxygen, 7.23 per cent.; nitrogen, 72.77 per cent.; methane, 8 per cent.; carbon dioxide, 12 per cent.

* * *

Assuming, on the other hand, that the No. 4 mixture referred to here was formed by adding carbon dioxide to the mixed air and methane, the composition of the *artificial* atmosphere thus formed is calculated in a similar manner; but, in this case, it is evident that there are 80 vol. of original air in 100 vol. of the mixture. The corresponding volume of oxygen, therefore, is 80 × 0.209 = 16.72 vol., and that of nitrogen 80 — 16.72 = 63.28 vol.

The composition of this artificial atmosphere is, therefore, as stated on p. 998, as follows: oxygen, 16.72 per cent.; nitrogen, 63.28 per cent.; methane, 8 per cent.; carbon dioxide, 12 per cent.

* * *

It will be of interest, in this connection, to calculate the composition of a firedamp mixture rendered nonexplosive by the addition of carbon dioxide. This calculation is based on the assumption that firedamp is rendered nonexplosive by the addition of a volume of carbon dioxide equal to one-seventh of the volume of the firedamp *at its most explosive point,* or when the firedamp mixture contains 9.46 per cent. of methane mixed with otherwise pure air.

In this case, 100 vol. of the firedamp will contain 9.46 vol. of methane and 90.54 vol. of pure air. To render this volume of firedamp nonexplosive, it is assumed that there will be required 100 ÷ 7 = 14.28 vol. of carbon dioxide added, which will make the total volume of the mixture 100 + 14.28 = 114.28 vol. The percentage of pure air in the mixture, after the addition of the carbon dioxide, is 90.54 ÷ 114.28 = 79.22 per cent. In like manner, the percentage of methane in the mixture is 9.46 ÷ 114.28 = 8.28 per cent., and that of carbon dioxide is 14.28 ÷ 114.28 = 12.50 per cent.

One hundred volumes of this mixture, which has been rendered nonexplosive by the addition of carbon dioxide, therefore, contains pure air, 79.22 vol.; methane, 8.28 vol.; carbon dioxide, 12.50 vol. The volume of oxygen in the air of the mixture is, then 79.22 × 0.209 = 16.55 vol. and that of nitrogen 79.22 — 16.55 = 62.67 vol. As before, these volumes represent percentages.

Finally, the composition of the nonexplosive firedamp mixture is as follows: oxygen, 16.55 per cent.; nitrogen, 62.67 per cent.; methane, 8.28 per cent.; carbon dioxide, 12.50 per cent.

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Effect of Head on Motor in Pumping

Kindly answer the following question in Coal Age: If a centrifugal pump, driven by a motor having a speed of 860 r.p.m., is operated under a head of 150 ft., what will be the effect on the motor operated at the same speed if the head against which the pump is discharging is reduced from 150 ft. to 75 ft.? Please notice that the motor is operated at the same speed, against the different pressure heads.

Richard Todhunter.

Barnesboro, Penn.

This question was submitted to the engineering department of one of the oldest and largest manufacturers of centrifugal pumps and elicited the following answer:

Replying to the question, What will be the effect on the motor driving a centrifugal pump, in case the head against which the pump is discharging is reduced, assuming the motor is operated at the same speed in each case, we would advise that this usually results in a much larger quantity of water passing through the pump, and, unless the pump has been carefully designed, the motive power is considerably overloaded.

The Cameron pump is so designed that, in the event of the discharge head being reduced, resulting in an increase in the gallons of water pumped, this increment is nevertheless not sufficient to seriously overload the motor.

J. J. O.

New York City.

Examination Questions

Alberta, Canada, Examination for First-Class Certificates, Held June 23-25, 1914

EXPLOSIONS, UNDERGROUND FIRES AND INUNDATIONS

Ques.—In a dry and dusty mine where inflammable gas is given off in the workings, what precautions would you take to prevent the ignition of coal dust? If no inflammable gas was found, would you continue to take these precautions? Give reasons.

Ans.—It is important to make and enforce rigid regulations in regard to shooting the coal and loading out all dust and fine coal from the working faces. Every precaution should also be taken to prevent the scattering of coal along the roads, by the use of dust-tight cars and enforcing strict regulations in regard to the "topping" of the cars in loading. All haulage roads should be cleaned regularly, on the night shift. If the roadways and travelingways are particularly dry, a suitable sprinkling system should be installed throughout the mine.

All holes should be carefully inspected, charged and fired by authorized and competent men, after the workmen have withdrawn from the mine. Only permissible powder should be used, and the shotfirers should be authorized to condemn and refuse to fire any shots that, in their opinion, are doubtful or dangerous. The coal should be suitably undermined, and care should be taken to place all shots in such a position that the charge will be free to perform its work. All holes should be tamped with sand, fireclay or other incombustible material.

An ample system of ventilation should be employed and the air current made to sweep each working face in such a manner as to keep it free from gas. Each place should be tested with a safety lamp before firing a shot therein. The firing of shots should begin on the "last of the air" and proceed in order toward the intake, in each section of the mine. Sufficient time should be given, after the firing of each shot, for the air current to regain its normal condition at the face of the room next adjoining. This will require a somewhat longer time to fire the shots, but is the only safe method to pursue.

Most of the precautions just named should be followed in the operation of a dry and dusty mine, whether inflammable gas is present or the workings are practically free from gas; for the reason that, under these conditions, even a small percentage of gas that would escape attention may cause a dust explosion; or such an explosion may occur in the absence of any gas.

Ques.—An explosion has occurred in a mine where inflammable gas is frequently found in the workings. The fan is undamaged and still working. An examination of the return air indicates that a fire exists in the workings. What precautions for their own safety are necessary to be taken by an exploring party entering the mine?

Ans.—It is difficult to answer this question without being familiar with the plan of the mine and the circulation of the air currents. It may be assumed, however, that the mine is ventilated in separate sections or districts, each having its own air split. It is probable that the fire exists in that section of the mine where the explosion occurred. However, it is also possible that the force of the explosion has destroyed the overcast or division doors that would permit the circulation of the return currents, laden with gas from other sections, to pass over the fire and give rise to a second explosion.

An exploring party, entering a mine after an explosion, under the conditions named, always incurs some risk of being exposed to a second explosion. To reduce this risk to a minimum, the exploring party should enter the intake of the mine and follow the air current to the first section. If this is in good condition and the explorers have fair assurance that the fire is still further inby, they should proceed promptly along the main intake to the second section, and, in the same manner, to the third section, until one is found showing evidence of fire within, or where the circulation is so deranged that the return of that section is passing into the mine instead of into the main return airway. In either case, it would be well to cut off the air from entering that section and, if possible, erect a temporary brattice in the main intake, inby of the mouth of the section, so as to isolate, for the time, the remaining sections of the mine.

In the meantime, preparations should be made to bring water to the fire, which must be fought from the intake side, taking every precaution to prevent gas from reaching the fire, and maintaining only sufficient air for the performance of the work. Safety lamps only should be used throughout the mine when making the exploration.

Ques.—To what causes do you attribute spontaneous heating underground? How can this heating be detected, and what steps would you take to eliminate the danger?

Ans.—Excessive heating of underground workings is generally due to the existence of a slow combustion going on in the gob or in some abandoned workings. This may be due to spontaneous combustion having taken place in the fine coal stored in the waste, or to the accidental ignition of a feeder of gas in the floor underneath the waste and which has ignited the coal. A similar heating and, in some cases, ignition may result from the steady advance of a heavy squeeze, in deep workings, especially where the coal is highly inflammable and more or less gas exists.

To prevent such a spontaneous heating of the mine workings, every precaution should be used to keep fine coal and dust out of the waste stored in the mine. All waste and abandoned places should be carefully sealed or thoroughly ventilated by a sufficient "scale of air." To prevent the occurrence of a squeeze, in deep workings, a sufficient ratio of pillar to opening should be maintained throughout the mine.

The heating of mine workings can be detected by the increased temperature of the workings or by the heating of the coal in the ribs; or if fire exists this is often made known by the peculiar odor that an experienced miner readily detects.

Coal and Coke News

Harrisburg, Penn.

There will be no more all-night sessions in the saloons of towns in the anthracite region, nor will employees of the coal companies be able to secure their "morning eye-opener" while on their way to work should success meet the efforts of several of the burgesses, who are sending letters to all saloonkeepers requesting them to sign a gentlemen's agreement to close their bars at 11 o'clock at night and keep them closed until 7:30 in the morning.

The movement, which was inaugurated 10 months ago, by the burgess of Edwardsville, has the indorsement of the Kingston Coal Co. and the Delaware, Lackawanna & Western Coal Co., and it is thought that other big companies will join the movement, seeing therein the long-awaited opportunity to break up the practice of their employees of stopping in saloons before starting the day's work with the result that they are negligent of the maxims and rules and work injury upon themselves and their fellow employees. There are indications that the hotel men of Edwardsville and Kingston will sign the proposed agreement and thus make the movement a success. Should such action be taken the result will be watched with interest by officials of coal companies throughout the state.

Without doubt the proposed movement of the burgesses and the coal companies would work for the betterment of all concerned, the employees of the coal companies, their families and dependents, the municipalities in which they reside and the hotel keepers themselves.

It is not the intention of the coal companies to enter into the prohibition or local option movement in any way, nor to forbid its employees from drinking. They feel, however, that it is contrary to the laws of safety to allow an employee to enter the mines in the morning after he has spent most of the night in a saloon, with probably a "hang over" or has spent some time in a saloon in the morning on his way to work and had an opportunity to become intoxicated.

The companies intend notifying their employees that discharge will be the punishment for breaking the rule of drinking before going to work.

It is thought that more good can be accomplished, however, by securing the consent of the saloonkeepers to close their bars at an early hour and keep closed until the men have started their day's work and with this end in view the companies have coöperated with the burgesses in the proposed movement.

The Proposed Canal

With ninety per cent. of the surveys finished and 75 miles of the total length of the 104.5 miles laid out and mapped, the Lake Erie and Ohio River ship canal, the half-century-old dream of coal and steel men for an all water route from Pittsburgh to the Great Lakes, is brought down to concrete preparation in the first report of the canal board laid before Governor John K. Tener, on Jan. 13.

Within the next four or five months, the report announces the board will have completed its preliminary work and be ready to submit estimates of the cost of the giant engineering feat.

A tentative route with an alternate is submitted, definitely indicating the probable course which the canal, beginning at Pittsburgh, will take in reaching Ashtabula, Ohio, on Lake Erie.

Beginning at the junction of the Beaver and Ohio rivers, passing up the Beaver River to the junction of the Mahoning and Shenango rivers; thence up the Mahoning River to a point two miles beyond Warren, Ohio; thence northerly across the divide into the Grand River valley; along this valley to a point 8 miles from Lake Erie; thence northerly down the Lake slope coming out on Lake Erie near the mouth of Indian Creek; 6 miles west of Ashtabula, a total distance of 104.5 miles.

The alternate route contemplates building the canal across the divide from the Mahoning River at Niles, Ohio, thence up Mosquito Creek and into the Grand River valley to a junction with the previous route.

Four great reservoirs are proposed. One of these, the greatest of the four and one which will be an engineering task of immense proportions, will be constructed in the Pymatuning swamp on the Shenango River above Turnersville, Penn., with a capacity of 16,500,000,000 cu.ft. of water, which it will receive from its own watershed as well as that diverted from French Creek. The Mahoning River reservoir will have a capacity of 1,500,000,000 cu.ft., and that on the north branch of French Creek, 2,200,000,000 cu.ft. capacity. A reservoir on Pymatuning Creek, which will not be available for canal purposes but only for regulating the Shenango River, will have a capacity of 3,500,000,000 cu.ft. of water.

Six billion cubic feet of water, artificially stored, will be required annually to regulate the flow of Shenango River.

The principal sources of supply from which water may be obtained will be the Shenango and Mahoning rivers, French and Pymatuning creeks. A conservative estimate places the amount available annually from these sources at 20,000,000,000 cu.ft. of water.

PENNSYLVANIA

Anthracite

Carbondale—Two men were killed by a premature blast in the Erie Coal Co.'s mine at Mayfield on Jan. 14. It is said that the miners were using dynamite and both bodies were torn and mutilated, making recognition almost impossible.

Scranton—Every mine and colliery of the Delaware, Lackawanna & Western Coal Co. in the valley was ordered to suspend operation Jan. 15 and 16. Over 18,000 men were affected. Weather conditions were assigned as being solely responsible for this shut down.

Highland—Fire of unknown origin, which started in the tipple and spread so rapidly that for a time it was thought it would communicate to the underground workings, destroyed the coal breaker of the G. B. Markle Co., on the night of Jan. 15. Howard Howells, chief clerk and paymaster of the coal company, lost his life when he was buried under falling timber while serving coffee to the firemen. Officials of the company could not assign the cause for the disastrous blaze, but announced that work on the reconstruction of the giant breaker would begin at once. While the debris was still smoldering in sections, and firemen guarding against a renewal of the fire, squads of men were put to work clearing away the wreckage, to prepare the way for the builders. In the meantime, most of the 600 men and boys who were employed in the breaker are left idle.

North Scranton—In an opinion handed down on Jan. 14, by Judge E. C. Newcomb, the Scranton Board loses its case to enjoin the Clearview Coal Co. from mining under No. 40 school. The injunction was asked by two city taxpayers, backed by the school board and the state. The school district requested the court not only to order mining under the school property to cease until such time as proper support was provided, but that mining within a distance of 375 ft. of the school premises should be stopped. The case probably will be carried to the Supreme Court.

Kingston—A modern hospital equipped with the latest appliances for giving medical attention to injured workmen, has been completed at the No. 4 colliery of the Kingston Coal Co. Officials of the company are the first to install such an emergency hospital on the west side of the river and plan to erect a similar one at the Gaylord colliery at Plymouth.

Bituminous

Connellsville—The coke trade continues to improve and shipments have increased about 15,000 tons and production 7000 tons per week. No idle ovens have been fired but the running time is better. It is understood that one or two contracts are under negotiation, but details are carefully guarded, and there is no precise information available. Buying of prompt furnace coke has increased.

Pittsburgh—Improvement in the fuel situation is visible, there being a somewhat better call from manufacturing interests. It is said that Lake buyers are in the market for approximately a million tons of coal. This is an encouraging symptom, as inquiries from the Lakes do not usually appear until Apr. 1. Railroads are also bidding for their 1915 requirements, which are somewhat larger than were taken in 1914.

More than 700,000 bushels of coal were taken south Jan. 14, by the steamers "W. K. Fields" and "James Moren." This shipment comprised practically all of the coal stored in the local harbor. It was made to Louisville, from where the coal will be conveyed to lower Mississippi points by larger towboats.

The school of mines of the University of Pittsburgh has opened its university extension classes in the mining towns of western Pennsylvania for the third year. Five classes have been organized to study the subjects of mine gases, ventilation, law and safety in preparation for the fireboss examination. These are located at Uniontown, Mount Pleasant, Leisenring, Yukon and Russellton. In addition, a class in more advanced subjects to prepare candidates for the mine foremen's examinations is being conducted at Irwin. The enrollment in the six towns is 157, exceeding that of the two previous years. Among the number are 5 superintendents, 4 mine foremen, 8 assistant foremen, 14 firebosses, 3 hoisting engineers, 2 electricians and 4 mining engineers. The remainder are chiefly miners, motormen, machine runners, pumpers, timbermen, etc. The ages of the students range from 16 to 51. Each class will meet once a week in the evening with a member of the school of mines faculty.

Kittanning—It was learned on Jan. 15, that negotiations for the sale of a block of 21,000 acres of Freeport vein coal lands in Armstrong and Clarion counties, for about $5,000,000, are under way and that the deal will probably be consummated in a short time. The coal is owned by a group of capitalists, most of them residing in Kittanning. The block of coal lands under consideration lies along the Allegheny River, and, it is said, may be mined by drift workings opening directly to the river bank. The coal is said to be among the best steam-making coals in the country.

Ebensburg—The store and offices of the Cardiff Coal Co. were recently destroyed by fire, with a loss of about $15,000. Manager Charles Williams sustained painful burns in rescuing books and papers of the company. The post office was also damaged. The blaze started in the oil room of the store, but the cause is unknown.

WEST VIRGINIA

Charleston—It is indicated by District President Thomas Cairns, of the miners' union, that the organization will vigorously oppose the proposal to establish a state constabulary in West Virginia, similar to that in Pennsylvania. A bill for this purpose has been drafted for introduction in the legislature at this session.

The proposed tax upon coal production, at the rate of ½c. a ton, is meeting with considerable opposition on the part of coal operators. Its advocates point to the expenses of the mining department of the state, miners' hospitals and so forth as a reason for the tax, together with the fact that the state has lost a considerable revenue by the exclusion of the liquor industry. It is estimated that the tax would produce about $300,000 a year.

The South Penn Oil Co. recently leased 5600 acres of oil lands in the Cabin Creek district, from the Ohley Coal Co., the lessor receiving a liberal bonus for the oil rights. The United Fuel Co. is also negotiating a lease for about 3000 acres. These deals are regarded as forerunners of an era of great prosperity.

Huntington—Plans are now being formulated, looking to the transfer of the equipment of three of the Ohio mines owned by the Lorain Coal & Dock Co., to the tract of land east of Logan recently taken over by that concern. Already considerable work is being done on this firm's new tract, and engineers are surveying for railroad spurs which are to run from the Chesapeake & Ohio R.R. about a mile away. The Lorain Coal & Dock Co. will not move its offices from Columbus to Huntington as was rumored some time ago.

Hinton—The congestion of coal cars at Newport News continues, and there appears to be no immediate prospect of relief. The east-bound coal movement over the Hinton division has slightly improved, but no permanent amelioration is looked for until shipping conditions are better at the seaport. The export trade is light and but few vessels are putting in at the terminal for coal.

Bluefield—The production of coal along the Norfolk & Western is declining. In November, 1,852,858 tons were handled. During December, shipments totaled 1,641,165 tons. This is believed, however, to be the low mark, and it is thought that the January shipments will show an increase

Kingwood—Within a few weeks, the Irona mine near here will be operated to capacity and turning out more coal than ever before in the history of the plant. The company houses will all be repaired and put in shape for occupancy, and the store will be put in commission as soon as the demand warrants.

Matewan—The Allburn Coal & Coke Co. recently purchased from the Thacker Mining Co. the lease of the Lynn Coal Co., comprising several hundred acres of coal land about a mile east of this town. The amount involved in the deal is estimated at $60,000. It is said that the new owners will develop the property within a short time.

KENTUCKY

Sebree—The Walnut Coal & Coke Co., Frank P. Helm and S. P. Miller, promoters, has begun sinking a new shaft near the old Sebree mine. The coal bed will be reached at a shallow depth and it is understood the company will work it. Machinery to begin operations on a small scale is to be installed, though the operation will be increased later, and the company is expected to be ready to hoist coal in the near future.

Hazard—After an expenditure of a quarter of a million dollars, the Ashless Coal Co. has opened a mine at Lothair, which will have a daily output of 4000 tons. The operation consists of two main entries, located on opposite mountain sides, separated by a narrow valley, which is spanned by the tipple, reached at either end by the mine tracks from the entries. For several months the company has been building bridges, railroad tracks, power house, tipple, machine shops and miners' houses and everything else to be found in a modern mining camp, including a telephone system. Mining operations began with a force of 40 miners and the output is running about 350 tons daily, but will be extended until the maximum is reached. The company plans in the near future to drive another entry further up the valley, opening up the No. 5 vein.

OHIO

Brilliant—J. C. Ault, one of the receivers under the United States Court, for the Dexter coal mine, recently stated that the mine had been operated by order of the court under the anti-screen law, for a year, and although $100,000 worth of business had been done, only expenses had been made. Nothing was made for the creditors and the assets of the company had been depleted in an attempt to prove that the mine could be operated profitably under the new law. The receivers have not been able to pay off any bonds and even taxes have gone delinquent. They have called a meeting of creditors, stockholders and bondholders, for Jan. 23, to take action for closing the mine down and selling it.

Portsmouth—It is announced that the holdings of the Buckhorn Coal Co., in Lawrence County, have been leased to Pirrung, Evans & Co., of Ironton, Ohio, and that the lessee will at once begin operating the two mines. The capacity of the workings is about 150 tons a day.

Hamden—Milton Mine No. 3, one of the best known properties in Jackson County, has been sold by the Dayton Coal & Iron Co., of Dayton, Ohio, to Eli Oury, of Wellston, who will start operations in the near future.

Joyce—The West Goshen Mine, the largest in York township, which has been closed since Apr. 1 last, has been opened, giving employment to 50 miners. The mine was formerly occupied by the now defunct Goshen Coal Co. and was sold to William MacKay, of Cleveland. The New Philadelphia Coal Co. has leased the property.

Starr—The Coonville mine at Starr, has been closed permanently, throwing 200 miners out of work.

INDIANA

Evansville—The Evansville Central Labor Union has added its protest to the chorus going up against the practice of coal stripping in southern Indiana. The protest was in the form of a resolution asking the legislature to stop the evil practice.

The Newburg Coal Co.'s property at Newburg, Ind., has been sold by William O'Brien and James P. Abshire, to Louis Julian and R. G. Humphrey. The new owners will continue to operate the mines.

Bicknell—The new Oliphant-Wasson mine at Bruceville is nearing completion. The fifth vein has been reached, which has a thickness of 5 ft., 10 in.

ILLINOIS

East St. Louis—One of the largest damage suits recently filed against a mining company is that of Theo. Minkanich vs. New Staunton Coal Co., for $15,000.

Willisville—Arrangements are being made here to dismantle the mine of the Missouri & Illinois Coal Co., and to abandon the property. This mine has a capacity of 600 tons a day, and has been working continuously for several years, producing coal for the M. & O. R.R. It is one of the few mines in the southern Illinois field that operated night and day.

Belleville—The recent meeting held here by the operators of the 5th and 9th Districts, including operators who belonged to the association of independent operators, and also representatives of the coöperative mines, failed to bring about a solution of the local problem. In a general way, it is understood that the purpose of the meeting was to get an understanding from the coöperative miners as to whether they would insist upon getting for their labor the same scale of wages that the miners were paid in mines belonging to members of the association. Failure on the part of the coöperative miners to do this, brings about a condition of competition that is absolutely ruinous to the operators who are paying their miners the union scale. It was brought out at the meeting that some mines have not worked for a period of over three years.

Danville—More than 500 miners, idle since last November, have been put to work in the Danville mining district. Among the mines reopened are those belonging to the Bunsen company, which supplies coal to the steel mills at South Chicago and Joliet.

Gillespie—The three mines of the Superior Coal Co. made an average of 12,222 tons per day worked during 1914. This is the largest ever made by the three mines. During the month of December, with 22 working days, mine No. 1 hoisted 90,143 tons; No. 2, 96,406; and No. 3 mine hoisted 82,334 tons. The greatest record for mine No. 1 was reached during this month, when a hoist of 3919 tons was made in one day.

Harrisburg—The Saline County Coal Co. mine No. 3 broke the county record for hoisting coal on Jan. 14. In 8 hr., 81 railroad cars were loaded, or a total of 3388 tons were produced. This mine is said to be the most modernly equipped of any in southern Illinois.

ARKANSAS

Greenwood—James Slankard and Ree Trout, charged with the murder of two guards in the rioting at the Bache-Denman coal mine No. 4, in the Prairie Creek district last July, were acquitted Jan. 15. After introducing evidence to prove an alibi, the attorney for the defense placed three physicians on the witness stand who testified that the bones found in the burned miner's cabin supposed to have been those of the two guards were not human remains.

COLORADO

Cokedale—Cokedale, which is one of the most important coke manufacturing centers in Colorado, situated about 20 miles west of Trinidad, faces extinction as the result of a recent recovery by the Federal Government of 4000 acres of coal land alleged to have been fraudulently acquired by the Carbon Coal & Coke Co., and which has been deeded back, following a series of suits brought in the Federal courts of Denver. The town stands for the most part on this land, and the question of what shall be done with it is puzzling the authorities.

PERSONALS

George L. Morgan, one of the Illinois state mine inspectors, with headquarters at Benton, has been transferred to Peoria. He will be succeeded at Benton, by J. E. Jones, who has been stationed at Danville.

Ezra L. Foulks, the "Grand Old Man" of the Hopkinsville, Ky., business interests, and the Nestor of all the coal men in the southwestern part of the state, has just passed his 92d birthday. He was not in sufficiently good health to receive his friends on his birthday.

J. H. Winder, recently made general manager of the Sunday Creek Co., has been elected president of the Hocking Valley Coal Operators' Association to fill the vacancy caused by the resignation of E. A. Cole. When Mr. Cole resigned as president of the Sunday Creek Co. he also resigned as head of the operators' association.

M. T. Fahey, who has been acting as superintendent for the past year for the Manor Coal Co.'s works, and who recently resigned, was recently presented with a gold watch, chain and locket, the latter bearing the inscription "Presented to M. T. Fahey by the employees and members of the Manor Big Vein Coal Co., Shaw, W. Va."

Mrs. Ella Bird, of Francisco, Ind., has been appointed as a mine inspector by the Gibson County Mine Commissioners. This was a reappointment, Mrs. Bird having served, with the two men who complete the inspection board, since its founding. Following the death of her husband, who owned the Francisco mine, Mrs. Bird continued to operate it. She is thoroughly versed in mining practices.

OBITUARY

David G. Jones, aged 54, general manager of the Pittsburgh-Buffalo Coal Co., and a well-known coal operator, died late on Jan. 16, following an operation. Besides his connection with the Pittsburgh-Buffalo Co., Mr. Jones was president of the Four States Coal Co. of West Virginia, and the Dexter Coal Co. of Ohio.

CONSTRUCTION NEWS

Lisbon, Ohio—The Lewis and Evans mine, north of Lisbon, which has been in operation for five years, is to be enlarged into a railroad mine. Trestles and tipple will be built at once.

Viper, Ky.—The Viper Coal Co. is starting the initial work on a coal development about one mile north of here, on the Lexington & Eastern R.R. It will build sidings, coal tipples, miners' residences, commissary, power station, etc., giving employment to several hundred men.

Whitesburg, Ky.—As a preliminary step toward building into the eastern Kentucky coal field the Baltimore & Ohio R.R. has just filed a mortgage at Whitesburg, Ky., to secure $5,000,000 of bonds. The active competitor of the B. & O. in this field will be the Louisville & Nashville R.R.

Andersonville, Penn.—The new tipple of the Anderson Coal Co. on the Montour R.R., near the old McPherson mill in Cecil Township, is completed and a coal town is fast springing up. This village promises to be a scene of activity next summer when the large, modernly equipped mine will be put in operation. The foundation for a large store which the coal company is building has been completed. This structure will stand close to the site of the old McPherson mill which was burned down some months ago.

Wilkes-Barre, Penn.—Sprinkler systems that can be turned on by hand from outside of the building are being installed in 14 of the wooden anthracite breakers of the Lehigh Valley Coal Co., while two more similar installations are in contemplation. The new sprinkler systems consist of pipes 10 to 15 ft. apart with nozzles pointing upward at equal intervals which dash the water against concave plates of metal causing an umbrella-shaped spray to fall to the floor. The nozzles are so placed that these water sprays will cover the entire breaker area, and 800 to 3000 gal. of water per minute can be discharged or a quantity equal to that flowing from one to four fire hoses. The new systems supplement but do not replace any of the regular fire fighting apparatus.

NEW INCORPORATIONS

Ashland, Ky.—The Alum Creek Block Coal Co. has been incorporated with $250,000 capital and J. W. M. Stewart, president, K. M. Fitzgerald, secretary-treasurer. The concern is understood to have arranged for an indefinite acreage though it is not in the market for mining machinery just at this time.

Wilmington, Del.—The Elliott-Chapman Coal & Coke Co., a Delaware corporation, has gone into voluntary bankruptcy in the United States Court here, with liabilities of $38,000 and assets of $20,000. Melville B. Chapman, of New York, and Charles W. Bush, of Wilmington, have been appointed receivers.

Sutton, W. Va.—The Otter-Birch Coal & Coke Co. has been incorporated with a capital stock of $250,000. The concern will have its chief works in the Otter and Birch districts of Braxton County. The incorporators are O. P. Markle, Isadore Frank, W. W. Markle, W. C. Hawk, and A. D. Williams, all of Uniontown, Penn.

Charleston, W. Va.—At a meeting of the Main Island Creek Coal Co., recently held here, it was decided to increase the capital stock from $500,000 to $1,000,000, for the purpose of providing funds for extensive improvements to the company's properties. About $200,000 will be spent at Island Creek on new operations, two steel tipples, a new store building to replace that which was recently burnt, and a number of miners' houses. It is the intention of the company to double its production of 50,000 tons this year.

INDUSTRIAL NEWS

Hazard, Ky.—It is reported that Williams & Wilson have leased a tract of 1000 acres on Buffalo Creek which they will develop.

Connellsville, Penn.—The Union Line recently placed the first order for equipment since the rate decision. This calls for 500 steel tank cars.

Buffalo, N. Y.—The discount of 1 per cent. on Canadian paper here has disturbed the Canadian coal trade materially, as for the buyer to pay it appears to advance the price of coal and for the shipper to stand it seems a reduction of the price.

Columbus, Ohio—The Ohio Utilities Commission has granted a rehearing to the Lake Shore & Michigan Southern Ry. Co. in the case involving joint rates with the Lorain & Southern, an industrial road. The commission recently held that the Lorain & Southern is a common carrier and thus is entitled to a share in the freight revenues with the Lake Shore.

Chicago, Ill.—A bill was recently filed in the United States District Court, asking the foreclosure of the first mortgage bonds of the Chicago & Indiana Coal Ry. Co., a property absorbed by the Chicago & Eastern Illinois R.R. This suit was filed in behalf of the Metropolitan Trust Co., of New York, trustee of $5,000,000 bonds of the coal road, dated Dec. 1, 1885. It is the second foreclosure suit in six months.

Bristol, Tenn.—In order to prevent confusion in trade names, the Enterprise Foundry and Machine Works now terms its product, Enterprise wheels, instead of A. J. Whitney's wheels. There has been no change in the personnel of this firm. Mr. Whitney will continue as heretofore to give his direct personal supervision to the manufacture of self oiling and roller bearing wheels for the mine car trade.

Huntington, W. Va.—It is stated that the Chesapeake & Ohio R.R. is well equipped to care for an increase in the volume of the coal traffic which is expected to result from the transfer of the activities on the part of certain Ohio mine operators to West Virginia and Kentucky. Four thousand coal cars have been recently purchased by the road; 2000 of these are of 70 tons capacity and 1000 are of 57½ tons.

Harrisburg, Penn.—Figures compiled at the state Department of Mines show that there were 401 fatal accidents in the bituminous fields of the state, last year, as against 611 in 1913. There were 596 such accidents in the anthracite field, as against 624 in the previous year. The production of anthracite coal last year was about the same as that in 1913, but bituminous was 34,000,000 tons less than in the preceding year.

Whitesburg, Ky.—It is reported here from the plants of the Consolidation Coal Co., the Elk Horn Mining Corporation in the Jenkins-McRoberts-Fleming-Haymond-Hemphill field, that mining continues to increase rapidly and that by Feb. 1 all the mines, it is safe to say, will be running full time. New men are being added every week, and preparations going forward getting in readiness for a complete resumption at all of the mines.

Chicago, Ill.—It was stated recently before the Federal Arbitration Board hearing the wage demands of western railroad engine men, that for every $1000 paid railroad firemen in 1913, on a number of western railroads, 100 fewer tons of coal were shoveled into locomotive fireboxes than in 1890. The assertion that firemen's productive efficiency showed a decrease from 1890, was made after and examination of the records of a selected number of coal burning roads.

Pittsburgh, Penn.—Optimism pervades the minds of coal operators in the Pittsburgh district. They feel that an uprising status of the manufacturing and transportation industries is imminent, and that the demand for fuel will approximate and perhaps exceed the volume of tonnage put out in 1913. It is stated that buyers of fuel for the larger consuming concerns of the country are making inquiries for prices for the coming year, and that the tonnage asked for bespeaks prosperity.

New York City, N. Y.—"Safety Engineering," known as The Magazine of Safety, is to be published hereafter by the Safety Press, Inc., 80 Madison Lane, New York City. This magazine is now in its 14th year, having been founded in April, 1901, under the name of "Insurance Engineering," by Franklin Webster, president of the Insurance Press. For several years it was devoted largely to fire prevention and fire-proof construction, and its attention to that important field is to be continued as heretofore.

Washington, D. C.—Two sailing vessels were chartered by the Government, Jan. 15, to go to Philadelphia to transport coal from the Richmond Street pier. This was done by the Navy Department in order to overcome the situation in the upper Delaware River which forbids the use of 19,000-ton colliers because the northern part of the channel is not deep enough to accommodate them. The department is determined, if possible, to take as much of the Pennsylvania coal as it can. The big colliers will therefore be sent to Hampton Roads and the small ones to Philadelphia.

Pittsburgh, Penn.—Many rumors have been circulated concerning the coal deal between J. V. Thompson, of Uniontown, and interests supposed to represent the United States Steel Corporation. It is stated, however, upon good authority that Mr. Thompson has practically closed the deal with H. C. Frick and a number of his business associates for about 60,000 acres of coal land in the Dunkard Creek Valley of Greene County, the price being about $300 an acre, or a total of $18,000,000. The report that the United States Steel Corporation is the purchaser is without foundation.

Philadelphia, Penn.—The joint petition and appeal by the Pennsylvania, Philadelphia & Reading, Central R.R. of N. J., Lehigh Valley, and the Delaware, Lackawanna & Western R.R. companies, respondents from the filing of the order of the Public Service Commission of Pennsylvania in the Philadelphia anthracite case, contains the petition and appeal of these respondents with 31 assignments of error and a number of exhibits of the numerous complaints with respective answers of the respondents and the report of the Public Service Commission. The assignments of error are in some cases similar to those filed for the companies in their separate petitions and appeals.

Elkins, W. Va.—The Davis Colliery Co. and the Junior Mercantile Co. recently moved into their new office and store building at Bower, W. Va. This structure replaces the one destroyed by fire Mar. 16, 1914, and is of absolutely fireproof construction; the walls being of brick, floors, roof and stairways of concrete, and the partitions of gypsum blocks. The basement and first floor are occupied by the Junior Mercantile Co., and the upper floor by the colliery company as offices, drafting rooms, etc. The arrangement and conveniences embody the latest features in buildings of this kind, and it is thought that this is the finest building for the purpose in the state. The total cost of construction was about $30,000.

Washington, D. C.—Arguments were begun here, Jan. 15, before the Interstate Commerce Commission marking the conclusion of the investigation into the rates, practices, rules and regulations governing transportation of anthracite. Eleven of the principal coal carrying roads are involved, and the case is considered one of the most important before the Commission. One of the side issues is the interest of the hard coal carrying roads in the anthracite they transport. The investigation was begun in 1912, and the testimony fills about 70 volumes. The Government position was stated to rest on the contention that the cost of transportaion, the investment of the roads and the disposition of their income did not justify the rate charged.

Uniontown, Penn.—The First National Bank of Uniontown, of which J. V. Thompson is president, failed on Jan. 18. This bank has a capital of $100,000, deposits of approximately $2,600,000 and has been paying 22 per cent. annual dividends. In Pittsburgh coke circles, no surprise whatever was felt over the failure of this bank, the only surprise being that the trouble had not developed sooner. It is entirely a reflection of the overbonding of certain coke operations whereby the interest, sinking fund and exhaustion fund cannot possibly be provided from selling prices of coke as the coke market has been in recent years. Some of the coke interests have long been unable to take care of their bonds which have been held largely by banks. It is thought that this failure may precipitate other developments.

St. Louis, Mo.—A suit recently filed in the Circuit Court here is creating considerable attention in coal mining circles. It is that of the Missouri & Illinois Coal Co. vs. Willis Coal & Mining Co.; contract, $60,527.26. This suit, it is understood, is the result of an order from the defendant to the plaintiff, notifying the plaintiff to cease the mining and shipping of coal on the order of the defendant. The coal was sold by the defendant to the M. & O. R.R., as company fuel. The mine of the plaintiff, it is understood, is located on the royalty right of the defendant, said right being leased to the plaintiff on a royalty basis. The plaintiff, then in turn, mined and produced the coal and sold it again to the defendant. The mining property in question is at Willisville, in Randolph County, Illinois. The general business depression is given as the cause of the curtailment of coal to be used for fuel purposes by the M. & O.

Coal Trade Reviews

General Review

A general sweeping reduction in the working schedules of the hard-coalers. Bituminous trade also less encouraging. Situation on new contracts indeterminate. Sharp break in the Middle Western boom.

The extremely mild weather has brought the expected relapse in the anthracite market, and the collieries are all under heavily restricted working schedules—a most unusual condition at this season of the year. Prices have so far been fairly well maintained, but the outlook is not encouraging over the balance of the season. It is a weather market entirely from now on, and with only two coal-burning months left, consumers will restrict their orders to the minimum.

The situation on bituminous has become equally depressed. The gradual improvement noted over the past several weeks, fell flat this week, and the movement was confined almost entirely to old orders. Some increase in the demand offshore has toned up the market slightly, but ocean freights are so erratic and uncertain that little business can be negotiated in this direction. The higher grades are possibly somewhat steadier, but the general situation cannot be regarded as other than most disappointing.

Increased interest is noted in contracts as the season advances. So far there has been no definite developments, and the situation is decidedly mixed. Operators are reluctant to start negotiations at a time when the market is so demoralized, while consumers on the other hand feel that there are strong possibilities of obtaining concessions on last year figures. The situation will probably not be straightened out for several weeks, and in the meantime both consumers and producers are following the trend of conditions keenly.

While the Pittsburgh market is apparently holding its own, the gradual improvement of the past several weeks has ceased, for the time being, at least. Mines working on railroad business seem to be the best fixed. Prices are generally irregular, and there are no immediate indications of any improvement. The Ohio market has also slowed up, due apparently to the mild weather, but there is still a fair amount of business being done as compared with that of several weeks ago. The industrial depression continues the predominating factor in the situation; manufactures are only buying for their immediate requirements which, in most cases, are substantially below normal.

Southern consumers appear to be satisfied that they have sufficient stocks to carry them through the balance of the winter, and buying is at a minimum. Operators are at the moment chiefly concerned with the opening of summer business.

Even the Middlewestern market, where the outlook has been particularly encouraging, has suffered a sharp reversal. The long stretch of mild weather has caused the demand to practically disappear at some points, and the trade is entirely lacking in the vigor that marked the closing days of December. There was apparently considerable stocking against a possible curtailment over the holiday period, and a reaction has set in which has been further aggravated by the summer-like weather. The decline is apparent in all parts of the Middle West, and a general slump is to be expected unless there is a return of the cold weather.

ATLANTIC SEABOARD

BOSTON

Rather more interest in season contracts; $2.85 f.o.b. Hampton Roads understood to be the basis. Spot market still very slow, but high ocean freights a factor in the outlook. George's Creek prices the same as last year. Water freights stiffen. Anthracite demand sluggish again.

Bituminous—A moderate inquiry for season prices has developed during the week but so far there has been nothing really significant. It is understood that $2.85 f.o.b. Hampton Roads will be the price aimed at by the various interests but it is altogether too early to make forecasts. A mild January is not favorable to firm prices. The current demand is meanwhile as slow as has lately been the rule. Except as interruptions to shipping have temporarily cut down receipts there is only a light inquiry at the distributing points for inland supplies. On car prices continue more uniform.

Dumpings on a larger scale for shipment off-shore has given a better tone to the market on Pocahontas and New River and the agencies are encouraged to hope for better things a month or two hence. Such prospects, however, have little effect on current prices; $2.70 is still about the average figure, all grades considered, and shippers are actively seeking orders. There is a shortage of bottoms, another obstacle to the interests wanting to place coal.

Seven collieries ordinarily faring between Chesapeake Bay and Boston have been chartered off-shore and there is hardly enough sail and barge tonnage to replace them, or would not be if business were normal. Each of the larger steamers carries about 30,000 tons per month and it takes a number of schooners to freight that amount of coal in the same period. This condition and the thick stormy weather have seriously interfered with the prompt release of cars at the Virginia terminals.

A few more weeks will clear up the situation so that some line can be had on the new season's trade. The curtailment in mining will probably be adhered to for a time at least; then conditions will dictate some sort of policy and the usual scramble for busines will begin.

The Georges Creek shippers have announced that season prices will be the same as last year. They are still in arrears on current orders, but a fortnight of clear weather will straighten them out.

Pennsylvania interests are following the market very closely in the hope of finding conditions more favorable for their output. There is almost no spot business on the Pennsylvania grades and bargains can be had at all the shipping piers.

Water Freights have stiffened materially the past ten days. Not only has the weather shortened up the supply of tonnage, but an increasing number of colliers are being chartered off-shore. Even schooners of 3500 tons capacity have been chartered to take cotton to points like Genoa on terms that seem very remunerative to the carrier; $5000 per month and $8@9 a ton have been mentioned as going rates. It is not surprising that large vessels, Hampton Roads to Boston can now command 85c. as a minimum.

Anthracite—The mild weather has put the hard-coal trade back into almost a midsummer demand. Several of the collieries have closed down for a week at a time because of the coal accumulated at the loading piers.

Wholesale prices on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.60@2.75
Boston†				3.68@3.78
Providence†				3.63@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous situation more discouraging. Interest centers on new contracts. Exceptionally mild weather causes a general slump in anthracite and operations are heavily curtailed.

Bituminous—It is difficult to see anything of an encouraging nature in the local bituminous situation. The past few weeks have witnessed a progressive, though very slow, broadening of the market, but this has apparently come to a complete standstill the current week. Probably this was more or less directly due to the almost summerlike weather, but whatever the cause it is evident that there was a complete cessation in new orders.

Bunkering contracts, most of which expire on the first of the year, have been mostly renewed on the same basis as last year. On other contracts, which are now beginning to come up, there is little heard as yet. Both operators and consumers appear mutually reluctant to close; the former because of the difficulty in negotiating a satisfactory deal when the market is so weak, and the latter because of the exceedingly low prices which have ruled continually over the past year. It is still felt in all quarters that last year's figures will be generally obtained on the new contracts, the exceptions being those on which operators succeeded in forcing prices unwarrantably high last year.

The New York market is quotable on the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

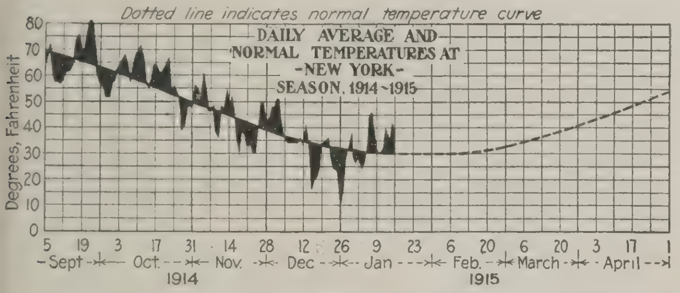
Anthracite—A somewhat protracted period of springlike weather has created havoc with the anthracite trade as evidenced by the strict curtailment generally observed in all directions. The Reading and Susquehanna companies cut their operations 50% last week, and the Lehigh Valley made a similar reduction the current week. The market is exceedingly flat and it is commonly said that the independents are producing sufficient coal to meet all the current demand.

On the domestic sizes, egg coal is in the best demand, though the call for chestnut is fairly good; a few individuals, however, are offering chestnut at the same price as stove coal in order to avoid demurrage charges.

There is a large supply of pea coal in all directions, but prices are holding relatively firm, the maximum concession being only about 10c. per ton. There is a slight shortage of high grade buckwheat No. 1 but a continuance of the mild weather will soon relieve this. Rice is the hardest of all sizes to move, particularly the lower grade qualities. Good grade barleys are doing well, but the off qualities are weak.

A continuance of the exceedingly mild temperatures will soon be reflected throughout the anthracite industry from the smallest dealer to the largest producer. Such heavy overstocks are accumulating in all directions that some drastic move will have to be undertaken. The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.10@5.35	5.30	4.80@5.30
Stove	5.35	5.20@5.35	5 30	5.15@5.30
Chestnut	5.60	5.45@5.60	5.55	5 30@5.55
Pea	3.55	3 45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.25@2.30	2.00@2.25	1.80@2.25
Barley	1.80	1.70@1.80	1.75	1.35@1.75



BUFFALO

Bituminous improving very slowly and shippers are becoming impatient. Mines still running about half time. Anthracite quiet; sales appear to be slacking off because of early activity.

Bituminous—The improvement anticipated some weeks ago has failed to appear as yet; in fact a good many shippers are of the opinion that the demand is not as good as it was, due mostly to the mild weather. There is some resumption of business, but it is by no means general and will have to be much larger to make up for falling off last autumn. Buffalo shippers who are in touch with Pittsburgh find that there is doubt as to the propriety of making a Buffalo base price in the spring, as has been done in former years by one of the leading companies there. The future of the trade is more uncertain and the price will have to be made lower, which is anything but desirable.

The bituminous mines in the Allegheny Valley are running about half time and though the supply of slack is very light this is due to the fact that the sale for three-quarter is not large. Shippers say that in spite of the stiffer price for slack they are obliged to be careful about handling it. The railroads are buying a little more actively, but they have not yet shown much disposition to stock up though mines with good rail orders appear to be better off than the average. There is no material change of prices in the bituminous trade. Quotations are still on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley prices rule 25c. lower than Pittsburgh.

Anthracite—The quiet condition of the trade continues though shippers do not feel like complaining. The report that there is likely to be a shortage at Upper-Lake ports before spring is not seriously considered here. If coal runs short there the Eastern shipper will be greatly surprised, though it is fairly certain that much less will be left over than last spring.

One company is loading coal into Lake vessels, having about 100,000 tons afloat at present. More tonnage is in demand, but it is difficult to get. Sales of grain for export have been more active lately, so that tonnage should be plentiful soon.

The city anthracite trade is fairly good. Some competition is developing on the part of the sellers of independent anthracite, the circular price being cut slightly now. The scarcity now centers on egg, which was lately very plentiful.

TORONTO, CAN.

Weather mild and the market very quiet.

Trade is steady, but quiet for the season which since the New Year has been generally mild. Dealers are generally carrying large stocks and only light shipments are coming forward. Prices remain unchanged as follows: Retail, anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75. Bituminous, steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars, three-quarter lump, $3.78, screenings, $2.79.

PHILADELPHIA

Anthracite continues listless. Operations still on reduced basis. Bituminous shows improvement in spots, but the general condition remains about the same.

Anthracite—Outside of the call for buckwheat, which is fairly strong, there is no short size in the market. Just at the present time, the call for buckwheat is in excess of the output, under the restricted mining, and it is understood that active reloading of this size is taking place at the storage yards of the large companies. Chestnut is probably the next size showing the most active call. The restricted output of stove and egg is being absorbed, but the most strenuous efforts are necessary to place it. Outside of the gas companies, the market is requiring very little broken coal, and at many operations this size is being reduced.

The Tidewater market still manifests weakness, the New England trade being well supplied with coal. Low temperatures may create a demand, which will enable the operators to work full time, but the outlook is not encouraging now. Prices are well maintained, despite the dull market, although it is understood that concessions on all sizes are being made by the individuals, in order to find a prompt disposal of their product.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.80@4.90
Stove	5.00	5.00
Chestnut	5.25	4.90@5.00

Bituminous—While the general situation shows little or no improvement, better conditions are commencing to appear in certain coals. This is especially true of the Georges Creek; in fact, the demand on the line is interfering with their Tidewater obligations, and considerable delay is experienced in gathering a cargo together. Other coals reflect this improved condition, but not to an appreciable extent. Good fuels are quoted at $1.35 at the mines, with the medium grades 25 to 30c. less.

BALTIMORE

Warm weather depressing the trade. Prices weaker, especially on slack. Railroad movement improves.

The coal trade is being affected adversely by the warmer weather. The temperatures throughout the East and Middle West have been considerably above normal. A drop in the demand Westward is noted and attributed largely to this cause. In the local territory the hard-coal trade has also suffered largely from the higher temperatures. Smaller sizes, which have been a feature of the recent activity, were much weaker.

In bituminous the price list was not as strong, although there was no great amount of spot business done. Slack sold in several cases around 60c., which was about ten to fifteen cents off some sales a week or ten days ago. In the Fairmont district three-quarter sold at 85c., and run-of-mine at about 75c. West Virginia steam coals sold at from 80 to 85 cents.

The Pennsylvania situation was somewhat better. Somerset best grades brought $1.25 in limited quantities, with from poor to medium 95c. to $1.10. The Clearfield situation was about the same.

The various coal agencies here are busier figuring on the approaching contract period than on immediate business. A number of cars of sample coal are now being shipped. The consumers are rather slow in coming in for contracts, and the trade is showing no tendency to sacrifice, as all feel that better industrial times are coming that will boom the coal business and set a much higher standard of prices.

HAMPTON ROADS

Accumulation of coal somewhat reduced. Prices unchanged. Indications point to a heavy January tonnage.

Dumpings at Hampton Roads for the week have been about fair. In addition to coastwise and foreign shipments, the government has also been taking some coal, mostly barges for loading into vessels of the fleet now in Hampton Roads. The coastwise movement has been mostly to Boston with other large cargoes to Providence, Portland, Lynn and Savannah. Export cargoes have gone to Havana, Iquique, Para, and Barbadoes. Small cargoes are still moving to the foreign trade in schooners. Taking the month's movement thus far there is a decided improvement shown over the December dumpings and the outlook for a large tonnage is fair.

Prices on the various grades remain unchanged. The demand has not been heavy, and so far as can be ascertained practically all of the coal moving has been contract business.

Steamer clearances for the week ending Jan. 10, were as follows:

Vessel	Destination	Vessel	Destination
Isle of Jura[1]	Havana	Denis[1]	Para, Brazil
Chincha[2]	Iquique, Chile	Korsfjord[2]	Barbadoes
*Sallie C. Marvil[2]	Hamilton, Bermuda		

[1] Loaded at Newport News. [2] Loaded at Norfolk. *Schooner.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
(Grace boat)	American	Atlantic Range	San Francisco San Diego†	4000*	$6.50
Allanwilde		Baltimore	Martinique	565	
Bertha L. Downes		Baltimore	Martinique	606	
Dustin G. Cressy		Baltimore	Mayport	726	
Ruth E. Merrill		Baltimore	Boston**	2309	

Note—Steamers are indicated by **bold face** type, all others being schooners.
* To 5000 tons d.w. † or Puget Sound, $7. ** or Portland.

OCEAN FREIGHTS

Conflicting rates on charters U. S. to the Plate with Cardiff demanding substantially higher figures than are obtainable locally. Freights generally continue at prohibitive levels.

During the past week a British steamer locally controlled of about 6000 tons capacity, early February loading, was offered firm at $7.20 to the Plate and a neutral steamer about 5000 tons capacity, late January loading, was asking for an offer of $7.20 for the same voyage. But the coal interests claim that American coals cannot be sold in the Plate in competition with Cardiff, on a basis of $7.20 freight. Numerous cables were received from the other side, stating that $8.40 and later $9 was offered from United States to the Plate, and last Saturday the British steamer "Induna," about 6000 tons capacity, was closed in London, from Baltimore to the Plate at $9.30.

On American orders shippers can arrange charters on much better terms here than in London. Various owners are now asking the same rate that the "Induna" secured.

Freights to other destinations are unchanged and the market is quotable as follows:

To	Rate	To	Rate
Havana	$**2.00**	Guantanamo	$2.50@2.75
Cardenas or Sagua	**2.50**	Demerara	**4.50**
Cienfuegos	**2.50**	Bermuda	2.40@2.50
Port of Spain, Trinidad	2.75@3.00	Vera Cruz	**2.50**
St. Lucia	2.50@3.00	Tampico	**2.50**
St. Thomas	**2.50**	Rio*	**9.60**
Barbados	2.75@3.00	Montevideo, Buenos Aires or La Plata	8.40@9.30
Kingston*	**2.50**	Mediterranean	**9.60**
Curacao	2.25@2.50	Valparaiso	4.80@6.00
Santiago	2.50@2.75		

*Small boats to Kingston $2.50@2.75.
W. W. Battie & Co.'s Coal Trade Freight Report.
Note—Rates noted in **bold face** type are only approximate.

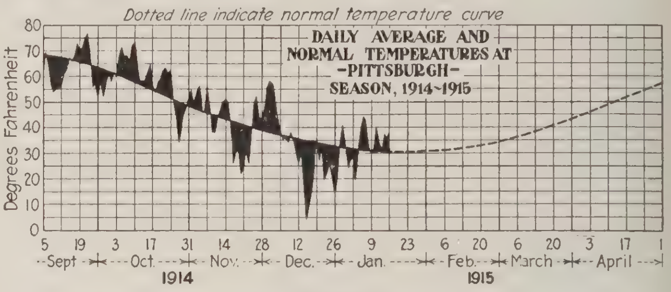
OHIO VALLEY

PITTSBURGH

Market shows no further improvement, but is holding its own, with mines operating at slightly over 50% of capacity. Prices unchanged.

The market has experienced no further improvement, but is about holding the gain recently made. The weather has been exceptionally mild and retail demand has not developed further, while the industrial improvement that seemed to be in full swing two or three weeks ago has not gained any additional ground. The steel mills are consuming from one-fourth to one-third more coal than in December but do not seem to expect any further increase within a week or two, the steel market having been relatively quiet in the past fortnight.

Prices continue to be rather irregular, but are better maintained than a month ago, and the whole feeling in the trade continues to be one of much higher hopes than were entertained until very recently. The general market, subject to some cutting, stands about as follows: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per ton at mine, Pittsburgh district. Mining operations in the district as a whole are averaging somewhat over 50% of capacity.



TOLEDO

Steam trade better but the market continues a weather proposition.

The extremely soft weather of the past week has been bad for the trade generally. While there has been no change in prices for mine shipments, those caught with coal on track have been compelled to sell at a sacrifice. Some cold weather, however, would make the market active. There has been some improvement in the steam trade during the past week, owing to the fact that many of the factories which were closed down for inventories during the holidays have resumed operations.

COLUMBUS

Warmer weather has caused a slight lull in domestic demand. Steam business still slow. The small sizes in good demand.

A slight weakness in domestic trade is noted, due to warmer weather. The market is purely and simply a weather proposition from this time on and the tone is still satisfactory as yet.

Dealers are not increasing their stocks, believing that shipments can be obtained promptly when the trade is brisker. Stocks are larger than at the first of the year, when inventories were completed. Trade is coming in fairly steady, but orders generally are small. Retail business is still on a good basis with prices ruling firm at the levels which have prevailed for some time. Pocahontas and West Virginia coals are in good demand but there is also a good movement of Hocking and Pomeroy varieties.

Production has shown a slight decrease because of the lull in domestic trade. Hocking Valley is reported as producing 65% of the usual tonnage and Jackson, Cambridge, Crooksville and Massillon are outputting about the same amount. In the Pomeroy Bend field the production is estimated at 85% of the average.

Steam business is still slow and there are no immediate indications of an improvement. Railroads are taking a little more fuel for train movement but other lines are not increasing their requisitions. Manufacturing is still at a low ebb and collections are bad all along the line. The small sizes are selling well, with nut, pea and slack quoted around 65 and 70c. and coarse slack about 10c. less.

There is a good steady demand for anthracite with prices ruling firm. Retail figures are: Chestnut, $8.25; egg, $8 and grate, $7.75.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.60	.....
Inch and a quarter	1.45	1.50	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.70	0.75	0.65
Coarse slack	0.60	0.65	0.55

CLEVELAND

Consignment coal is plentiful. Brokers are refusing to receive some that is offered. Prices range lower on a dull market.

Fairmount and Richland No. 8 are so freely offered that the coarse-coal market is very low. Fairmount 1½ in. is being sold at $1.75 and West Virginia No. 8 three-quarter at the same price. These coals are on consignment and are difficult to move because of the small demand.

Fine coal on track here is selling at $1.60 to $1.70; Ohio fuels are bringing the lower figure and high-grade Fairmount is moving at the higher price. Brokers could have more coal on consignment, but there is some on demurrage that was brought in on consignment and they are afraid to touch it.

Although 200 tons a day are being mined in Ohio No. 8 mines, it is not reaching the open market. Railroads are taking the bulk of it and contracts would cover a good deal more than is being produced. The retail trade is dull because of the warm weather. Prices for shipment are higher than in the spot market and this is keeping Pennsylvania coals out. The prices for shipment are off about 5c. a ton as compared with a few weeks ago. There were 600 cars of coal on track the first of the week.

Shipment quotations are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60	......	......	......	......
Lump, 6 in.	......	......	$2.35	......	......
Lump, 1½ in.	......	......	2.20	$1.95	......
Lump, 1¼ in.	......	$2.35	......	......	......
Lump, ¾ in.	......	2.25	2.10	1.90	$2.05
Egg	3.60	......	......	......	......
Egg, 6 in.	......	......	2.00	......	......
Mine run	2.60	2.15	1.90	1.85	1.95
Slack	......	1.80	1.75	1.70	1.75

CINCINNATI

A fair tonnage is moving but there is little activity on new business. Mild weather and industrial inactivity are adversely affecting the market.

The business of the past week was considered satisfactory, though it was decidedly below expectations. Deliveries on contracts were fairly good, there being a better call for the steam grades than for some time. This was largely due to a better feeling in the iron trade, and to increased activity in coke. However, it remains true that the industrial depression continues, as far as the large manufacturers are concerned. They are only buying for current consumption, which is much below normal.

Mild weather has hurt the domestic market, and retailers are buying only as their stocks become exhausted. For the most part this enables them to keep up with the demands of their customers, and only a real cold snap, with a rush of domestic orders will stimulate the domestic business.

COKE

CONNELLSVILLE

First National Bank of Uniontown, the coke bank, closed, and J. V. Thompson properties go into a receivership. Coke market quiet with quotations unchanged. Production and shipments slightly larger.

A great event in the coke trade, by no means unexpected, has occurred. At the beginning of the week the First National Bank of Uniontown was closed by the banking authorities and this was followed by the appointing of a receivership for the J. V. Thompson coal properties. For years it has been known that various coke interests were unable to meet their full fixed charges, involving banks that were carrying their bonds, while Josiah V. Thompson, who controlled the First National Bank of Uniontown has been a heavy buyer and a relatively light seller of coking coal acreage, particularly in Greene County, comprising the extension across the Monongahela River of the regular Connellsville coking coal seam. In coke circles the impression is that the closing of the one bank in Uniontown is merely the beginning of a general adjustment, which had really been expected before this. While the depression in the iron industry may be given in some quarters as the cause of the present financial involvment, a long range view indicates that the real difficulty is that the Uniontown interests did not allow, in their plans for the future, for the great development in byproduct coking that has been taking place, and which enables the steel industry to use other coal, rather than pay relatively high prices for the best, or what may possibly be the only suitable coal if the old beehive practice is followed.

The coke market has been very quiet, with occasional sales of prompt coke but no contracting. Prices remain quotable as follows: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2@2.20; contract foundry, $2.15@2.25, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 9 at 206,602 tons, an increase of 4105 tons, and shipments at 216,888 tons, an increase of 15,176 tons.

Buffalo—The demand for coke is about what it was and all efforts of the shippers to make the trade do anything better have not succeeded. They undertook to advance their prices, but the consumer failed to respond, so that there was nothing to do but to continue selling at the old price, which was on the basis of $4.25 for best 72-hr. Connellsville foundry, with $3.30 for stock coke. Consumers of coke are very particular, so that coal dealers do not like to handle it. For some reason the Buffalo gas light company has put the price of its gas coke up from $5.40 to $6.

Columbus—Coke is in fair demand at prices unchanged from December quotations.

Chicago—Domestic sizes are firm but the demand is lessened. Quite a number of shipments of coke have been on hand this week drawing demurrage. Prices for furnace and foundry coke have declined about 10c. per ton, and are as follows: Byproduct, $4.60@4.75; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.60@4.75; gas coke, $4.10@4.25.

THE STEEL INDUSTRY

Operations increased slightly. London market strong with a tendency to advance. Local buying still restricted.

Pittsburgh advices give a more favorable aspect to the steel trade. Mill operations in the district are now stated to be at 50 to 55% of capacity, which shows a considerable gain in the rate of production as compared with the preceding week.

Most interesting news has just been cabled to us by our London correspondent. He states that the British iron market is excited, with pig-iron prices rapidly rising. The makers of pig iron, especially producers of hematite or bessemer iron, are now being obliged to pay $3.65 per ton for freight on ore from Spanish ports to Middlesbrough. Other branches of the iron trade are finding their costs advancing because of scarcity of labor, and are raising prices.

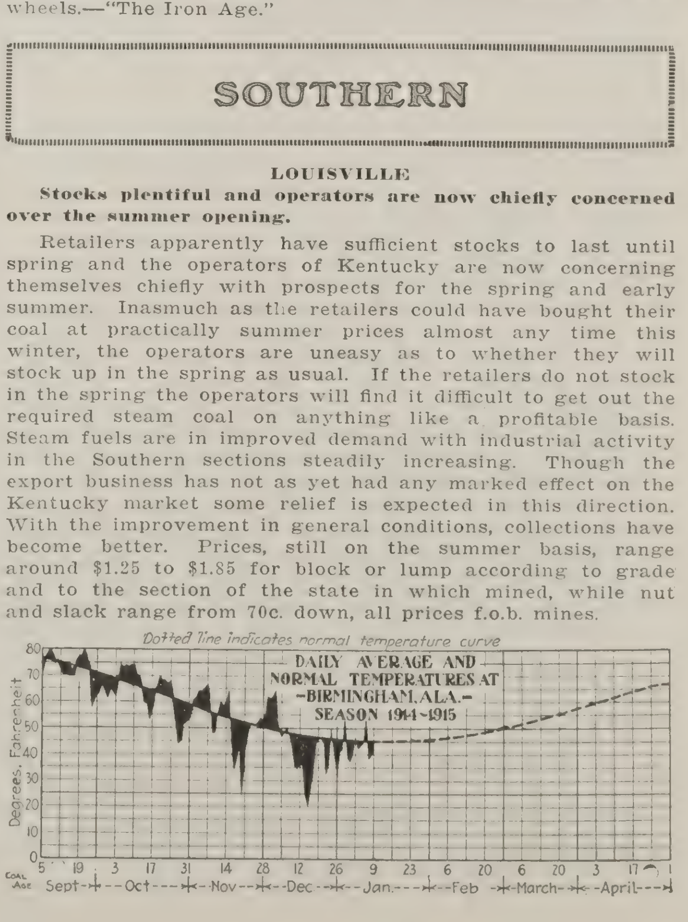
Our home markets show no great increase in buying. The railroads are quite freely placing orders for such track material as spikes, bolts and angle bars, but are not ordering large quantities of rails. Conspicuous among pending business for track material is that of the New York Central, which is inquiring for 30,000 kegs of spikes and bolts. It is reported that the Southern Pacific has bought 30,000 tons of rails; the Norfolk & Western Railroad has bought 5000 tons from the Carnegie Steel Co. and the United States Steel Products Co. has booked orders from South America for 13,000 tons. The Baltimore & Ohio is inquiring for 25,000 tons and the Hocking Valley 4000 tons. The New Haven's contract for 18,000 tons of rails has been practically awarded, 16,000 tons being divided between the Pennsylvania and Bethlehem Steel companies, the remainder going to the Lackawanna Steel Co. In connection with railroad business it is interesting to note that the Pullman Co. has an inquiry out for 15,000 passenger carwheels.—"The Iron Age."

SOUTHERN

LOUISVILLE

Stocks plentiful and operators are now chiefly concerned over the summer opening.

Retailers apparently have sufficient stocks to last until spring and the operators of Kentucky are now concerning themselves chiefly with prospects for the spring and early summer. Inasmuch as the retailers could have bought their coal at practically summer prices almost any time this winter, the operators are uneasy as to whether they will stock up in the spring as usual. If the retailers do not stock in the spring the operators will find it difficult to get out the required steam coal on anything like a profitable basis. Steam fuels are in improved demand with industrial activity in the Southern sections steadily increasing. Though the export business has not as yet had any marked effect on the Kentucky market some relief is expected in this direction. With the improvement in general conditions, collections have become better. Prices, still on the summer basis, range around $1.25 to $1.85 for block or lump according to grade and to the section of the state in which mined, while nut and slack range from 70c. down, all prices f.o.b. mines.



MIDDLE WESTERN

CHICAGO

Milder weather weakens situation and market is spotty. Screenings not so strong. Anthracite trade good.

A week of milder weather has curtailed the demand, and the general situation is not so satisfactory. Small-lot buying now predominates and the vigor of the closing days of December is lacking. There has been reduced running time at the Illinois and Indiana mines with less production, and observers note a decreased tonnage as compared with previous seasons. The heavy accumulation of screenings prior to the holidays in anticipation of a shutdown at the mines had a bullish tendency, and the market is now feeling the reaction with the result that screenings are softening somewhat, although there is no extreme weakening tendency. Conditions seem to be less unsettled for Indiana coals than for the Illinois product.

The anthracite trade is in a healthy condition; the demand for chestnut is brisk, while egg and stove are being absorbed about as fast as received. There is an influx of considerable low-price anthracite from independent operators into the Western territory. Some of the docks are also making special prices but there is no decided tendency in this direction.

Franklin, Williamson and Saline County coals have been greatly influenced by the weather, and very few of the operators have been able to secure the recently established $2 price for domestic lump.

The production of Indiana coals has been reduced, but the demand has fallen off even faster though prices are relatively firm. There has been a loss of 5c. to 10c. per ton in the price of screenings.

Less domestic coal has been demanded from the Springfield District, and screenings are not so strong. The adverse weather has affected the situation here particularly.

Eastern Kentucky coal seems to have a broader market. Circular prices for lump in several cases have been reduced 15c. per ton, but there is little of this spot coal in Chicago.

A few Hocking shipments have been sacrificed the past week to prevent accrual of demurrage, but prices are reasonably firm.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.50@2.00	$1.50	$1.50@1.75	$1.50@1.65	$1.50@2.00
4-in. lump..	....	....	....	....	....
Steam lump	....	1.15	....	1.15@1.20	....
2½-in. lump.	....	....	1.50@1.60	....	....
1¼-in. lump.	....	....	1.35@1.50	....	....
Mine-run...	1.25	1.10	....	1.10	....
Egg.......	1.50@1.75	....	....	1.40@1.50	....
No.1washed	....	....	....	....	1.60@1.75
No.2washed	....	....	....	....	1.60@1.75
6x3-in. egg.	....	1.40@1.50	....	....	1.50@1.75
Nut.......	....	1.35	....	1.25	....
No. 1 nut..	1.75	....	....	....	....
No. 2 nut..	1.50@1.60	....	....	....	....
Screenings..	0.70@0.80	0.70@0.75	0.70@0.75	0.70@0.75	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.50@1.75	$1.75@1.90	....	....	....
1¼-in. lump.	....	....	....	....	$1.50@1.60
Lump & egg	....	....	$2.00@2.25	$2.25	....
Mine-run...	1.20	....	1.25@1.40	1.25@1.40	1.15@1.25
Egg.......	1.50@1.75	1.50@1.75	....	....	....
No. 1 nut..	1.50@1.75	....	....	....	....
No. 2 nut..	1.30@1.60	....	....	....	....
Screenings..	0.70@0.75	....	....	....	....

Greene County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40; 5-in. egg, $1.25@1.35; 3-in. egg, $1.30; mine-run, $1.10; screenings, 0.70@0.85 cents.

ST. LOUIS

Continued warm weather causes a sharp break in the market. Prices have receded all along the line and the situation is notably weaker with operations again heavily restricted.

The past week has been a most distressing one to the local coal trade. Summer weather has prevailed now for ten days or two weeks, and the demand has practically disappeared even on the steam grades. Everything seemed to go down together; screenings which should be in good demand are almost a drug on the market in some quarters. There has been some little demand for the country trade, but this has been well taken care of, and the mines have already curtailed their output in many instances.

In the Williamson-Franklin County field the operators have made a heroic but futile effort to keep market prices up. The washed market for No. 1 size is in fair condition, but the other grades are dragging, with the exception of No. 4. In the Standard district, 2-in. lump is selling for as low as 85c., while screenings are going at anywhere from 45 to 50c. If warm weather continues, screenings will decline in price, as there is absolutely no demand at all for domestic coal. The situation is relieved some by two or three large railroad orders, which were placed the latter part of December for shipment during January. These orders are being filled to the maximum.

There is practically no anthracite moving in, very little if any smokeless, and the local coke situation is anything but encouraging.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump........	....	....	$1.25	$0.90@1.00	$1.05@1.10
3-in. lump........	....	....	1.40	....	....
6-in. lump........	$1.40@1.60	....	1.50	1.10@1.20	1.15@1.25
Lump and egg....	1.85@2.15	$2.00	....	....	1.35
No. 1 nut........	1.25@1.40	....	....	0.90@0.95	....
Screenings........	0.50@0.55	....	....	0.55@0.65	0.55@0.60
Mine-run.........	0.95@1.05	....	....	0.85@0.90	....
No. 1 washed nut.	1.65@1.75	....	1.60	....	....
No. 2 washed nut.	1.30@1.40	....	....	....	....
No. 3 washed nut.	1.20@1.25	....	....	....	....
No. 4 washed nut.	1.15@1.20	....	....	....	....
No. 5 washed nut.	0.50@0.55	....	....	....	....

INDIANAPOLIS

Milder weather and demand lighter, especially for domestic lump. Screenings also affected and prices shaded 10c. a ton. Industrial situation puzzling. Mine operations slowing up.

With milder weather, the consumption of domestic coal fell off, making operations less active at the mines. The price of slack, the strength of which has been a feature for several weeks, also decreased about 10c. a ton.

The industrial situation is puzzling; there are indications that it is improving, yet the improvement is so slow and gradual that it scarcely is reflected in a larger demand for coal. Until the return of milder weather there was a good business at fair prices, though not quite up to the average for the season. Some of the retail dealers here claim they have not had a better trade in a similar period in recent years.

KANSAS CITY

The coal market is slightly stronger; retailers are taking on some stock, but prices are unchanged.

The market conditions in Kansas City have shown but little change. The weather continues mild, but the stocks of the retailers are beginning to run low. The possibility of an increase in prices during the winter is dwindling and nothing short of a famine will bring this about. There are practically no large contracts being let. The continued low price of oil, and the uncertainty of that fuel market, keeps the buyers in a very uncertain frame of mind.

PRODUCTION AND TRANSPORTATION STATISTICS

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports of the United States for November, 1913-14, and for the eleven months ending November, 1912-13-14, in long tons:

	11 Months			November	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	6,294	5,329	16,429	70	7,757
Canada........	1,294,416	979,980	937,833	82,491	97,386
Japan..........	25,663	99,437	55,939	10,322	5,840
Australia and Tasmania....	151,928	160,754	194,827	19,176	7,490
Other countries	2,202	3,296	2,253	....	200
Total.......	1,480,503	1,248,796	1,207,281	112,059	118,673
Exports:					
Anthracite					
Canada........	3,337,180	3,863,911	3,585,425	323,575	233,856
Brazil.........	....	....	6	....	....
Other countries.	67,778	64,084	60,346	6,077	5,430
Total.......	3,404,958	3,927,995	3,645,777	329,652	239,286
Bituminous					
Canada........	9,838,701	12,749,300	8,742,124	1,086,831	520,657
Panama........	423,327	452,551	251,798	32,871	11,961
Mexico.........	269,007	439,427	324,536	22,165	35,277
Cuba..........	1,033,220	1,200,958	1,012,092	89,385	103,768
West Indies.....	602,406	548,454	524,004	24,194	13,809
Argentina......	....	70,048	231,943	8,171	24,039
Brazil..........	....	250,663	260,936	9,564	25,483
Uruguay.......	....	5,163	76,088	....	4,269
Other countries.	1,383,092	1,140,217	1,681,783	39,944	111,284
Total.......	13,549,753	16,856,781	13,105,304	1,313,125	850,547
Bunker coal....	6,766,443	7,093,271	6,775,071	610,251	489,301

VIRGINIAN RAILWAY CO.

Shipments over this road for November, 1914, amounted to 281,499 tons, as compared with 341,703 the preceding month.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 37—New York—The section of this contract (p. 1048, Vol. 6, and p. 149, Vol. 7) which called for furnishing and delivering 75 tons of coal in the Borough of Bronx, for which like bids were offered by the Consolidation Coal Co. and Olin J. Stephens, will not be awarded to either bidder. The action has been deferred so that the department may purchase this supply in the open market. Address Robert Adamson, Fire Commissioner, Fire Department, 11th Floor, Municipal Building, New York.

Contract No. 43—New York—The bids on this contract (p. 108), which provides for furnishing 48 tons of stove coal, 390 tons of egg coal, 765 tons broken coal, 300 tons buckwheat coal, 15 tons of Cumberland coal, 14 tons of nut coal, for the Department of Parks, were as follows: Burns Bros., $8797.97; Meyer-Denker & Sinram, $8904.50. Address Department of Parks, Municipal Building, New York.

Contract No. 52—Buffalo, N. Y.—The Board of County Commissioners of Erie County, N. Y., will receive sealed bids for the supply of coal required at the Court House for the two years commencing Feb. 5, 1915. Bids will be opened at 1 p.m., Feb. 2, 1915, and the Board reserves the privilege to reject any or all bids. Address J. D. Stevenson, County Clerk, Buffalo, N. Y.

Contract No. 53—Siloam Springs, Ark.—The Municipal Electric Light & Water Plant will soon be in the market for 1500 tons of coal. The business is usually let on competitive bids. Both mine-run and slack are required, the customary prices ranging about $2.70 for the former, and $2.25 for the latter. Address M. Halooson, Recorder, Municipal Electric Light & Water Plant, Siloam Springs, Ark.

Contract No. 54—Two Rivers, Wis.—The Municipal Water & Light Plant at this place will soon be in the market for about 1600 tons of coal. Youghiogheny coal is commonly used, and the usual contracting figure is around $3.55 per ton. Address Geo. H. Wehausen, Supt., Municipal Water & Light Plant, Two Rivers, Wis.

Contract No. 55—Springfield, Ill. — The Springfield Water Department is in the market for 10,000 tons of 1¼-in. mesh coal deliveries to begin on Mar. 1, and be at the rate of 150 tons per day. Address W. J. Spaulding, Commissioner Public Property, Springfield, Ill.

Contract No. 56—Milwaukee, Wis.—Sealed bids were received until Jan. 18, for furnishing and delivering 2000 tons of coal to the Menomonee special sewage pumping station. Delivery is to be made at the pumping works in quantities of not less than 200 tons per month until Oct. 31, 1915. Bond for $1800 or check for $900 to accompany all bids. Address Fred G. Simmons, Commissioner of Public Works, or Percy Braman, deputy, Milwaukee, Wis.

Contract No. 57—Warrensville, Ohio—Sealed proposals will be received by the city of Cleveland, Ohio, until noon, Jan. 27, for furnishing coal for the Correction Farm at Warrensville. Specifications and further information may be obtained at the office of the Secretary to the Director of Public Welfare, Room 209 City Hall, Cleveland, Ohio. A. R. Callow, Room 511, City Hall, Cleveland, is Commissioner of Purchases and Supplies.

Contract No. 58—Cleveland, Ohio—Sealed proposals will be received by the city of Cleveland, Ohio, until noon, Jan. 27, for furnishing coal for the outdoor relief. Specifications and further information may be obtained at the office of the Secretary to the Director of Public Welfare, Room 209 City Hall, Cleveland. A. R. Callow, Room 511, City Hall, is Commissioner of Purchases and Supplies.

Contract No. 59—Warrensville, Ohio—Sealed proposals will be received by the city of Cleveland, until noon, Jan. 27, for furnishing coal for the Cooley Farm, Warrensville. Specifications and further information may be obtained at the office of the Secretary to the Director of Public Welfare, Room 209, City Hall, Cleveland. A. R. Callow, Room 511, City Hall, Cleveland, is Commissioner of Purchases and Supplies.

Contract No. 60— Detroit, Mich.—The Department of Public Works received bids up to 10 a.m., Jan. 21, for furnishing its coal requirements until Jan. 31, 1916. Deliveries are to be made in railroad cars, wagon lots at the yards, sidings or barns, as directed. The bidders were required to file a certified check for $800 with their bid, same to be forfeited in the event of their failure to enter into contract with a surety company bond, for the full estimated amount of the contract within five days after the award. Address George H. Fenkell, Commissioner, Department of Public Works, Detroit, Mich.

Contract No. 61—Erie, Penn.—Bids were received by the city council at this place, on Jan. 21, for furnishing the requirements at the garbage plant during the fiscal year, ended Dec. 31, 1915. Only the best Pittsburgh ¾-in. lump coal was considered and prices quoted were to be delivered f.o.b. Garbage Disposal Plant, Belle Valley, Penn., in self-clearing hoppers. Address Frank E. Pelow, superintendent, Department of Parks and Public Property.

Contract No. 62—New York—Bids will be received by the President of the Borough of Queens, Long Island City, until 11 a.m., Jan. 29, for furnishing and delivering the following: (1) 650 gross tons bituminous coal to the Far Rockaway disposal plant, 5th ward, Borough of Queens, deliveries to be made during the year 1915, and the security required will be 30% of the amount for which the contract is awarded. (2) 280 gross tons pea coal to the Newtown disposal plant, 2nd ward, Borough of Queens, with deliveries and security requirements the same as above. (3) 1040 gross tons anthracite coal to the County and Borough Buildings in the Borough of Queens with requirements the same as above. (4) 280 gross tons bituminous coal to the Crematories of the Bureau of Street Cleaning at Far Rockaway and Aqueduct, Borough of Queens, with deliveries and security requirements the same as above. These contracts will be awarded at a lump or aggregate sum. Blank forms and further information may be obtained at the office of Maurice E. Connolly, President, Borough Hall, Jackson and 5th St., Long Island City, New York.

Contract No. 63 — Lorain, Ohio — The following is list of the bidders on this contract which provides for furnishing 3500 tons of coal for the water works department: John Stack, Lorain, Ohio; The Midvale-Goshen Coal Co., Cleveland, Ohio; The Tuscora Sand & Coal Co.; The Kendall Coal Mining Co.; Ohio & Michigan Coal Co.; Lagron Coal Co., Lorain, Ohio; Peoples Coal & Supply Co., Lorain, Ohio; The West Virginia & Ohio Coal & Coke Co.; Consumers Coal & Supply Co., Lorain, Ohio; Goshen Valley Mines; Smith Coal & Supply Co., Lorain, Ohio; Keystone Coal & Coke Co.; Black Diamond Coal Co. Address, L. B. Johnston, Clerk, Board of Public Service, Lorain, Ohio.

CONTRACTS LET

Contract No. 21—Cleveland, Ohio—County Commissioners of Cuyahoga County awarded the Easterbook Coal Co. this contract (see pp. 892, 933, 972, Vol. 6). The contract provides for furnishing 2000 tons of No. 8 nut or mine-run at $2.40 delivered, 100 tons of Massillon lump at $4.25, and 50 tons of anthracite egg at $7.10. The company also bid $2.48 for Pittsburgh nut or mine-run. Address E. G. Krause, Clerk of the Board of County commissioners, Cuyahoga County, Cleveland, Ohio.

Contract No. 26—St. Louis, Mo.—The awards on this contract (pp. 972, 1009, Vol. 6), which provides for furnishing 30,000 tons of coal for delivery at various engineering departments of the United States Army, have been made as follows:

BALD EAGLE MINING CO., St. Louis, Mo., 1000 tons of No. 7 mine, Miller, Ill., $1.54; total, $1540.

SOUTHERN COAL MINING CO., St. Louis, Mo., 5000 tons Little Oak, Shiloh, New Braden run-of-mine coal, $1.38.

CAIRO CITY COAL CO., Cairo, Ill., 4000 tons Paradise run-of-mine coal, $2.25.

MONONGAHELA RIVER CONSOLIDATED COAL & COKE CO., Pittsburgh, Penn., 1500 tons, Cypress Creek, $2.52; 200 tons, same, $2.75, delivered Rosedale, Miss., 400 tons, same, delivered Baton Rouge, La., $3.93; 1000 tons Youghiogheny coal, delivered Vicksburg, Miss., $4.24; 400 tons, same, delivered Natchez, Miss., $3.25.

WEST KENTUCKY COAL CO., Sturgis, Ky., 1000 tons Treadwater coal, delivered Greenville, Miss., $3.50.

Address B. McD. Townsend, Colonel, of Engineers, United States Engineer's Office, Custom House, St. Louis, Mo.

Contract No. 38—Hamilton, N. J.—This contract (p. 1048, Vol. 6), which provides for furnishing the pumping station of the Standard Oil Co. with 5000 tons of No. 1 buckwheat coal for delivery during the year 1915 in monthly proportions, has been awarded to the Knickerbocker Fuel Co. Address J. L. Hutchison, Coal Purchasing Agent, 26 Broadway, New York.

Contract No. 41—New York—This contract (pp. 108, 149), which provides for furnishing and delivering anthracite broken coal to the Brooklyn Bridge, has been awarded to John F. Schmadeke, at $3282. Address Department of Bridges, Municipal Building, New York.

Contract No. 51—Buffalo, N. Y.—The following bids were received by the Lighthouse Inspector, 10th District, Buffalo, for furnishing 200 tons of bituminous lump coal for the lighthouse tender "Crocus": Bert D. Smith, Sandusky, Ohio, $2.90 (awarded contract); Hunt & Weis, Sandusky, $3.25; Frederick Groch Coal Co., Sandusky, $4; C. A. Neilson Coal Co., Sandusky, $2.95. Address Lighthouse Inspector, Buffalo, N. Y.

CONTRACT NOTES

It is understood that J. L. Hutchison, coal purchasing agent for the Standard Oil Co., 26 Broadway, New York, closed a contract recently for upward of 1,000,000 tons of anthracite coal in steam sizes, the greater portion of the contract going to the Lehigh Valley Coal Sales Co.

In the matter of the recent large contracts entered into between the Elkins Coal & Coke Co. and the Lehigh Coke Co., regarding which the daily press has had much to say recently, it has been ascertained that this was considerably enlarged upon. There was no new contract made, but simply an extension of a contract which has already been running for three years for an additional three years more.

CONSULAR NOTES

Reliable concerns desiring to get in communication with the parties mentioned in the following notes may obtain blank application forms from "Coal Age."

An American Consular Officer reports that a business man in southern Europe desires to import coal. Correspondence should be in Spanish, if possible, and the consular officer requests that his office be supplied with duplicate copies of any catalogs that might be forwarded to this party.

An American Consular Officer in Europe reports the name and address of a firm in his district which desires to receive quotations on American coal c.i.f. destination for industrial and household purposes.

An American Consular Officer has been advised by a business man in Southern Europe that he desires to communicate with American exporters of coal, with the view of representing such firms in that market. Prices are to be quoted c.i.f. destination, and to include insurance against war risk and the agent's commission. Payments are to be against documents presented at local banks. Correspondence, if possible, should be in the Italian language. References can be furnished.

FOREIGN MARKETS

GREAT BRITAIN

Prices advanced. Railroad movement slow and deliveries are uncertain and irregular. Production reduced.

London, Jan. 8—The London coal trade continues very brisk. Public prices were advanced 24c. per ton on all qualities from Thursday morning. Coke was advanced 48c. per chaldron on Tuesday last. Railway deliveries have been exceedingly irregular, and consequently shortage at depots has become serious.

For the time being, the great difficulty now experienced in all districts regarding railway traffic chiefly occupies the attention of those connected with the coal trade. Not only is the scarcity of wagons most pronounced, but even when on the line delivery is very uncertain. The limited production brought about by various causes is now finding a reflex in prices; in several districts advances have been made, and in the other cases the quotations are very firmly maintained.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during December was $3.22 per ton, as compared with $3.38 in December, 1913, and $3.17 in December, 1912.

The value of exported fuel during the completed year was $3.27 per ton, as compared with $3.36 and $3.05 per ton in the corresponding periods of 1913 and 1912 respectively.—"The Colliery Guardian."

Jan. 8—Owing to tonnage scarcity the market is somewhat easier for prompt loading while for forward shipment there is little doing at the present time. Quotations are approximately as follows:

Best Welsh steam.......	$4.92@5.04	Best Monmouthshires....	$4.26@4.32
Best seconds...........	4.62@4.74	Seconds................	4.14@4.20
Seconds................	4 38@4.50	Best Cardiff smalls......	3.12@3.24
Best dry coals..........	4.56@4.80	Cargo smalls...........	2.52@2.76

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage and for cash payment.

Freights—The scarcity of prompt tonnage having become more pronounced rates have risen considerably and the tendency is towards further improvement. Rates are approximately as follows:

Rouen...........	$3.06	Genoa, Savona...	$5.28	Las Palmas......	$3.36
Gibraltar.........	3.60	Naples..........	4.92	St. Vincent.......	3.60
Malta............	3.72	Venice, Ancona...	6.00	Rio Janeiro......	5.28
Marseille....	4.20	Alexandria.......	6.48	Monte Video.....	4.80
Algiers...........	4.00	Port Said........	6.48	River Plate......	5.04

Exports—British exports for December and the past three years were as follows:

	December			Year		
To	1912	1913	1914	1912	1913	1914
Russia.....	187,415	400,315	....	4,046,644	5,998,434	3,087,805
Sweden....	354,959	379,522	291,039	4,115,551	4,563,076	4,250,255
Norway....	195,674	201,951	179,562	2,201,305	2,298,345	2,462,200
Denmark...	259,381	294,685	225,520	2,780,957	3,034,240	3,059,162
Germany...	694,330	655,841	....	8,394,864	8,952,328	5,256,765
Netherlands	285,476	148,598	90,634	2,096,494	2,018,401	1,722,215
Belgium....	147,365	140,761	1,008	1,546,768	2,031,077	1,168,554
France.....	930,811	1,099,553	1,246,786	10,190,948	12,775,909	12,330,545
Portugal[1]...	108,158	129,485	84,853	1,255,417	1,356,081	1,169,625
Spain[4].....	322,869	293,858	148,132	3,441,523	3,648,760	2,940,148
Italy.......	824,755	802,488	759,477	9,180,208	9,647,161	8,625,254
Aus. Hung..	74,551	78,728	....	728,941	1,056,634	564,362
Greece.....	32,688	61,042	44,594	610,383	727,899	578,757
Roumania..	....	25,722	....	195,600	251,925	218,218
Turkey.....	109	61,951	....	348,469	369,789	429,506
Egypt[2].....	281,759	358,847	177,511	2,925,825	3,162,477	2,633,581
Algeria.....	99,655	107,169	53,649	1,054,786	1,281,664	910,211
Portuguese[5]	17,015	19,187	25,732	281,869	233,015	184,686
Chile......	30,048	46,523	2,933	551,980	588,526	377,482
Brazil......	153,022	155,208	75,216	1,625,780	1,886,871	1,176,780
Uruguay...	88,941	66,143	9,385	870,313	723,936	550,876
Argentine..	327,503	380,859	194,499	3,365,099	3,693,572	2,883,064
Channel Is..	13,377	14,636	9,051	176,996	167,862	162,066
Gibraltar...	35,956	33,703	34,835	343,439	354,702	309,650
Malta......	82,029	78,622	4,925	474,784	700,111	338,673
Aden[3]......	15,932	26,664	4,004	191,307	181,204	139,821
India......	20,143	27,189	7,054	134,514	179,192	158,261
Ceylon.....	29,770	26,115	5,495	242,111	239,657	250,173
Miscellaneous......	83,674	114,088	22,980	1,071,520	1,277,270	1,101,185
Coke.......	97,409	118,619	107,442	1,010,650	1,235,141	1,182,248
Briquettes..	171,400	178,235	73,077	1,580,803	2,053,187	1,607,757
Total....	5,966,177	6,526,307	3,879,393	67,035,848	76,688,446	61,830,485
Bunker....	1,556,784	1,842,006	1,248,215	18,291,370	21,031,550	18,535,579

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.

GERMANY

According to reports by the Rhenish-Westfalian Coal Syndicate, the situation, which was naturally affected at the beginning of the war, has steadily recovered, as indicated in the table of the daily average output and sale given below.

These figures indicate that the output as well as the sale has increased from month to month, the increase of sales being somewhat more rapid than that of the output.

The following is a comparison of the production and sales for August, September and October, 1913-14 in short tons:

	Output		Sales	
Month	1914	Loss,* Per Cent.	1914	Loss,* Per Cent.
August	161,316	46.7	128,055	57.7
September	192,239	35.6	186,847	37.1
October	202,994	30.3	201,433	28.5

*Indicates the loss as compared with the same month in 1913.

COAL FREIGHT DECISIONS

Investigation and Suspension Docket No. 420—Switching charges on coal and coke within the Chicago switching district.

Proposed increased rates on bituminous coal and coke from points in Ohio, Pennsylvania, Virginia and West Virginia to Chicago & North Western stations, Peterson Ave., Crawford Ave., Weber and Greenwood St., not justified in full. Reasonable maximum rates prescribed.

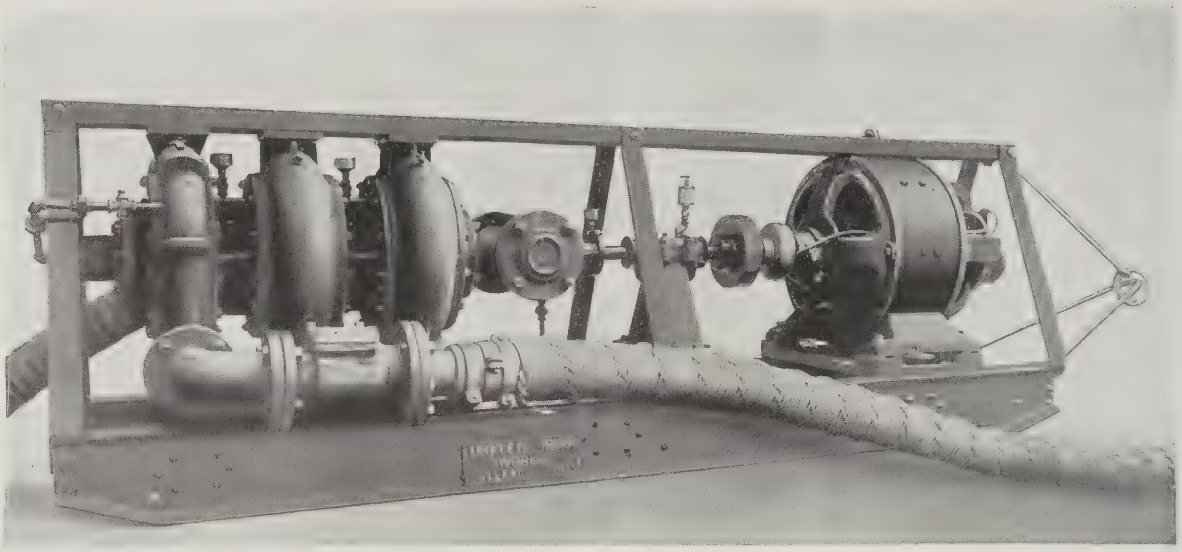
COAL AGE

Volume 7, No. 5
Issued Every Saturday
Hill Publishing Company

NEW YORK, JANUARY 30, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

The Main Island Creek Coal Co.'s No. 4 Tipple, Omar, Logan County, W. Va.



Westinghouse Electric Direct-Current Motor and Pump mounted on a skid for lowering down inclines.

Westinghouse Electric Self-Starting Direct-Current Motors for Mine Pumps

These motors form the most satisfactory drive for small pumps in coal mines equipped with direct current.

They are similar to standard motors except that they can be connected directly to the line and require no starting box.

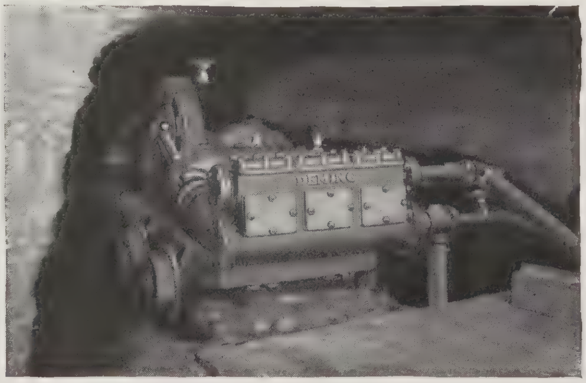
In starting these motors it is only necessary to close a circuit breaker in the power house or at some other convenient location; there is no need of visiting each pump and starting each by hand.

Another advantage lies in the fact that these motors start automatically on the return of power after a temporary failure of voltage, thus insuring operation at all times without individual attention.

Since there is no starting box and resistance, the connections are of the simplest possible character, a switch being all that is required.

These motors have been in successful operation in coal mines for several years and many re-orders from users prove their satisfactoriness in service. They are built in sizes up to 20 h.p. for all commercial direct-current voltages.

Full information sent on request.



Pump in a Coal Mine driven by a Westinghouse Electric D. C. Motor.

Westinghouse Electric & Mfg. Co.

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Baltimore, Md.
Birmingham, Ala.
Bluefield, W.Va.
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Buffalo, N. Y.
Butte, Mont.
Charleston, W.Va.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, O.
Cleveland, O.
Columbus, O.
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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000
None sent free regularly, no returns from news companies, no back numbers.

The Subscribers' Forum

Conducted by the Business Manager of Coal Age

Devoted to weekly discussions, interviews, etc. on
the important subjects of your business and ours

YOU men, whose duty it is to investigate, select, and buy equipment, machinery and supplies for your mines, will be interested in this letter from Edward G. Epple, General Superintendent of the Queen Coal and Mining Co., of Jasonville, Ind.

Mr. Epple says:—"Please mail me the bill for the subscriptions of my mine boss and mine electrician, as I want them to read your paper and consider that I am making a profitable investment when I present them with their subscriptions.

"During the past year I have purchased equipment from the General Electric Company (three mine locomotives), and from the Cincinnati Frog and Switch Company (some 300 switches and 5 cross-overs, for our mines Nos. 2 and 4).

"Both purchases are thoroughly satisfactory in every respect and were originally suggested to me by a Coal Age advertisement.

"I may add that I consider your advertisements of as much value to me as your editorial work, and experience as an active superintendent and purchasing agent has taught me the reliability of your advertisers."

You see the man on whose shoulders rests the responsibility of spending company money for new equipment wants and needs all the guarantee he can get.

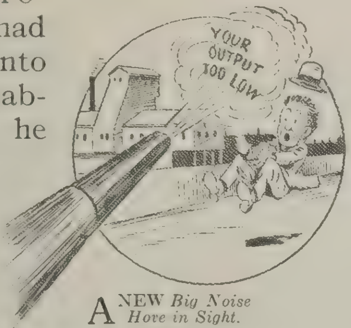
And nowadays men realize that products advertised in a high class technical paper are reliable and honest in quality—otherwise they couldn't buy space in such a paper at any price.

COAL AGE

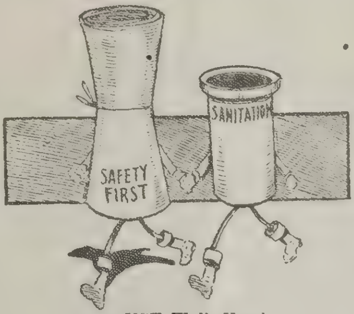
Vol. 7 NEW YORK, JANUARY 30, 1915 No. 5

The Fable of the "Supe" and the New "Big Noise"

Once upon a time there dwelt in a mining camp a supe who posed as the "chief squeeze" around that dump, and inasmuch as he had for many moons deftly extracted from the coffers of the company his stipulated number of simoleons, it had grown into such a habit that he had entirely lost sight of the value-received part of the bargain. As a picture of contentment, he had everybody backed up against the wall and gasping for breath.



A NEW *Big Noise Hove in Sight.*



MUST *Walk Hand in Hand.*

SEEK YE YOUR MINING JOURNALS
WISDOM

AT *the Temple of Wisdom.*

And it came to pass that a New Big Noise—a 42-centimeter—hove in sight, cast anchor and trained batteries on the supe. Could he believe his ears; the first discharge sounded like this: "Your output too low; your cost too high; your camp the bummest burg I have seen in a decade. Get busy; come across with some reasons why."

With his first line of fortifications all shot to pieces without a return volley, the dismayed supe fell back on the inner works and pulled off something in a wee small voice that sounded like: "Located too far from town; labor scarce."

"Labor scarce! Ha! Ha!" boomed the 42-centimeter. "Know ye not, oh many times mistaken supe, that the modern miner stayeth not where the turn runneth slow. Verily, also, must there be education for his children; physical and moral welfare work must prevail; sanitation and safety first must walk hand in hand. You are in a rut. Come out of it, for verily I say unto you not one amongst ye hath a strangle hold on his job. Your looks seemeth that of a man sick almost unto death — a vacation for you. Brush up; remodel yourself. Get a death grip on some late and imported wisdom lest very much worse things befall thee."

Wearied with his long journey the supe approached the Temple of Wisdom, made deep obeisance to the high priest of knowledge who presided there, and spake with feeling:

"Oh, most wise and beneficent sage, greatly am I troubled. My new boss findeth much fault with me. Verily have I lost my grip.

"I must show a complete reversal of form, and 'then some' in the very near and immediate future, for trouble and disgrace dog my footsteps. I fain would acquire knowledge, and would learn the way."

"Son," quoth the sage, "return ye to your own country for knowledge lies not far distant. Seek ye your mining journals that have accumulated with wrappers undisturbed for weeks and months. Read carefully and profit thereby.

"Drink to the full of this fountain of facts, for therein lie the fruits of ripe experience, which is true wisdom."

—By C. P. Shockley.

Moral:

OPPORTUNITY *is on your trail; duck or he will catch you.*

The Main Island Creek Coal Co.'s No. 4 Tipple

By H. Reisser*

SYNOPSIS—Details of a modern steel tipple having three kick-back dumps and an elaborate arrangement of screens. The mine has four drift openings. Method of disposing of refuse. Drives are started and stopped automatically.

Situated at Omar, on the Guyandotte Valley Branch of the Chesapeake & Ohio R.R., about 9 miles from Logan, in Logan County, this tipple was recently completed.

The Main Island Creek Coal Co., although comparatively new, has one of the largest tracts of rich coal lands in the Logan district, and is increasing its tonnage rapidly. The No. 4 tipple has one of the largest capacities of any such plant so far started. The coal seam, which lies some 75 ft. above the elevation of the railroad tracks, is the famous Island Creek bed. It is 8 ft. thick, has few impurities, makes blocky coal, and is used both for domestic and stoking purposes.

Showing Pickers at Work in the Conveyor House

Four drift openings have been driven into the seam at various points, all of which lead to the head house at coal elevation. Mine cars are brought from these openings to the dumping points with electric locomotives in 30-car trips.

The plant was designed and built by the Link-Belt Co., of Philadelphia, Chicago and Indianapolis, and following the general modern trend in bituminous-coal-preparing plants, the tipple and other buildings were made of structural steel and covered with corrugated iron, placing wood only as walks, stairways, etc., making the structures practically fireproof.

The plant is divided into three units: The head house, the conveyor and picking house, and the screening house.

The head house covers the three kick-back dumps, a 15-ton steel dump hopper and an apron feeder.

Equipment in the Head House

The apron feeder is made up of a standard Link-Belt corrugated apron mounted on two strands of steel-bushed roller chain traveling on angle tracks. At the end of this feeder, the coal discharges over a lip-screen discharge chute which removes all the "fines" and deposits same on the bottom of the apron conveyor. This feeder is driven by a chain receiving its power from the foot shaft of the apron conveyor down hill. A structural steel frame, mounted on concrete, supports the machine.

The Conveyor and Picking House

The picking house covers the 72-in. wide corrugated apron mounted on two strands of steel-bushed roller chain, which move down to the elevation of the shaking screens. The upper end is pitched downward at 30 deg., and at the lower end it becomes horizontal, giving the pickers a chance to remove refuse from the coal. This refuse is all in the larger sizes, so that it is easy to detect. The refuse and slate are disposed of by means of boxes at the table sides handy to the pickers which empty into one common refuse bin placed directly under the picking floor and discharged by a standard Link-Belt undercut gate into side-dump cars, which in turn deposit their load on the hillside.

---

*Engineer, Link-Belt Co., Philadelphia, Penn.

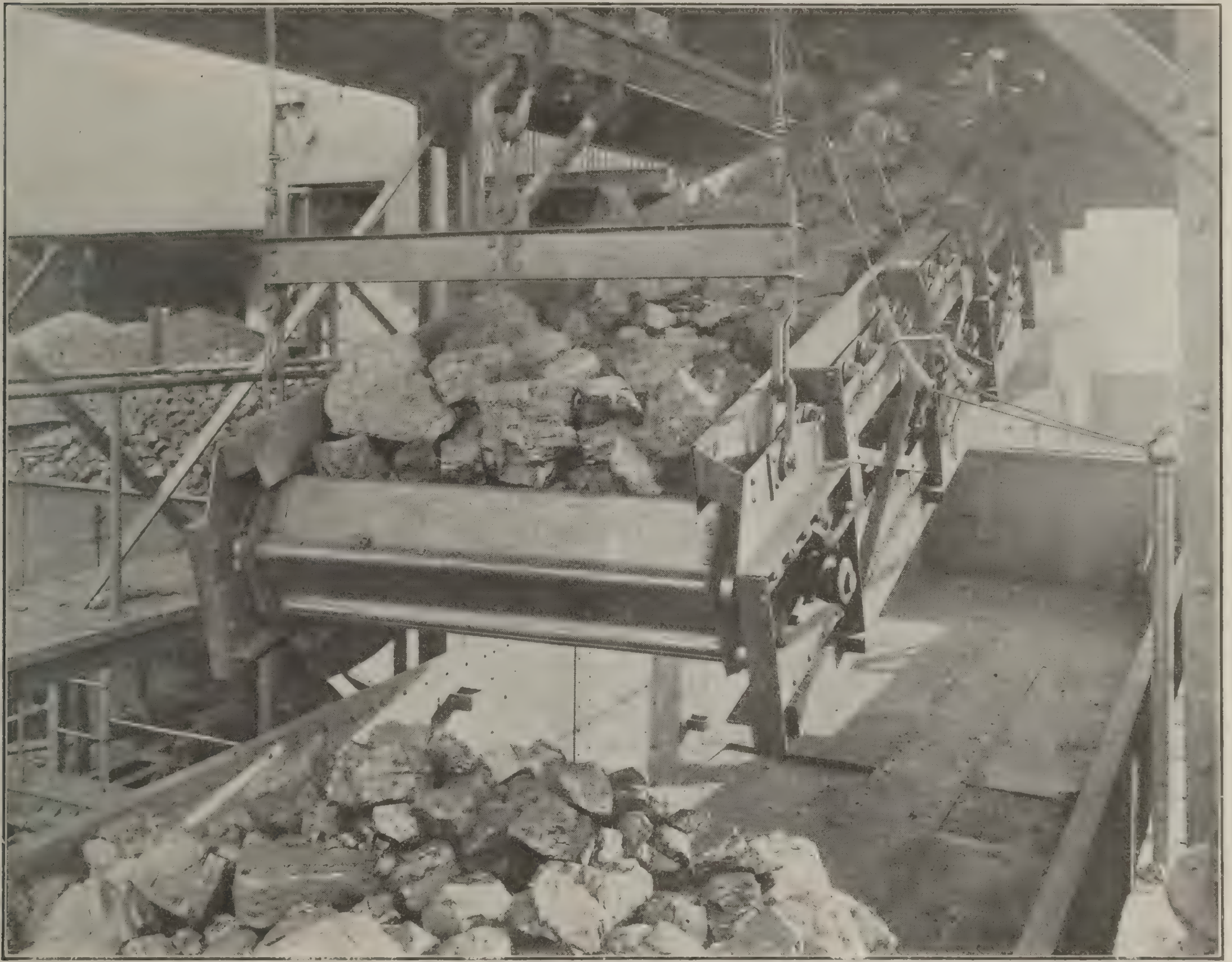
The Screening House

The screen house covers the shaking screens, chutes and lump-loading boom. The 72-in. wide corrugated apron conveyor before mentioned discharges over a ¾-in. perforated chute provided with a fly-valve. This chute when closed supplies boiler fuel, which is carried to the power house by side-dump cars; the remaining coal is discharged onto the shaking screens.

The hopper receiving this coal is designed with two compartments, the bottom of the main hopper being equipped with a bar screen to allow the fine coal going through the perforated screen in the discharge chute above the screens, into the boiler fuel bin. The main hopper is utilized for either slack (when making screened coal) or run-of-mine. The flow of coal at the discharge over the track is controlled by a standard Link-Belt undercut gate and adjustable end chute.

Shaking Screens

The shaking screens are of the usual rugged type, suspended in tandem with adjustable forged-steel hanger rods, 8 ft. wide, and prepare the coal in sizes, namely: Lump over a 4-in. screen on the outside track, egg over 1¾-in. screens on the middle track, and slack on the inside track. To accomplish these requirements, patented flanged-lip screens are employed, these being a decided improvement over the heretofore used perforated plate screens, due to the former having slotted taper holes to prevent clogging of slivers and due to the fact that every 12 in. the coal is turned.



View of Boom Topping Off a Lump Car

To make 4-in. run-of-mine, the upper screen is arranged with a removable one-piece rail, raised and lowered by hand winches, bolted to the screen itself when in use, and suspended over it when idle. This method has entirely eliminated the leakage of very fine coal, which is an annoying feature in screening plants, and the veil now forms an integral part of the screen when it is fastened to same.

The upper screen removes the product under 1¾ in., the same falling into the above mentioned combination slack and run-of-mine hopper. The lower screen removes the product over 1¾ in. and under 4 in., which passes into a shaking and attached gathering hopper from which it passes into curved adjustable chutes with extensions for low cars, controlled and operated by ropes and winches. The product over 4 in. size passes onto the lump-loading boom.

The screens are driven through ball-and-socket eccentrics and wooden rods to the eccentric shafts on which is placed a heavy flywheel pulley which counteracts any unbalanced motion of the screen. A belt drive connects this shaft to the common countershaft of the main drive.

The eccentric shaft is supported on an independent structural steel frame, which is designed in the form of an "A," and takes all the vibrations of the screens directly to the foundation, thus insuring rigidity and long life for the balance of the structure.

A Close View of the Sized Coal Made at the Tipple

The Drives

The drive for both the down-hill conveyor and the shaking screens is located directly under the discharge point of the conveyor, which through countershafts, cast and cut-spur gears and belt drives lead to the common countershaft, on which are located friction clutches, pulley, etc., so that one or both units can be stopped and started at will.

To eliminate electric troubles, two 50-hp. motors are used to drive both units which are located in the same arc of radius so that in case one breaks down it is only a matter of a minute or two to change the belt to the remaining motor.

Automatic starting and stopping push-button stations are located in different points of the tipple. Such stations are located in the head house on top, the picking house, and at the loading tracks below, allowing the motors to be stopped at the several points in case of trouble. The plan provides that motors can only be started from the point where they were stopped.

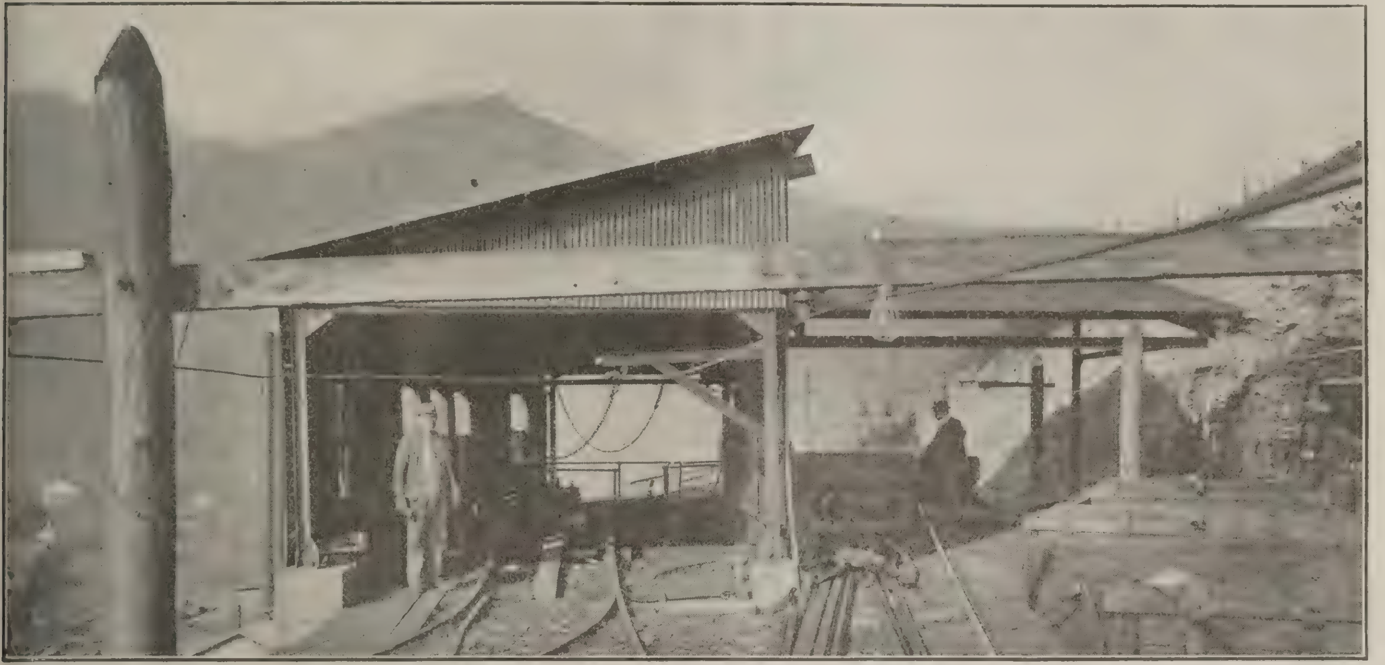
The Loading Boom

For the loading boom, a moving corrugated apron is again employed, constructed of the same style and type as described for the apron feeder and down-hill conveyor. It is moved on a short fixed horizontal steel frame, to the end of which is fastened the boom itself. A self-contained structural steel frame is the means of providing guides on which the apron moves, carrying the coal to within 6 in. of the bottom of the railroad car. The raising and lowering of the boom are accomplished with a 3-ton electric hoist, insulated, which insures quick action, and in turn few delays in loading the cars. The machine is driven through a countershaft, cast- and cut-spur gears, belt drive to 5-hp. motor and can be stopped and started at will by friction clutches.

In the design of the buildings, columns of the Bethlehem section were used wherever possible, making it an easy matter to repaint same, allowing no accumulation of the fine dust in inaccessible corners, etc., for such dust appears to have a strong corroding action on structural steelwork in general.

Trimmers' walks at the car sides are provided at all available points to give both the loaders and the car handlers ample means of going from place to place quickly, and throughout the entire equipment an abundance of light (both natural and artificial), walks and stairways are noticed.

The officers of the company are John Laing, president (former chief of the Department of Mines, West Virginia); A. J. Dalton, general manager; R. F. Carson, chief engineer; John A. Kelly, assistant superintendent, and O. O. Cooper, secretary and treasurer. The directors of the company are: Messrs. Clinton Crane, J. O. Cole, R. G. Huffard, Enoch Smith, L. E. Johnson, O. O. Cooper, J. E. Cox, James Dinet, W. A. Brown, J. F. Johnson, and James Prince.



THE HEAD HOUSE AND DUMPS

⁂

Sprinkler Systems for Wooden Breakers

Sprinkler systems that can be turned on by hand from outside the buildings are being installed in 14 of the wooden anthracite breakers of the Lehigh Valley Coal Co. and installations in two more are planned. Four of the breakers have already been equipped, and 10 are under way. At recent tests of these new systems before a Committee of the Underwriters' Association of the State of Pennsylvania, the Committee agreed to recommend a substantial reduction in the high rate of insurance now in force on these wooden breakers for buildings thus equipped.

It is almost impossible to enter a breaker which has caught fire. The conflagration is quick and hot, fed by the coal and the numerous drafts throughout the immense open structure. The new sprinkler systems consist of pipes 10 or 15 ft. apart with nozzles pointing upward at equal intervals which dash the water against concave circles of metal causing it to spread out in umbrella shape as it falls to the floor. The nozzles are so placed that the falls of water will overlap and cover the entire breaker building.

This system will throw 800 to 3000 gal. of water a minute, a quantity equal to from one to four fire hose throwing 750 gal. a minute. It will extinguish any small fire and prevent one that has gained headway from spreading further. Wooden breakers are extremely inflammable and a number of them have been burned to the ground. This involves not only a replacement cost of from $150,000 to $200,000, but the loss from the fact that no coal can be mined for many months from the shafts that feed the breaker, as the means of preparing the coal for market have been destroyed. These new systems supplement but do not replace any of the regular fire-fighting apparatus installed in every breaker, such as hose, standpipes, fire pails, sand pails, water barrels and hand grenades.

⁂

A Rapid Growth

An instance of the difference between efficient centralized management and that which is distributed and necessarily less efficient is coming to light in the case of the Sacandaga Coal Co. This company bought its first piece of property in March, 1913. It now has 600 acres of coal land and two miles of narrow-gage railway connecting up the properties in Mayfield and Carbondale. The annual output of the properties which the Sacandaga company acquired was a scant 30,000 tons. The work of the company is still in the development stage, but it has two breakers, Sacandaga No. 1 and Sacandaga No. 3, with a capacity of 250,000 tons a year. The output this year is expected to be 150,000 tons and by the end of 1916 the breakers are expected to be running at full capacity. This instance tends to prove that the efficient administration of coal lands has as much to do with success as advantageous location and easy mining.

⁂

Experiments made in France have shown that 10 per cent. more weight of briquets can be stored in a given space than of lump coal.

Mine Tracks

By Sheldon Smillie*

SYNOPSIS—Mechanical mine haulage is in reality a miniature railroad system and should be treated as such. Bonding, ballast and other details are all essential to satisfactory operation.

Mechanical haulage, particularly electrical, has been installed by many managers because they were told it was cheaper than the old system. They probably did not realize that they were constructing a miniature industrial railroad which should be treated as such. How many of these managers will tell you of armature troubles, bearings, tires, etc., which are making their lives shorter.

Tracks should be as straight as possible. There is no reason why they cannot be laid to the same sights upon which the entry is driven, and not made to go around every little knob the cutters leave. They should be laid evenly, the ties being tamped up to the rail, not the rail drawn down to the ties.

Heavy rails are desirable because they bend less easily and offer a greater surface to the tires. Most locomotive makers recommend a certain size of rail to be used with a certain weight of machine. This rail sustains the locomotive when the ties are spaced 2-ft. centers.

Tracks should be kept clean down to the ties. How many mines one has been in where there is a mound between the two rails, possibly scored in the center by the brake rods of the locomotive, the flanges of the wheels making a groove along the rail with water running over the same in spots and down these grooves. Dirt increases the resistance of the cars and holds the moisture on the rail, necessitating sanding. The sand in its turn piles up around the rail, making matters worse. Tracks are easily kept clean when frequently attended to and the cleaning generally pays for itself in decreased boiler coal.

The grade of the main haulage should be watched carefully. A short piece of adverse grade will limit the capacity of the locomotive. The work of leveling up will be more than paid for by the increased number of cars hauled per trip.

Locomotives are designed to pull a certain load at a certain speed over the average grades in the purchaser's mines with allowances for short stretches of maximum grade. These data are usually furnished the manufacturer by the engineering department, which usually forgets to furnish the mine foreman with the same figures also. The result is that when the machine arrives it is set the task of hauling the coal out of the dip, the motorman adding cars until he can just crawl over the hump while piling sand on the tracks.

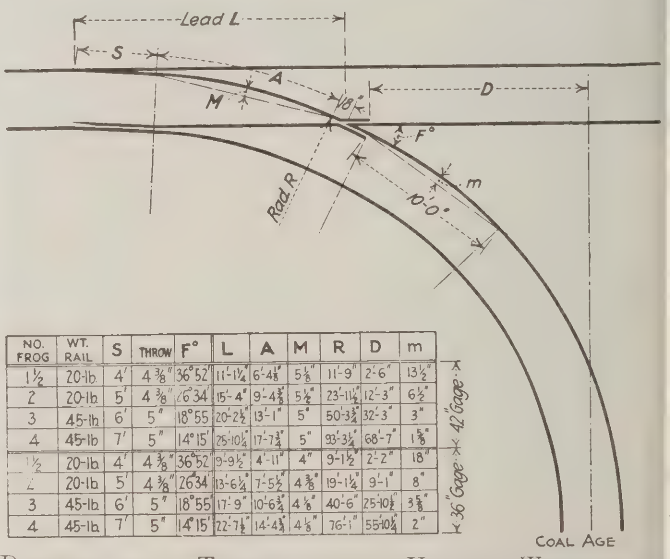
He would have saved time by making an extra trip or two at the capacity designed and the mine foreman would not call up the general manager in a few days and report, "That new Jordan locomotive is no d—— good. Order us a set of armature coils, a set of brushes and controller fingers and segments. Yes, and get some resistance grids too."

With the proper load and dry tracks, no sand should be required except on starting. Sand increases the resistance to the return current, and where much of it is used it frequently gets spilled all over the top of the locomotive and works down into the bearings, particularly the journal boxes, cutting them rapidly.

My experience has been that most motormen sand vigorously, thinking to gain speed thereby, when the trouble is actually too steep a grade for the load. A little grit is all that should be necessary and my opinion is that a number of companies could substitute a cheap river or bank sand and find that they use no more of it than the more expensive siliceous or glass sands.

Low voltage is probably the cause of most electric-locomotive troubles, and while this may be caused by remoteness and too small a feeder, the trouble can usually be found in the rail bonding. Rail bonds are the most important and most neglected feature of electric haulage. Almost every electrician has his opinion as to the best kind of bond and every maker has his "pet" pattern, but I believe the short, flexible, concealed type properly pressed into a freshly reamed hole is the best. To secure first-class results the fishplate should be tight and the joint supported by a well tamped tie under the end of each rail and under the fishplate.

Joints should be inspected with a bond tester every two weeks. A few defective ones will be found and the trackmen will soon learn the cause of failure and use more care in putting in the new ones.



NO. FROG	WT. RAIL	S	THROW	F°	L	A	M	R	D	m	
1½	20-lb.	4'	4⅜"	36°52'	11'-1¼"	6'-4⅛"	5⅛"	11'-9"	2'-6"	13½"	42" Gage
2	20-lb.	5'	4⅜"	26°34'	15'-4"	9'-4⅜"	5½"	23'-11½"	12'-3"	6½"	
3	45-lb.	6'	5"	18°55'	20'-2½"	13'-1"	5"	50'-3¾"	32'-3"	3"	
4	45-lb.	7'	5"	14°15'	25'-10¼"	17'-7¾"	5"	93'-3¼"	68'-7"	1⅝"	
1½	20-lb.	4'	4⅜"	36°52'	9'-9½"	4'-11"	4"	9'-1½"	2'-2"	18"	36" Gage
2	20-lb.	5'	4⅜"	26°34'	13'-6¼"	7'-5½"	4⅜"	19'-1¼"	9'-1"	8"	
3	45-lb.	6'	5"	18°55'	17'-9"	10'-6¾"	4⅛"	40'-6"	25'-10½"	3⅝"	
4	45-lb.	7'	5"	14°15'	22'-7½"	14'-4¾"	4⅛"	76'-1"	55'-10¼"	2"	

Dimensions of Turnouts with Various Weights of Rail on 36- and 42-In. Gages

A good method of getting a general idea of the condition of the bonds is to figure the feeder resistance and consequent drop in voltage due thereto to some remote corner of the mine, and then measure the actual drop at that point between feeder and rail. The difference between figured loss and actual is the approximate loss due to the resistance of the return. This will usually be many times that of the feeder.

It is a poor scheme to bond over to the water or air pipe with a view of using that as a return, as the varying resistance of pipe and track will keep the return current constantly passing from one to the other and back again, causing electrolysis and early destruction of the pipe. The best thing I have found where the tracks are in poor shape is to get an old haulage rope and lay it along the rib grounding over to it at frequent intervals.

---

*Division engineer, Rochester & Pittsburgh Coal & Iron Co., Indiana, Penn.

One of the quickest things to upset the regular routine of a mine and get the miners disgusted and ready to quit is to have the cars going off the track continually. Poor track laying is the cause of a good deal of trouble, but poor switches cause the majority of accidents. Herewith I give an original table calculated especially for underground conditions and for the frogs most usually employed. Small variations may be made from these figures without materially affecting the operation. The distance *D* is from the heel of the frog to the center line of the track at right angles to the main haulage on a curve equal to that of the turnout. It is the distance that the frog should be set back of the center line of the cross-entry or room. The middle ordinate of a 10-ft. chord of the outer rail of this curve is designated as *M*.

Curves should be banked in mines as well as on any surface line and for the same reason.

Time will often be saved by providing a regular switch stand with ground light showing which way the switch is thrown. A light should also be turned by the same motion in the side entry so that the motorman on a trip coming out will be able to see without stopping whether another trip has been by and thrown the switch while he was inside.

* *

Legal, Legislative and Labor Developments during 1914

By A. T. Shurick

SYNOPSIS—Supplementing the article in our Jan. 9 issue, on "Coal Markets and Business Aspects of the Fuel Industry in 1914," we give herewith a brief sketch of principal legal and labor developments of the year.

The Ohio Anti-Screen Law—Among the important legislation of the year, a period which, by the way, stands forth as one singularly replete with drastic lawmaking of all kinds, the enactment of the Ohio Anti-Screen Law is particularly important, and proved a crushing blow to the coal industry of that state. In the face of a most earnest protest from the operating interests, substantiated, it might be said, by irrefutable figures as to the ultimate results, Governor Cox and his radical following stubbornly persisted in their efforts, until the measure finally became a statute.

As was only to be expected, the constitutionality of the law was immediately questioned by the operators, and the matter hurried through the lower courts in order to obtain a decision from the Supreme Court as soon as possible. This latter tribunal at first sustained the law, but later withdrew its decision, and the matter was still in question at the end of the year.

The Hard Coalers—A continuation of the Government's proceedings against the alleged anthracite trust was a feature in the judicial circles during the year. The Department of Justice is now approaching this problem along new lines; it proposes to amend the National statutes in such a way that its actions may be carried to a successful conclusion. The very persistence which the Government is exhibiting in the prosecution of this suit tends to convince one that it is based upon substantial and well grounded reasons, and if it is successful in establishing its case, this combination should be dissolved. It must be remembered, however, that Judge Gray, in the United States Court at Philadelphia, found that no such combination existed, and his decision was later affirmed by the Supreme Court.

It is interesting to note in this connection, the inconsistencies of some of the statutes in effect in this country. Half a century ago, Pennsylvania enacted a law making it mandatory on the railroads of the state to assist in the development of the coal industry, whereas the present federal laws direct entirely to the contrary. In 1874 a change was proposed in the state constitution, but it was never put into effect and is still operative to this day.

The Anthracite Rate to Philadelphia—Among the several important decisions that marked the year's end, the heavy cut in the anthracite freight rate to Philadelphia stands out as one of the most drastic of the year. The decision was handed down by the Pennsylvania State Commission, whose jurisdiction, of course, covers the rate to Philadelphia, but not to outside points. The reduction was quite heavy, being 40c. per ton on all sizes above pea coal and scaling down to 20c. per ton on the smaller grades.

The decision is apparently based on the rather illogical hypothesis of a comparison with the New York rate, the haul to the latter point being longer and it being assumed, therefore, that the rate to Philadelphia should not in any event exceed that to New York. The Interstate Commerce Commission has long since proved the fallacy of arriving at an equitable rate by such means, and it is disappointing to find one of the state tribunals reverting to such methods which can only serve to excite the popular fancy of the ill-informed.

The Clayton Bill—The enactment of the so called Clayton anti-trust bill on Oct. 15 marked the end of a great deal of exaggerated comment and unnecessary alarm. Organized labor claimed that the passage of this law brought them relief in certain directions that they had long been striving for. While it is generally agreed that the wording and phraseology of the act are so confused in certain instances as to raise some doubt regarding just what interpretation may put upon it, there are conservative and authoritative attorneys who state that the claims of the labor parties are entirely exaggerated.

In fact, instead of exemption from the provisions of the Sherman law, the new act considerably enlarges the scope by which private individuals may bring action for violations of its provisions; thus, the right of triple damages for any injury as provided in the Sherman act is emphasized particularly in the fourth section of the Clayton act. However, should it so develop that the new law does not meet with the expectations of the labor party, it is, of course, only a question of time until they resume aggressive steps to gain this end.

The Five per Cent. Freight Rate—Among the constructive elements in the country's business affairs, the granting of the 5 per cent. rate increase to the Eastern roads, toward the close of the year, stands out prominently. Unfortunately, this was so long delayed that the practical benefits to the roads are inconsiderable, but the general tone of the decision was so eminently encouraging that it may ultimately prove a potent stimulus. Thus, the scope of the rates was extended beyond the territory of the roads making the application, while a close study of the report leads one to the conclusion that even more than the allotted 5 per cent. increase might have been granted in certain instances had it been requested. This change of sentiment and principle in which the commission at last recognizes the necessity of concessions for "the common weal," seems to be the most hopeful note yet sounded by the new administration.

The Government vs. the Lehigh Valley—The decision rendered by Federal Judge Hough, in the Government's dissolution proceedings against the Lehigh Valley Railroad Co., was quite favorably interpreted by the large business interests, though the Government has so consistently failed in suits of this nature that the results were already largely discounted. The action embraced no unusual features of any kind, the charge being an attempt to monopolize interstate commerce, and the transporting of anthracite coal in violation of the commodity clause of the Hepburn law. The Government appealed the case and it will be carried into the Supreme Court.

The Pennsylvania State Tax on Anthracite—In the case of the Pennsylvania State tax on anthracite coal, there were some 16 appeals taken to this ruling during 1913, but the case did not come up for trial. The operators are attacking the constitutionality of the law on several grounds, the principal ones of which are: That the tax is a special tax, and therefore not uniformly applied as required by the law; that the distribution of the revenues from the tax are not legal, and that it is unfair to impose a burden upon the steam sizes of anthracite to which the bituminous coals, with which they are in competition, are not subjected. The principle involved in this controversy is one of considerable importance, since it will establish a precedent by which all such questions of this character will be decided.

IN LABOR CIRCLES

A period of depression such as has characterized the country during the past 12 months inevitably works to the discomfiture of the labor unions. Such has been the case during the past year to even more than the usual extent, and this in spite of the fact that the National administration has shown a pronounced sympathy with the labor parties and has exerted its best efforts to assist them in every way.

By far the most important development in the labor history of the country for the year was the culmination of the Colorado strike in what cannot be interpreted as other than a crushing defeat to organized labor. International Vice-President Hayes of the United Mine Workers of America is on record with the statement "That the Union had spent $3,044,000 on the strike," and it will go down in history as one of the best organized and most determined attempts of this organization to unionize an "open-shop" district. Conservative estimates place the loss in life at 66 and the gross monetary consideration at approximately $18,000,000. Through the connection of the Rockefeller interest with the Colorado Fuel & Iron Co., the opportunity to involve the already muchly abused Standard Oil Co. in the fracas was eagerly seized upon. Demonstrations in the shape of "mourner's parades" occurred in different parts of the country, notably New York, which did much to create an unsavory and prejudicial publicity to the operating interests.

NEW AGREEMENTS NOT SATISFACTORY

Undoubtedly one of the main reasons for the collapse of the Colorado strike was the unsatisfactory results obtained in the new agreements negotiated in the Eastern bituminous fields, Apr. 1. The expiration of the old wage scales found the operators in an unusually strong position with the markets flat and completely devoid of interest; coal could scarcely be moved at any figure, nor did the future hold out promising hopes for much improvement. The producers were so obviously determined to close down their mines rather than concede the customary advances that the miners concentrated their efforts on a very few districts.

Thus, instead of uniform scales being arranged at the different main conventions, these broke up in complete disagreement, and the matter was taken up by sub-districts. In Illinois and Indiana agreements were effected without any great trouble, and the same was true in Pennsylvania, with the exception of a very few districts where the negotiations were more or less spirited for a time. But with the pronounced surplus of Southern coals in the market it was not to be expected that the suspension in the central Pennsylvania district could long endure. As a matter of fact, the "suspension" was at no time taken seriously, the miners good naturedly consenting to work whenever the operators really required tonnage.

But in Ohio, the enactment of the Green anti-screen law so confused the situation that the operators experienced great difficulty in reaching an agreement, and the close of the year found the situation in the No. 8 district becoming more and more acute, and replete with grave possibilities. The demand was made for a basing rate of 47c. per ton for machine mining, with no provision for lump coal. This was accepted by the Hocking operators, to whom it meant a slight reduction in the cost of mining, and the Cambridge producers were also forced to accede to the demand because of the large contracts they had on hand, but the No. 8 operators steadfastly refused to consider any such rate. Thus a new scale was reached in some of the more important districts, but sections aggregating perhaps one-half the gross tonnage of the state were still out at the close of the year.

The enormous expenditures of the miners' organization in Colorado also interfered with the payment of benefits to the idle union men in Ohio during the early part of the suspension and considerable dissatisfaction was reported from many of the mining districts; this situation was somewhat relieved by modest donations toward the close of the year, but the miners have reached a point where their leaders are holding them in line with the greatest difficulty, and there are well defined rumors of internal dissension in the organization.

A New Rotary Air Compressor

A new air-cooled rotary air compressor has just been placed on the market by the Wernicke-Hatcher Pump Co. of Grand Rapids, Mich. A machine of this type, weighing 1400 lb., and being 46 in. long, 28 in. wide and 35 in. high, operating at 400 r.p.m., delivers about 75 cu.ft. of air per minute at 100 lb. gage pressure.

The machine, which may be built for either belt drive or direct connection to a motor, consists essentially of wo elements, a rotor and a rotor casing, both of which volve in the same direction and at the same speed, but pon independent shafts, which are eccentric to each her. At suitable intervals, plates or vanes extend radily from the surface of the rotor, fitting into slots in the sing and case head, and dividing the displacement of e compressor into independent pockets. These plates e pivoted to shoes which are so arranged as to slide the surface of the rotor.

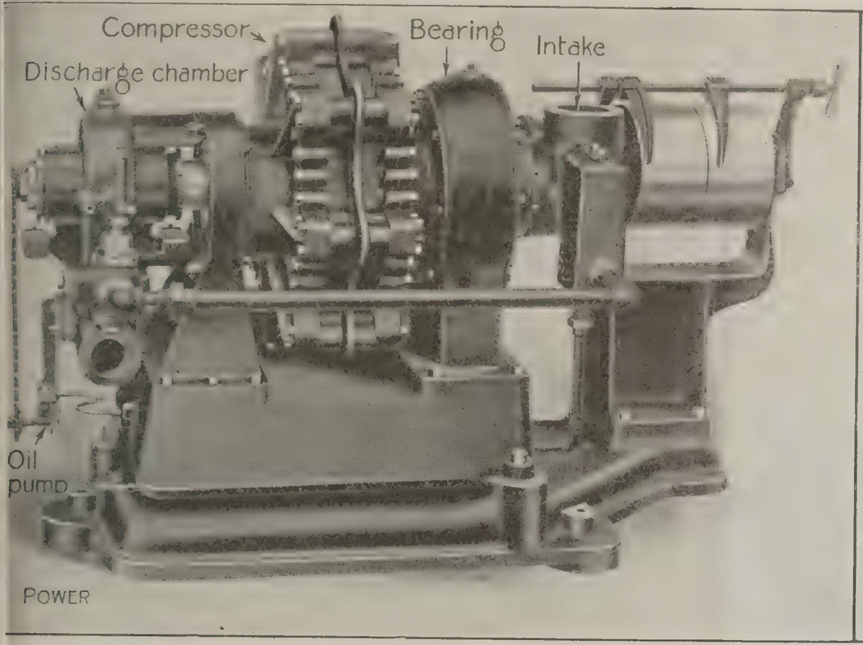


Fig. 1. Wernicke-Hatcher Single-Stage Rotary Air Compressor

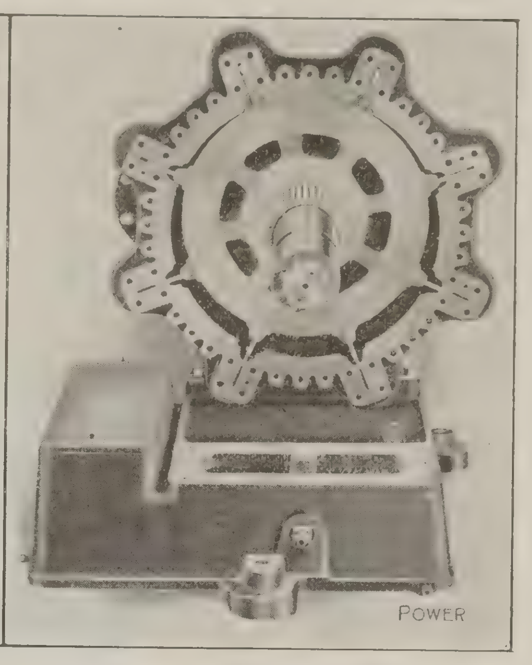


Fig. 2. Discharge End with Rear Bearing Bracket and Case Head Removed

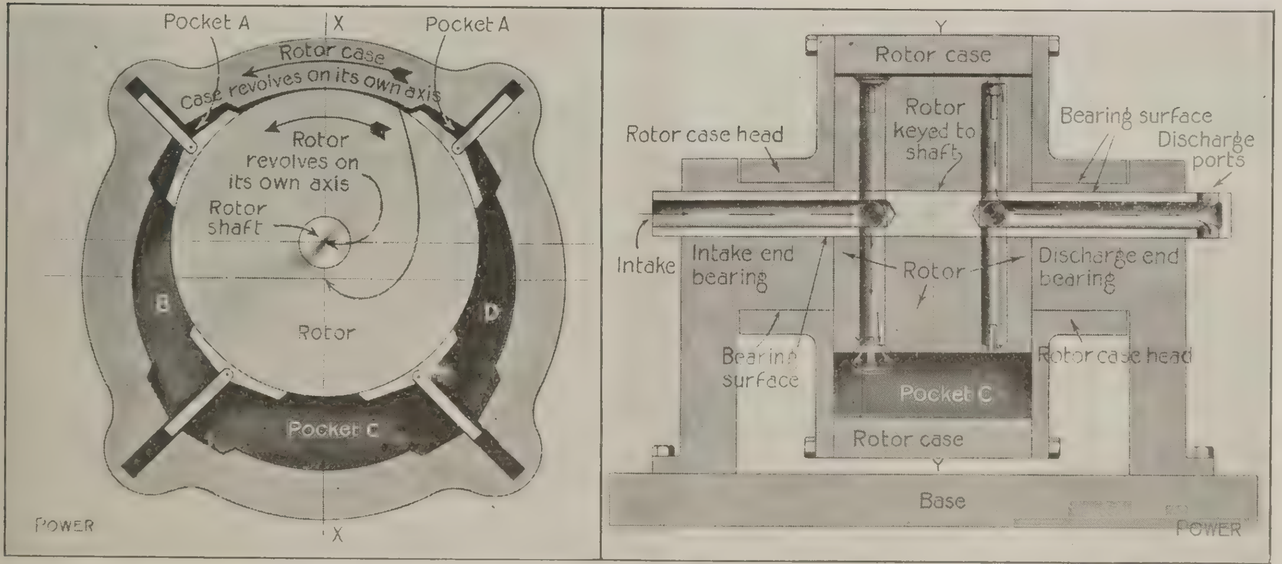


Fig. 3. End and Side Sectional Views, Showing Positions Taken by the Elements

The plates or vanes slide back and forth in the slots, but as the elements rotate in the same direction, this movement is relatively slow. This permits a close fit on the side walls, and as the pressure in the leading pockets during compression is always greater than in the pockets behind, the plates are pressed against the faces of the slot, causing little or no leakage to the chambers of lower pressure. Through one-half of the revolution, each pocket is expanding and drawing in air; through the other half, it is contracting in volume and discharges the air when the latter has reached the pressure of the receiver.

With eight pockets, there is practically a continuous compression, the periods of operation overlapping each other, so that the air is discharged practically uniformly at the desired pressure. This gives a uniform torque on the drive shaft, and as the machine is equipped with roller bearings, the friction is low. The cooling surface is afforded by the rotary casing. In proportion to the volume of air compressed, this surface is unusually large, nor is it contracted during compression.

On this account, much of the heat generated is immediately radiated, and on an all-day run, it is reported that the temperature will not exceed 300 deg. F. Water cooling is consequently unnecessary.

Each pocket of the machine is provided with an intake and discharge valve. These are of the ordinary poppet type, and connect through suitable passages with the intake and discharge openings located at opposite ends of the hollow rotor shaft. The intake valves are mechanically operated by a stationary cam, while the discharge valves are automatic. A suitable unloader protects the machine, and allows it to run idle except when air is being used.

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Extracts from a Superintendent's Diary

Occasionally a derelict drifts into our camp and attempts to find anchorage. The attempt is generally successful.

We buried such a one today.

Although Tom James has lived in our midst almost a year, it required his death to make us realize that we do not know a single fact in regard to his personal history previous to his arrival in our community.

Every man who has been associated with him in any way has been questioned and we find no clew to help us to discover possible relatives or friends, and so we were obliged to bury him without notifying kith or kin. To them his fate will probably forever remain a mystery.

When he applied for a check number, on first going to work, he remarked to our timekeeper, grinning pleasantly the while, that Tom James might be his name, which leaves little room to doubt that we do not even know his name.

And yet in spite of these facts, as I now recall the incidents of the past year, this man's personality has left an indelible impression with me. Truly! "what is in a name?"

The mystery surrounding his early life, which has just now become common gossip, has been greatly emphasized by the incident which was responsible for his death.

The faithful ladies of our only church decided upon a box supper as a possible means of raising funds with which to purchase some much needed seats.

The popularity of the affair exceeded their expectations, and it soon became evident that more chairs were required to take care of the people. Tom being janitor of the church (a position which carried no salary or perquisites, and at times not even a "thank you, sir," for his pains) was asked to go over to my office and request the loan of a few chairs; the ladies knew that I could be found at my office because my wife happened to be one of the ladies, and she had left me at the office, under protest, to worry over some unsatisfactory cost sheets.

Tom informed me of his mission, and obtaining my consent, proceeded to dust off a few chairs. On one of these, he happened to notice an open copy of a weekly. On it was a picture of a gay youth dining with a "painted lady," at a table well supplied with lobster and wine. The youth was pictured as smoking and the smoke from his cigarette had formed a cloud, and in the cloud appeared (to the youth) a vision of a country maiden sitting at a table with bowed head. The title of the picture was "Waiting."

I noticed that the picture seemed to take possession of Tom but I could not realize what it would lead to. He left my office carrying the chair on which he had discovered the weekly and the picture was still lying on the chair seat undisturbed.

He never got back to the scene of the supper.

Between my office and the dwelling houses, the road follows along a sheer precipice and Tom's body was found at the foot of this precipice at daylight the next morning.

He still clung to the chair although its legs, like his were terribly splintered.

The derelict had sighted land and then in the twinkling of an eye sank forever.

And yet some people insist that fate is a myth.

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Explosions in Flour Mills

Surely some consideration of methods pertaining to th prevention of dust explosions is called for. It has alread developed from laboratory study that most, if not all grain dusts are more inflammable than standard coa dust. Grain dusts in most cases develop higher pressure on explosion, especially at the lower temperatures. Th preliminary observations seem to indicate that the dust from oats and yellow corn are more inflammable tha those from wheat and other grain.

The investigations of the Millers' Committee indicat a difference in the inflammability of dried and undrie dusts. In nearly every case the pressure developed on ex plosion was increased appreciably after drying. The r sult of a decrease in the humidity of the air is thus sug gested.

Various causes have been assigned to the many e plosions in milling plants in this country and abroa among them the use of open lights, or naked flames, suc as lamps, torches, gas jets, lanterns, candles, matches, etc property fires; introduction of foreign materials in grin ing machines; electric sparks from motors, fuses, switche and lighting systems, and static electricity produced friction of pulleys and belts, grinding machines, etc.

The field-engineering inquiries of the Buffalo invest gators indicate that a large number of the recent expl sions and fires have been caused by the introduction foreign material into grinding machines. A possib means of prevention would be some system by which fo eign material might be removed before it reached the mi For the present, it is recommended that prevention of e plosions may be assisted by complete electric-lightin systems and the use of portable electric lamps instead lanterns or naked lights.

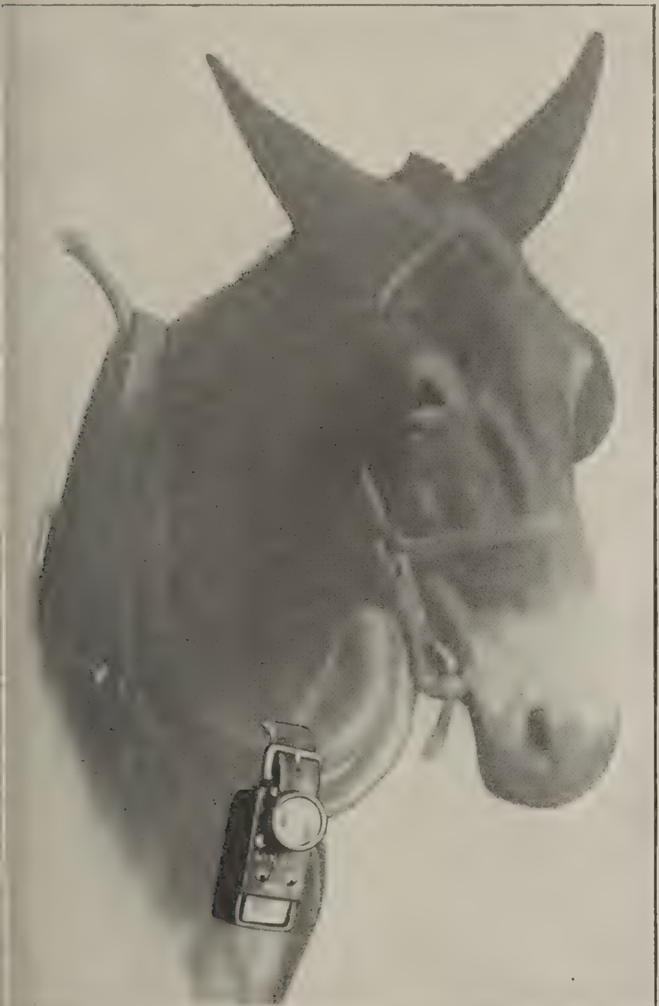
The Committee also advises that the receiving bins fro the grinding machines be as small as the operations pe mit, as increased size gives increased space for du clouds, and, therefore, opportunity for a more violent a destructive explosion.—*"The Journal of the Americ Medical Association."*

According to the Millers' Committee of Buffalo, in explosions which have occurred in grain mills in rece years, 78 men were killed and 119 injured. The dama to property exceeded $2,000,000. In four explosions Europe since 1911—two in dextrin works, one in a pr ender mill grinding peas, beans and wheat, and one i linseed mill—there were 47 killed and 119 injured.

Some New Electrical Mining Apparatus

Of all the senses with which animate creation is en-lowed, that of sight is probably of the most benefit. It s the sense which is employed the most continuously to lirect the movements of both man and beast. Unfor-unately, however, the eye can receive no impression and ransmit it to the brain in the absence of a greater or esser amount of light. Without light the sense of sight s useless.

Those who have attempted to travel even a well known assage through the mines without the aid of light of ome kind, can appreciate how nearly perfect and absolute the absence of light underground, and also how thor-ughly and implicitly man depends upon his eyes to uide his ordinary movements. And what is true of a an in this respect, is also true of an animal, although, erhaps, in a modified degree.



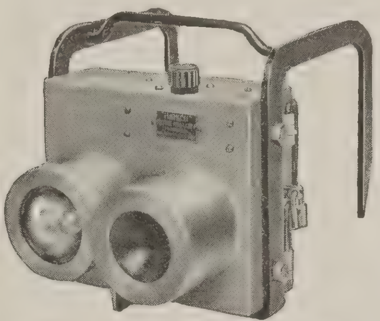
The Electric Mule Lamp in Position

In the past the light mostly used in mining was the oil rch, which burns with a long and smoky flame, and al-ough probably many attempts have been made to util-e such a lamp to aid man's best friend underground, the ine mule, such attempts have almost universally met ith failure. All animals fear fire.

Since the advent of the small and portable storage bat-ry, and the development of the efficient low-voltage in-ndescent lamp, the necessity for the old smoky long-flame oil torch has been removed. Mr. Douglas, stable boss of the New River Consolidated Collieries Co., at Eccles, W. Va., has devised a mule lamp of the storage-battery type, the rights to manufacture which have been given to the Hirsch Electric Mine Lamp Co., of Philadelphia, Penn. This lamp is identical in principle with the miner's cap lamp, except that the light bulb is attached directly to the storage battery, in this respect resembling the storage-battery hand lamp. A strap suitably arranged suspends the lamp and battery from the collar and hames of the harness, and the light thus hangs at a point where it will illuminate the mine passages to the best advantage, so far as the mule is concerned.

It is claimed that mules carrying this kind of light are much surer footed than are animals not thus equipped. Many accidents to mule flesh are thus avoided and the animal goes at his work with a greater willingness. Consequently more coal may be hauled out. The drivers, furthermore, are enabled to do more work and that under safer conditions.

In addition to the mule lamp just described, the above named company is placing upon the market a combination trip light and bell, which can be distinctly seen and heard at a distance of 500 ft. This is ruggedly built for the rough handling of the mines, and is claimed to be an effective accident preventer. A combination trip light and horn has also been developed, which it is claimed is reliable under all conditions and gives a shrill warning of the approaching trip.



The Combined Lamp and Horn

Another appliance, which is largely in the form of a safety device, is a storage-battery trip lamp, or tail lamp with a bright red reflector. This serves as a danger signal without the confusion commonly experienced with the ordinary type of lamp, or the oil-burning torch.

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Coal in Northern Montana

The coal of the Cleveland field, Blaine County, Mont., is described by C. F. Bowen in a report issued by the United States Geological Survey in Bulletin 541-H.

Practically all the coal of the Cleveland field occurs north of Peoples Creek, in the northern part of the state. As the surface is covered by glacial drift the coal beds are, as a rule, exposed only in the coulees where the drift has been eroded. At these places they are thin and are commonly separated by shale partings.

The coal has been opened at a few places by ranchers, and in Sec. 35, T. 30 N, R. 20 E, there is a small mine operated in the winter, which produces about 600 tons of coal a year. The coal is similar in quality to that in the Milk River field, in the vicinity of Chinook.

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The question of temperature has an important bearing in all tests and calculations on electrical conductors, since the resistance varies directly with the temperature. The resistance of copper wire increases about 0.23 per cent., and that of iron wire about 0.28 per cent. for each additional degree Fahrenheit.

The New Knowledge of Coal and Its Practical Application

By Horace C. Porter*

SYNOPSIS—The author says that the loss due to the needlessly inefficient use of coal, after it is mined, costs this nation at least $240,000,000 a year. He suggests that partial carbonization of coal with saving of byproducts should be one of the industries of the country. We should not only make coke but also partially devolatilized coal. Some coals exposed to heat promptly give off large quantities of volatile matter, yet in the long run their carbonization may not provide as much volatile matter as coals which break down less speedily.

At least 80 per cent. of the total power operating modern industries is derived from the combustion of fuel. Coal and the coke and gas made from it constitute 85 per cent. of the industrial fuel of America.

The proportionate cost of power to other charges for production varies widely in different industries, but taking them as a whole, the census reports show that fuel constitutes about 8 per cent. of the operating costs, exclusive of the cost of materials, in manufacturing industries. From this the importance of efficiency in the use of fuel becomes at once apparent, and it is made clear also by the fact that over 150,000,000 tons of coal are used for industrial power.

If the utilization of the energy of this coal were everywhere increased by 8 per cent., an increase entirely possible through the use of modern, improved, steam-engineering appliances and of the gas producer and gas engine, the cost of the industrial fuel used in the United States would be cut in two and at least $150,000,000 saved. If all the coke produced in the United States in 1913 had been made in byproduct ovens, $80,000,000 worth of byproducts might have been saved and the higher yield of coke would have resulted in a further earning of $10,000,000.

The United States Is the Largest Producer and Most Extensive User in the World

Coal is by far the biggest mineral product of the United States. The production in 1913 was about 570,000,000 tons and the bulk of this was consumed in our own land. The nation's coal bill was in the neighborhood of 1½ billions of dollars, or $60 for each wage-earner per annum. The United States is far ahead of other nations in coal production, having passed Great Britain, the nearest competitor, in 1899, and now surpassing her by nearly 100 per cent. Since we export but little coal and other nations a great deal, our home consumption surpasses that of other countries by even a much greater margin. Our industries are greater, to be sure, but we must face the fact also that an abundance of fuel resources has made us careless of efficiency in their use.

The coal reserves of this country are immense, the most recent estimates of the United States Geological Survey (for the XII International Congress of Geology, Canada, 1913) showing 1500 billions of tons easily available, not including the sub-bituminous and lignitic coals, these as yet not being widely used.

Purposes for Which Our Coal Is Used

The 570 millions of tons produced in the United States were used approximately as follows:

PURPOSES FOR WHICH COAL IS MINED

Purpose	Short Tons	Percentage
Domestic	120,000,000	21
Other heating of buildings	85,000,000	15
Coke and gas	75,000,000	13
Locomotives and steamboats	110,000,000	19
Industrial power (including central power plants)	180,000,000	32
	570,000,000	100

Scientifically the methods of utilizing coal may be classified into (1) combustion, (2) carbonization, and (3) gasification by partial combustion. Probably 80 per cent. of the coal consumption in America comes under the first class; that is, it is directly burned in air, and we see therefore the great importance of improving practical methods and appliances to assure efficient combustion.

Burning the Coal in Two Forms

In a combustion furnace using coal, all the coal and the intermediate products evolved from it are burned for their heating value only. On the other hand, the coke oven or gas retort utilized the coal more scientifically by converting it into two improved forms—fuel coke and gas—with a combined heating value about 85 per cent. of that of the coal, and in addition thereto saving the intermediate byproducts—tar, benzol and ammonia—which have a chemical value far exceeding their value as fuel. The coke and gas as fuels can be burned without smoke and with greater efficiency than the raw coal. A portion of the coke or of the gas, to be sure, must be used to supply the heat for carbonizing, this item amounting usually to from 10 to 14 per cent. of the original heat units in the coal.

It is not an idle dream to look forward to the time when there will be many central power and heating stations in the form of large byproduct coke-oven plants, placed at the mines or near large cities. As influences leading to this end, we may mention the following: Modern advances in long-distance transmission of electric power, the increasing demand for and value of coal byproducts for chemical purposes, the successful use of coke as a domestic and industrial fuel, the development of the gas engine, and the growth of public opposition to the smoke nuisance.

Devolatilizing Coal for the Market

Low-temperature or medium-temperature carbonization of coal has lately been introduced in Europe on an industrial scale. Coal is heated from 500 deg. to 700 deg. C (932 deg. to 1292 deg. F.), either under reduced pressure or in a current of auxiliary gas which passes directly through the coal, producing high yields of tars or oil and rich gas in small quantity. These processes depend for their commercial success on the quality and marketability of the oils and solid residues produced. Because of their adaptability to the recovery of oils, such as possibly motor fuels from coals not heretofore commonly used for byproducts, they offer an interesting field for industrial experiment in the United States.

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*Chemical engineer, U. S. Bureau of Mines.

NOTE—Abstract of lecture delivered before the Department of Chemical Engineering, University of Pittsburgh, Pittsburgh, Penn., Nov. 9, 1914. The first of a series on recent advances in Chemical Engineering, given as an evening course largely to graduate students.

In the present commercial situation brought on by the European war, the lack of an adequate supply of creosote oil, largely a coal-tar product, is a big incentive to the increase of coal-carbonizing operations in this country. Sufficient coal tar and benzol can be produced from existing byproduct coke ovens and gas retorts to supply the present American demand for all other coal-tar products, creosote oil being excepted. But in view of the increasing use of benzol for many purposes and of the growing demand for coal-tar products of all kinds, there is an opportunity for a large expansion of the coal-carbonizing industry, in the near future.

Composition of Coal Still an Unsolved Riddle

Coal is a mixture of complex organic substances which are degradation products of cellulose, resins and gums, and vegetable fats and waxes. Free carbon has never been proven to exist in coal, and hydrocarbons are probably not present in an amount greater than 1 per cent.

The problem of the constitution of coal has been attacked chiefly by two methods: (1) Extraction with solvents, and (2) destructive distillation at low temperatures. Extraction, while it has resulted, by use of pyridine, in dissolving and removing 15 to 18 per cent. of the coal substance, has not separated any single definite identifiable compound in more than mere traces.

Destructive distillation also has led to no exact results, but it has given, on the other hand, certain well defined indications of the nature of the substances present. These are mainly that coal is made up of many complex substances, which have resulted from degradation or decay of plant cellulose, lignose, resins and waxes. These substances in coal are closely graded into one another in chemical nature and composition, except that the cellulose and lignose group is probably more or less sharply distinguished from the resinous group. Within each group are substances in many different stages of alteration by aging.

Chemically the cellulose bodies are distinguished by their higher content of oxygen, by their tendency to combine with or absorb that element, and by their thermal decomposition into carbon dioxide and monoxide, water of constitution, and paraffin hydrocarbons. The resinous constituents, on the other hand, have a higher content of hydrogen and less of oxygen and decompose by heat into hydrocarbons and hydrogen with small quantities of carbon dioxide and water. The resinous bodies are contained most abundantly in the coking and mature coals of the Appalachian region.

Little or No Real Volatile Matter in Any Coal

The term "volatile matter of coal" is more or less of a misnomer, but serves as well as any other. There is probably little or no material in coal which is volatile without decomposition. What we call "volatile matter" is a mixture of vapors and gases resulting from decomposition of the coal substances by heat. Its composition depends on the kind of coal and also much on the temperature to which the coal is heated and to which the primary products are subjected.

By "primary products" are meant those which form first as the coal slowly rises in temperature. These are in order of their formation: Water, hydrogen sulphide, carbon dioxide, various saturated and unsaturated paraffin hydrocarbons and hydrogen. Many, in fact most, of the commonly known constituents of coal gas, coal tar and gas liquor, such as benzene, naphthalene, pitch and ammonia, are the products of secondary decomposition of these primary products.

Much "Volatile Combustible Matter" Cannot Be Burned

We see, therefore, that the volatile products of coal are not all combustible. From some bituminous coals, completely dried, we obtain by decomposition as much as 10 per cent. of noncombustible volatile matter, and from some lower-grade coals even as much as 15 or 18 per cent. So there can be no question that the term "volatile combustible matter" as frequently used is decidedly a misnomer, because from one-eighth to one-half of the volatile matter of coal is noncombustible. It is important to bear this in mind when comparing fuels, since those coals, the volatile matter of which is rich and smoky, are more difficult to burn efficiently than others having a volatile matter possibly greater in amount but more largely inert.

The Cellulosic Bodies Give Off the Incombustible Gas

An organic substance, of the cellulose nature, produces water and carbon dioxide and also monoxide, on decomposition by heat. When cellulose itself decomposes at temperatures below 500 deg. C. (932 deg. F.), 43 per cent. of its weight appears in the volatilized products as water and carbon dioxide. So also coal produces these products by decomposition, and the more abundantly the less matured and metamorphosed is the coal. We must expect to find an aqueous liquor distilled from coal during its decomposition, and in fact at gas works and coke ovens such is the case, a much greater volume of aqueous ammonia liquor being obtained, especially in the hydraulic mains (the first condensing point), then corresponds to the volume of the wash water added.

These facts enable us to draw inferences, at least, as to the chemical character of some of the substances in coal. The younger coals, like the lignites and sub-bituminous fuels, must contain large proportions of bodies with —OH and —CHO groupings, like the celluloses, since they produce water and carbon dioxide so readily; in the more mature coals, like the coking and high-grade steaming coals, there are not as many of these oxygen-bearing groups, but, probably, more of certain highly complex long-chain or many-ringed bodies having side groups of readily separable hydrogen atoms or of alkyls corresponding to the paraffin and possibly the aromatic hydrocarbons. These hydrocarbon groups are set free by heat, and then easily undergo further decomposition into the simple, commonly known products like methane and hydrogen.

The Hydrogen Probably Comes from Breaking down of Bodies Liberated at Low Temperatures

The theory of Wheeler, of the British Coal-Dust Experiment Station and others that coal contains considerable quantities of certain substances which decompose only above 700 deg. C., or 1292 deg. F., and thus yield principally hydrogen and the oxides of carbon, is hardly justified by the experimental data at hand. More reasonably is it to be supposed that the large amount of hydrogen which is produced above 700 deg. C., or 1292 deg. F., comes from the secondary breaking down of the hydrocarbons first liberated, and of the partially carbonized solid material left behind, these things not having been present, either of them, as such in the original coal. It is likely that all the organic substance in the fuel decomposes early by heat, below 500 deg. C. or 932 deg. F.

Why Coals Coke Is Not Yet Solved

The nature of the substances liberated or volatilized from coal by moderate heat throws some light on the coking properties of the coal. If by prolonged heating at 400 deg. C., or 752 deg. F., the coal shows little or no tendency to soften or sinter together, and liberates water and gas but only a small quantity of heavy, viscid tar or pitch, it does not have good coking properties.

Laboratory tests to show the coking quality of coals have never been satisfactory. Several are used which give more or less indication but are not definite. Among these may be mentioned (1) heating to a red heat a small sample inclosed in a covered, well filled platinum box, and examining the coke bar produced; (2) rubbing or grinding the coal in a mortar and noting the tendency to cake or adhere to the pestle and mortar; (3) analyzing for C, H and O and comparing ratios of O to H.

In recent laboratory experiments in Germany, cellulose has been converted into coal by subjecting it to very great pressure with moderate heating. Certain studies are now in progress to determine methods of increasing yields of some of the byproducts of coal carbonization, for example, the commercially desirable benzol and light oils, through carbonization at low temperatures and subsequent treatment, under carefully controlled conditions, of the tars thus produced.

Some Coals Volatilize Promptly when Heated but Their Volatile Output Later Falls Off

In the utilization of coal, particularly in burning on furnace grates, the rate at which the volatile matter is set free is frequently of greater importance than the total quantity produced. Coals vary greatly in this respect. The following results obtained in the laboratory on three different coals similarly treated (0.4 gram powdered, air-dry coal heated at 1000 deg. C., or 1832 deg. F), bring out this variation:

PERCENTAGES OF VOLATILE MATTER EXPELLED IN DIFFERENT PERIODS OF TIME

	5 Sec.		80 Sec.	
	Total	Combustible	Total	Combustible
New River, W. Va.	5.8	4.8	20.0	17.5
Pittsburgh, Penn.	9.0	7.5	34.0	28.1
Sheridan, Wyo.	36.0	12.4	49.0	21.6

It may be seen from these data that while the Pittsburgh coal finally produces more combustible volatile matter than that from Wyoming, the latter liberates considerably more in the first few seconds of heating.

The rate at which a given coal liberates volatile matter depends, first, on its chemical character, that is, its ease of decomposition, and, second, on the rate at which heat is supplied to it. The ratio between the quantity of coal heated and the quantity of heat supplied in unit time determines the rate at which any given coal becomes heated. It is, therefore, not a question of temperature as much as of quantity of heat and quantity of coal. When each particle of coal has attained a temperature of 900 deg. C., or 1652 deg. F., its decomposition into coke and volatile matter is practically complete.

The Variants in the Volatilization of Coal

Three points stand out as of importance in connection with the volatile matter, the constituent of coal which is so vital in all processes of coal utilization:

1. The composition as well as the quantity of volatile matter varies greatly between coals.
2. The first products volatilized in the early stages of a coal's rise in temperature are essentially different from the total product as usually obtained. These first primary products are largely tarry liquids, with some water vapor and heavy complex gases. Heating conditions determine the degree of secondary thermal decomposition of these products and the composition of the final gas and tar.
3. The rate of evolution of the volatile matter from coal is of practical importance and varies considerably with the kind of fuel. For a given coal it is dependent upon the relation between the quantity of coal heated and the quantity of heat supplied, not the temperature.

Oxidation and Ignition

Next to thermal decomposition or the evolution of volatile matter, perhaps the most fundamental process involved in the practical utilization of coal is that of oxidation or burning of the substance as a whole.

Slow oxidation at ordinary temperatures gives rise to spontaneous combustion and deterioration in storage; rapid oxidation has much to do with the initiation and propagation of coal-dust explosions in mines, and with the relative ease of ignition of fuels in general. The process of igniting a combustible substance is not as simple as it may seem on first thought, and just why some fuels ignite more easily than others requires careful analysis.

The Chip of Wood Burns before Its Gases Are Inflamed

At temperatures above that of the first appreciable decomposition of the substance (say 250 to 300 deg. C., or 482 to 572 deg. F. in case of coal), the process of combustion is complicated by the distillation of combustible gases and vapors and the alteration of the solid material. The gases and vapors of decomposition are not, however, all combustible and in fact those produced from the most readily ignited materials such as wood are largely noncombustible.

A splinter of wood held in a flame quickly ignites, it is true, because the gases of decomposition are quickly heated to their ignition temperatures. But we can also ignite the wood easily in a glass tube at 250 deg. C., or 482 deg. F., by passing a current of oxygen over it. Here the ignition cannot be a matter of distilled gases since the temperature used is much below their points of ignition.

Relative ease of ignition is unquestionably dependent to some extent on ease of oxidation; that is, the rapidity of the reaction of the substance with oxygen. Recent laboratory studies have shown that the wide variation among different coals and other combustible substances in their rate of oxidation follows the known variation in case of ignition, in susceptibility to spontaneous combustion, and in rate of deterioration in storage.

OXYGEN DOES NOT BURN THE CARBON OR HYDROGEN AT LOW TEMPERATURES BUT IS OCCLUDED

The action of oxygen on coal at ordinary temperatures has been shown by recent investigation to consist not in a burning of the carbon to carbon dioxide nor probably of a burning of the hydrogen to water, but largely of an addition of oxygen to the coal substance. This action develops heat. English investigators have shown that the calorific effect of this oxidizing action at 40 deg. C., or 104 deg. F., amounts to between 2 and 3 calories per cubic centimeter of oxygen consumed, only a little less than that produced per cubic centimeter of oxygen when coal is completely burned in which case 3 to 3.5 calories are developed.

The rate of oxidation increases rapidly with rise of temperature. A coal which at 30 deg. C., or 86 deg. F., consumes say 10 c.c. of oxygen per 100 grams in an hour, will multiply this rate so rapidly from the effect of its own production of heat, that the temperature would rise to 180 deg. C., or 356 deg. F., in a little over two days if no heat were lost. This would result speedily in ignition if an adequate oxygen supply were at hand.

DANGERS IN STORING RUN OF MINE

Spontaneous combustion in stored coal results from this slow oxidation by the air at ordinary temperatures. It is not, in any important degree, a matter of bacterial action, or fermentation. When conditions as to the size of coal and manner of piling are such that the rate of heat production by oxidation is greater than the rate of heat loss by convection currents and radiation, the temperature rises.

One of the most important practical considerations is whether an adequate air supply can penetrate to an inner section of the pile where the heat loss is slow. Fine slack coal does not heat seriously in the interior of a pile, if no lump is present. If, however, the material within consists largely of fine coal and the outer and lower sections of lump with little slack, one of the worst possible conditions is found, and spontaneous fires commonly result from such concurrent conditions.

Deterioration of coal in storage is due to slow oxidation, not to loss of volatile matter. The reduction in heating value is not as great as has commonly been supposed. With high-grade bituminous and semibituminous coals, careful determination has recently shown that this loss amounts to less than 1 per cent. in one year's exposure to the weather, and less than 3 per cent. in 5 years. With our Middle-Western and Western coals or lignites the loss is greater but probably does not exceed 4 or 5 per cent. in one year in any case. Deterioration in size or physical character may be somewhat more serious, and spontaneous heating even though moderate in degree causes an important loss. Deterioration of any kind may be quite largely prevented by storage under water.

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The Manchurian Railway Company operates five coal mines which give employment to 7000 Chinese laborers who work for 25c. per day. The output is about 3000 tons for each mine per 24 hours. Though the coal is bituminous, a combination of anthracite and metal methods of mining is used, for the seam is too thick, 125 ft., to make bituminous methods practical.

Coke-Oven Accidents during 1913

By ALBERT H. FAY

The hazard of the coke industry compares favorably with the quarry industry and the surface workings of metal mines, as shown by figures collected by the Bureau of Mines for the year 1913. The investigation conducted by the bureau includes the reports of 294 establishments, 67 of which were reported as idle, leaving 227 plants as operating, and for which accident reports were received.

These plants employed 24,345 men and of this number 46 were killed, 342 seriously injured, and 2172 slightly injured. The number killed and injured per thousand employed at coke ovens in 1913 was 1.89.

The number of coke establishments is practically 575, with slightly over 100,000 ovens. The Bureau's report embraces practically one-half of the operators, and 80 per cent. of the ovens, the number reported to the bureau as active being 67,526, and in addition 12,450 ovens were reported idle. While the accident figures thus collected are not complete for the entire industry, yet they are thoroughly representative. No distinction has been made concerning the type of ovens in use.

SERIOUS AND SLIGHT INJURIES

The distinction adopted between a serious and slight injury is in accordance with that used by the bureau in the collection of mine- and quarry-accident statistics. Hence, a serious accident is considered in this report as one that would disable a man and keep him from duty 20 days or more. This class includes such injuries as broken arms and legs, loss of eye, and severe cuts and bruises.

A slight injury is considered as one that involves a loss of more than one day and less than 20 days. Under this class may be placed such injuries as cuts, sprains, mashed fingers, bruises, dirt in eye, slight burns, effect of powder smoke, etc. Of course, any slight injury may become infected and thus result in a serious accident, as defined above.

CAUSES OF ACCIDENTS

It is stated that 13 fatalities resulted from accidents caused by cars, larries and motors, and 7 fatalities were caused by railway cars and locomotives, making a total of 20 deaths due to haulage or transportation systems, representing 43 per cent. of all the fatalities. Six fatalities were due to coke-drawing machines, representing 13 per cent. of the total, and 11 per cent. to electricity.

Of the serious injuries 26 per cent. were due to haulage systems; 23 per cent. to falls of persons. Of the slight injuries, 8 per cent. were due to haulage systems; 12 per cent. to falls of persons; 14 per cent. to hand tools and 16 per cent. to burns.

Since 43 per cent. of the fatalities at coke ovens are due to haulage systems, greater care and precaution should be taken to safeguard the employees who operate or work adjacent to transportation equipment. Inasmuch as electric haulage is used extensively, a large percentage of the electrical accidents may also be classified with those resulting from haulage systems, or a total of approximately 50 per cent. of all fatalities. It is in this department of the coking industry that there appears to be an excellent field for accident reduction.

Triangulating from Two Plumb Wires

Albert G. Wolf, mining engineer of Buckhorn, Nev., shows in the *Engineering and Mining Journal* the degree of accuracy attainable in triangulation from two plumb wires. Two methods are used in shaft plumbing. In one the transit is set up directly in line with both wires; in the other it is set to one side of them, the distance from the transit to each wire and the horizontal angle are measured and the triangle is calculated. In the first method the number of measurements is less than in the second and calculations are eliminated, but as a rule it takes longer to make the set-up. It is not the purpose of this discussion, however, to argue the respective merits of the two methods, but to point out the conditions under which the triangulation method can be used, when necessary or desired, with the least liability to error.

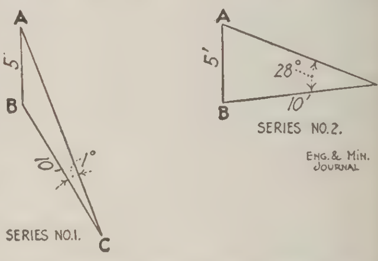
It is evident that a triangle with a small angle at the instrument, this angle small by reason of the instrument's being nearly in line with the two wires, not, however, at a great distance from them, will give the best results; for if the instrument is in line with the two wires an error in chaining will make no difference in the bearing and no horizontal angle is involved. To show exactly the relative importance of the errors to be avoided, two series of triangles of three each have been assumed and errors in azimuth calculated for assumed errors in measurement of the various parts of the triangles.

In the first series the following assumptions have been made: Distance between wires, 5 ft.; short leg of triangle, successively, 10 ft., 25 ft. and 50 ft.; angle at instrument, 1°. In the second series: Distance between wires, 5 ft.; short leg of triangle, 10 ft., 25 ft. and 50 ft.; angles at instrument, 28°, 11° and 5°, respectively. The calculations for 11° and 5° are not given in the table but those for 1° and 28° are elaborated in full.

The vertex angles of isosceles triangles with 5-ft. bases and sides 10, 25 and 50 ft. would be 28° 57′ 18″, 11° 28′ 42″ and 5° 43′ 54″, respectively, so it can be seen that the angles assumed in the second series approach nearly the maximum for triangles with the base and short side assumed. Errors of measurement assumed in each side are 0.02 ft. and in the angle at the instrument, 30″. The result in error in azimuth is calculated for each assumed error in measurement separately and the results are tabulated.

Set Up Near the Plumb Wire and as Nearly in Line as Possible

An inspection of the table shows that a small error in measuring either leg of a triangle in the first series makes an immaterial difference in azimuth, while in the second series an equal error in measuring makes an appreciable difference from the true azimuth. An error in measuring the angle at the instrument or the distance between wires, in either series, makes a large error in azimuth, but the error in a triangle of the first series is smaller than the error in a corresponding triangle of the second series. Now, referring to the first series of triangles only, it can be seen that the distance from the instrument to the wires makes no appreciable difference in the error in azimuth when an error in measuring to the wires is made, but an error in azimuth caused by an error in measuring either the distance between the wires or the angle at the transit increases rapidly as the distance from the instrument to the wires increases. In any set-up, therefore, the most serious errors to be avoided are those involved in measuring the distance between the plumb wires and the horizontal angle at the instrument. A check on the accuracy of the former is obtained by measuring between wires at the collar of the shaft, or point of suspension, and at the level of the set-up. The error in measuring the angle is reduced to a minimum by repeating the measurement and taking the average. An error in taping either of the legs of any triangle as large as the error assumed is not liable to be made if the work is checked and care is taken to hold the tape level.



Diagrams of Two Methods of Setting Up

In conclusion, the set-up least liable to result in an error in azimuth in triangulating from two plumb wires is one near the wires and in such a position that the horizontal angle measured at the transit is small.

ERRORS IN AZIMUTH, RESULTING FROM ERRORS IN MEASUREMENTS IN TRIANGULATION PLUMBING

Series No. 1. Triangle with Small Angle C

Lengths of Sides Short Leg	Long Leg (Calculated)	Base Line	Error in Bearing From Short Leg Inaccuracy	From Long Leg Inaccuracy	From Base Line Inaccuracy	From Inaccuracy in Angle	Calculated Angles Assuming Correct Measurements
Error assumed			0.02 ft.	0.02 ft.	0.02 ft.	30″	
In			Short leg	Long leg	Base line	Angle measured (C)	
10 ft.	14.9954 ft.	5 ft.	in A = 14.4″	in B = 14.4″	in A = 28.7″ in B = 43.1″	in A = 1′ 00″ in B = 1′ 30.1″	C = 1° 0′ 0″ A = 2° 0′ 1.1″ B = 176° 59′ 58.9″
25 ft.	29.9771 ft.	5 ft.	in A = 14.5″	in B = 14.5″	in A = 1′ 12″ in B = 1′ 26.5″	in A = 2′ 30.6″ in B = 3′ 0.8″	C = 1° 0′ 0″ A = 5° 0′ 22″ B = 173° 59′ 38″
50 ft.	54.9157 ft.	5 ft.	in A = 14.6″	in B = 14.7″	in A = 2′ 25.7″ in B = 2′ 40.5″	in A = 5′ 4.6″ in B = 5′ 35.7″	C = 1° 0′ 0″ A = 10° 3′ 3.5″ B = 168° 56′ 56.5″

Series No. 2. Triangle with Large Angle C

Length of Sides Short Leg	Long Leg (Calculated)	Base Line	Error in Bearing From Short Leg Inaccuracy	From Long Leg Inaccuracy	From Base Line Inaccuracy	From Inaccuracy in Angle	Calculated Angles Assuming Correct Measurements
Error assumed			0.02 ft.	0.02 ft.	0.02 ft.	30″	
In			Short leg	Long leg	Base line	Angle measured (C)	
10 ft.	10.5498 ft.	5 ft.	in A = 18′ 54.2″	in B = 49′ 37.5″	in A = 36′ 50.3″ in B = 1° 30′ 25.9″	in A = 2′ 34.1″ in B = 6′ 51.1″	C = 28° 0′ 0″ A = 69° 52′ 29.4″ B = 82° 7′ 30.6″
25 ft.	26.039 ft.	5 ft.	in A = 8′ 47.6″	in B = 24′ 9.2″	in A = 42′ 45.6″ in B = 1° 46′ 43.3″	in A = 8′ 13.3″ in B = 23′ 31.1″	C = 11° 0′ 0″ A = 72° 33′ 45.3″ B = 96° 26′ 14.7″
50 ft.	52.2612 ft.	5 ft.	in A = 2′ 26.8″	in B = 22′ 54.6″	in A = 24′ 11.8″ in B = 29′ 57.7″	in A = 10′ 11.1″ in B = 12′ 40.4″	C = 5° 0′ 0″ A = 60° 38′ 24.5″ B = 114° 21′ 35.5″

Coming Annual Meeting of A. I. M. E.

The annual meeting of the American Institute of Mining Engineers will be held in New York, Feb. 15 to 17, inclusive. The annual dinner has been arranged for the evening of Feb. 16. The price of the dinner will be $5 per plate. The attendance of ladies is especially urged. During the convention there will be several meetings of the alumni of various colleges.

On the program are a number of papers that will interest coal-mining people. On Monday morning, Feb. 15, Frank H. Kneeland, associate editor of Coal Age, will present a paper, entitled "Safeguarding the Use of Mining Machinery." Following this, Howard N. Eavenson, mechanical engineer of the U. S. Coal & Coke Co., at Gary, W. Va., will read a paper on "Safety Methods and Organization of the U. S. Coal & Coke Co." On Tuesday, commencing at 2 p.m., there will be a Technical Session on Fuels. The following papers will be presented: "The Limits of Mining under Heavy Wash," by Douglas Bunting, chief engineer of the Lehigh & Wilkes-Barre Coal Co., Wilkes-Barre, Penn.; "Recent Developments in Coal Briquetting," by Chas. T. Malcolmson, briquetting expert, Old Colony Bldg., Chicago, Ill.

The meeting of the committee on coal and coke will be held at 4 p.m., Tuesday afternoon.

At 2 o'clock on Wednesday afternoon, there will be a Technical Session on Electricity in Mines. One of the papers will deal with underground haulage by storage-battery locomotives.

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Lackawanna Banquet

A banquet was given Jan. 6 by H. G. Davis, district superintendent of District No. 4 of the Delaware, Lackawanna & Western R.R. Co. Coal-Mining Department, the guests being principally the inside and outside foremen of the collieries under his charge, which are Woodward, Pettebone, Avondale, Auchincloss, Bliss, Truesdale, Loomis and Shafts 3 and 4 of the Pettebone colliery around Wilkes-Barre, Penn.

This social gathering which took place at the Hotel Redington, is an annual event, but this year the foremen had decided to make it notable by the presentation of a large leather-covered morris chair to W. B. Owen of Dorrancetown, who, after 56 years of hard toil, has resigned his position with the company. He started work with the corporation as a breaker boy and since that time has been steadily promoted.

C. E. Tobey, general superintendent of the company, acted as toastmaster and among the invited guests were B. Samson, superintendent of construction, D. R. Reese, attorney of the coal-mining department; W. B. Thornton, superintendent of coal preparation; P. H. Devers and R. P. Thomas, assistant deputy superintendents; Dr. D. H. Lake, company physician, and S. J. Jennings and D. T. Davis, mine inspectors.

The speakers at the banquet were D. R. Reese, who spoke on mine accidents, declaring they were not unavoidable; P. H. Devers, whose address was on vocational schools and the Nanticoke Mining Institute; D. T. Davis and S. J. Jennings, who emphasized the need for further safety, the latter denouncing the fatalistic notion that "accidents will happen" no matter what is done to avoid them; Dr. D. H. Lake, who spoke on the value of first aid.

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The Anthracite Rate Case to Philadelphia

Five railroad companies have taken an appeal to the Court of Common Pleas of Dauphin County from the decision of the Public Service Commission of Pennsylvania in connection with the reduction ordered in the anthracite rates to Philadelphia on the following grounds:

(1) The decision in question orders not only a reduction in the rates on anthracite coal used for domestic purposes, but also a reduction in the rates on sizes of coal not so used, which rates were not embraced in the complaints filed with the Commission and the traffic moved under which is approximately 50% of the total anthracite coal tonnage to Philadelphia.

(2) The applications to the freight rates on all other commodities of the principle applied by the Commission in determining the Philadelphia rate on anthracite coal would produce commercial chaos and reduce the net revenues of the carriers by an amount far greater than the gain under the decision of the Interstate Commerce Commission in the Five Per Cent. Rate Case and the recent adjustment in the passenger rates.

(3) The reductions in the rates ordered will force the reduction of a large number of other anthracite rates, both state and interstate, to points other than Philadelphia.

(4) The effect of the reduction will be to diminish the net revenues of the Pennsylvania Railroad Co. by approximately $1,500,000 a year, the net revenue of the Philadelphia & Reading Railway Co. by approximately $2,000,000, and of the other companies by several hundred thousand dollars per annum.

The importance to the state of Pennsylvania and to the city of Philadelphia of adequately conserving the revenues of the carriers demands that immediate action shall be taken to protect their revenues from such widespread destruction as is involved under this order of the Public Service Commission.

The railroads which will enter appeal are: The Philadelphia & Reading Ry. Co., Pennsylvania R.R. Co., Lehigh Valley R.R. Co., Central R.R. of New Jersey and the Delaware, Lackawanna & Western. The companies will file separate appeals and also a joint appeal.—"Philadelphia News Bureau."

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Safety-First Developments in the Northwest

The Anaconda Copper Mining Co. of Montana has fallen into line with a number of the larger progressive Eastern coal companies in the matter of an official monthly publication, issued under the auspices of the company officials. The initial number appeared Jan. 1 and carries the appropriate title *The Anode*. It contains an interesting sketch of the safety-first developments at the company's coal operations by General Manager F. W. C. Whyte, of the coal department, which is interesting in that it typifies the current status of this movement in that section. We present the sketch in full herewith:

Up till the present time "Safety First" at the coal mines of the company has been confined to the customary rules governing such work, and to extra precautions we have learned from past experiences in the line of unlooked for accidents.

Ten years or more ago, in the mines at Diamondville, we had a fire that cost several lives, and a few years later a fatal explosion in the same mine. From these two experiences we learned several valuable lessons and have since been taking precautions at all the coal mines that are not usually practiced. For several years past our mines have been comparatively free from accidents, averaging somewhat below the neighboring operations, and it is my opinion that after the safety first committee has the time to attend to our needs and prescribe for our conditions we will effect a still further reduction in our accident rate.

So far we have only made the preliminary start in the way of cleaning up around and in the mines with a view to eliminating accidents due to interference in a man's working zone, and are now ready to organize with committees, etc., to carry the good work along. When this has been done there is no doubt in my mind that the Anaconda Co.'s mines at Diamondville, Washoe and Sand Coulee will compare more than favorably with any of the coal mines in the West.

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When wire is purchased for the purpose of stringing on poles for electric transmission, the general impression is that it is easier to handle if placed on reels than if in coils, but if this question were given a little thought, persons having such an idea would soon be convinced otherwise. They should take into consideration the transportation of wire in coils as against that on reels, the increased amount of coiled wire that can be stored in a given space as compared with the same amount placed on reels, the increased cost of freight due to reels, and the necessity of keeping the reels in good condition after being emptied and the amount of handling incurred because of the empty reels, the return transportation charges and the necessary clerical work and supervision required. With coils, all labor and responsibility cease after the wire is strung.

The Labor Situation

SYNOPSIS—Ettor is arrested for treason in eastern Ohio when he endeavors to start I. W. W. violence. Strike-breakers are said to be ready for transportation to the mines on strike. Testimony of J. D. Rockefeller, Jr., in New York City.

The principal event in the strike situation of eastern Ohio, during the past week, was the appearance and arrest of Joseph J. Ettor, the noted Industrial Worker of the World. Ettor was billed to speak at Bellaire, the handbills announcing a meeting of the "revolutionists." When Ettor stepped off the train the sheriff and a few deputies armed with a warrant for his arrest on the charge of treason appeared and took him in charge. He was hurried to the county jail at St. Clairsville. Later a demonstration on the part of some of his sympathizers was made, but the authorities held them in check.

Apparently the charge of treason was based on the wording of the notices announcing Ettor's proposed address. The meeting was declared on these placards to be "under the auspices of a group of revolutionists." Ettor's subject was to be "Against War: for the Class War: Against all Capitalists of the World."

Ettor was arraigned on the charge the following day, and, upon his signing a bond in the sum of $5000, agreeing to leave the county on the first train and also to refrain from sending Industrial Workers of the World organizers and agitators into that section, he was released.

Efforts Being Made to Reopen Mines without Union Control

Reports from the eastern Ohio district show that about 150 men are now employed by the Roby-Somers Coal Co. and other mine owners are arranging to start work. Quite a few of the operators are waiting for the result of the investigation by the federal Department of Labor which is still in progress.

The Roby-Somers Coal Co. is having difficulty in its evictions. Some of the summons were illegally drawn and new papers will have to be prepared. In all eviction suits the miners have first appeared at a hearing before a justice and demanded a jury trial. They have then appealed from the decision of the jury to the court of common pleas. No cases thus far advanced have as yet been decided but it is supposed that appeals will be taken from the court's decision in order that the tenants may not be dispossessed from their houses till the spring when the temperature will be better suited for dwelling in tents.

A meeting of the federal investigators with eastern Ohio operators and John P. White, president of the United Mine Workers of America, was held in Cleveland on Jan. 23.

Bringing in Strike-Breakers

A report came from the strike zone to the effect that arrangements had been completed for the importation of 6000 miners to take the places of the strikers. This colonizing is being done by the operators' association and not by the individual operators. The plan is believed to be preferable because under it individual operators will not assume any responsibility.

The men operating the fans and running the pumps at Mines Nos. 1 and 2, of the Rail & River Coal Co., have been called out. Nonunion men may be put to work and disorder may result. Now that there is talk of a resumption without any agreement being made with the miners, the union is not disposed to let union men keep the mines in condition for working.

Comparison of Eastern Ohio with Fairmont District

W. L. Moke, general manager of the Roby Coal Co., has interests in the Fairmont district of West Virginia. He is quoted as saying:

> In this particular nonunion district (Fairmont) the miners receive 38c. for loading a three-ton pit wagon and 40c. for loading a three-ton pit car in narrow work; hence 2c. per car for run-of-mine coal is the compensation they receive for driving narrow work, etc. They receive $1.60 to $1.75 for inside and outside day labor, 10 hr. per day, compared with $2.19 for outside day labor and $2.84 for inside day labor, 8 hr. per day, in eastern Ohio. Further than this the freight rate from eastern Ohio to the Lakes is 85c., while from Fairmont the rate is $1 with a difference of from 50 to 60 miles of haul. The miners of eastern Ohio are demanding 47c. a ton for machine coal though the operators have to meet this nonunion competition."

The miners recognize the importance of these railroad conditions as bearing on their attempts to secure the rate they demand. At the annual state convention of the United Mine Workers of America, held Jan. 12, the following resolution was adopted:

Freight-Rate Resolution

> **Whereas,** the mining and marketing of coal are dependent upon transportation from mines to markets, and it is claimed that coal mined in West Virginia and Kentucky is hauled greater distances by the railroads than Ohio coal, at the same price, and that Ohio railroads are hauling West Virginia and Kentucky coal in Ohio at lower freight rates than they are charging for hauling Ohio coal; and
>
> **Whereas,** the Ohio coal-mining industry and the miners and their families and all other dependent upon that industry are suffering, and it is charged that high freight rates and discriminations against coal mined in Ohio are largely responsible;
>
> **Therefore, Be It Resolved,** that we respectfully petition the General Assembly of Ohio to investigate the subject at this session and give to the miners, producers and consumers of Ohio coal the benefit of the same relative freight rates over the railroads in this state that the same railroads are now giving to the miners, producers and consumers of West Virginia and Kentucky coal; and
>
> **Resolved,** further, that in behalf of the miners, producers and consumers of Ohio coal and others dependent upon the industry, the Industrial Commission, the Public Utilities Commission and the attorney-general be and they are hereby respectfully petitioned to investigate and report to the General Assembly at its present session whether shipments of coal from Ohio mines are discouraged and in many cases reduced or prevented by discriminations practiced by Ohio railroads against shippers of coal mined in Ohio;

Arkansas Trouble Ending

Unexpectedly on Wednesday morning, Jan. 20, seven persons out of 20 arrested on charges found by a special grand jury last November in the investigation of the outbreaks of violence in the Prairie Creek mining district, pleaded guilty. W. C. Fitts, of Birmingham, Ala., the prosecutor for the government, entered a nolle prosequi for the other 13 defendants.

Peter R. Stewart, of McAlester, Okla., former president of the United Mine Workers of America in Arkansas, Oklahoma and Texas, was fined $1000. Fred W. Holt, of the same place, former secretary of the same district, was fined $1000 and was sentenced to six months in jail. James B. McNamara, a former councilman of Hartford, Okla., received the maximum sentence of $1000 fine and two years at hard labor at the federal penitentiary, Leavenworth, Kan. James Slankard, formerly constable of Hartford, is to pay $1000 fine and serve six months in prison, and Clint Burris, Sandy Robinson and John Manick pay $500 each and spend six months in jail.

It was announced by the prosecutor that John Champion, Dave Branch, Oscar Layton and William Reed, who were indicted on the charge of taking prisoners from Deputy U. S. Marshal Tom Black, at Hartford, shortly before the cavalry was ordered to Prairie Creek, would surrender themselves for trial.

James Slankard and Bee Trout, who were indicted for the murder of John Baskins and Clarence Syllesberry, were acquitted on Jan. 15, as testimony was brought to show that the alleged bones of the victims of the striking miners were from the carcass of some lower animal.

Whether any further action will be taken is uncertain. There will be no further attempt to redress the federal wrongs, except as regards the four men who took prisoners from the U. S. marshal, but the state may well take action to punish those who were guilty of arson and perhaps murder.

It is said that the United Mine Workers of America has deposited $50,000 to the order of the Bache-Denman Coal Co. as first payment for the mines of that corporation. The price at which the property is to be sold to the U. M. of A. is $200,000.

On Jan. 25 the executive board of the seventeenth district of the U. M. W. of A. met at Charleston, W. Va., to launch a movement to organize the miners in the Guyan Valley district.

Poor John D. Rockefeller, Jr.

On Jan. 25, 26 and 27, J. D. Rockefeller, Jr., testified before the Federal Relations Commission, and, according to the New York "American," he was severely heckled about conditions at Delagua by Chairman Walsh. He took the criticism with great serenity and did not appear to know any more than his pertinacious questioner that the Colorado Fuel & Iron Co., in which his father is interested, has no mines at Delagua, which is a Victor-American Fuel Co. camp. In fact Walsh is as much an absentee investigator as Rockefeller is an absentee owner. The whole business resolves itself into a complete farce. The people of Colorado are being victimized by agitators from outside, muck-raked by investigators who refuse to make definite inquiries, called upon to assent to conditions imposed by President Wilson, who has never been on the ground, and generally are suffering from long-distance treatment with all it entails.

Because Mr. Rockefeller did not deny several charges, it is declared he practically admitted them. If not denying is admitting, the Victor-American Fuel Co. may look well to its title in Delagua since John D. Rockefeller, Jr., did not deny that his father owned the plant. In fact, all the Colorado people may as well surrender claims to their property; the public refuses to believe that there is any other company than the Colorado Fuel & Iron Co. doing business in the state and that there is any other stock besides that which the Rockefeller interest owns, though John D. Rockefeller, Jr., has repeatedly called attention to the falsity of this opinion.

Mr. Rockefeller testified that $92,000,000 had been paid in wages since the stock had been purchased by his father, that the whole revenue derived by the Rockefeller stock was only $371,000. As that stock amounted to $6,000,000, the earnings were about two-thirds of one per cent. per annum. The estate also holds bonds but the investment both on stock and bonds has not amounted to 3½ per cent. per annum.

J. D. Rockefeller, Jr., Outlines His Attitude

Mr. Rockefeller made some remarks of much interest, among others the following:

As to the strike itself, its many distressing features have given me the deepest concern. I frankly confess that I felt there was something fundamentally wrong in a condition of affairs which rendered possible the loss of human lives, engendered hatred and bitterness and brought suffering and privation upon hundreds of human beings.

Without seeking to apportion blame, I determined that in so far as lay within my power I would seek means of avoiding the possibility of similar conflicts arising elsewhere or in the same industry in the future. It was in this way that I came to recommend to my colleagues in the Rockefeller Foundation the instituting of a series of studies into the fundamental problems arising out of industrial relations, which resulted in securing the services of Mackenzie King, former minister of labor of Canada, to direct the studies.

The correspondence will show that, in addition to having taken steps as early as the beginning of June last to secure Mr. King's services, I also sought and obtained advice with respect to machinery for the prevention and adjustment of industrial differences, to which I invited the consideration of the officers of the Colorado Fuel & Iron Co.

In early August I wrote the president of the company, forwarding, with my indorsement, a letter from Mr. King, written in answer to my request, outlining a plan previously discussed, to establish:

"A board on which both employers and employed are represented, and before which, at stated intervals, questions affecting conditions of employment can be discussed and grievances examined."

In reply to this communication, the president of the company indicated that measures of the kind I had suggested were in contemplation, but that their adoption while the strike was on would only serve to embarrass their successful introduction. He further indicated that, when the strike was terminated, steps would be taken immediately to secure to the employees of the company a more direct representation of their views as regards grievances and conditions affecting their employment.

The Miners to Be Represented

The strike was called off Dec. 10, 1914. On Dec. 16, David Griffiths, formerly state coal mine inspector of Colorado, was appointed an intermediary between the company and its employees, respecting matters of mutual interest.

On Jan. 5 a notice was posted at all the company's mines inviting the employees at each of the mines to assemble in mass meeting to select by ballot one representative to every 250 employees in each camp, to represent the men at a joint meeting of themselves and the executive officers of the company in Denver, "for the purpose of discussing matters of mutual concern and of considering means of more effective coöperation in maintaining fair and friendly relations."

In the published notice of these meetings it was stipulated that in order that the men might feel the greatest freedom in making their selection, they should choose their own chairman and neither superintendents nor pit bosses should attend.

Joint Conference Is a Success

I have received from the president of the company, a telegram informing me that this joint conference was held at Denver on the 19th instant, that the meeting had proved most satisfactory to all concerned and that its spirit had convinced the management that it would lead to more active coöperation between the company and its employees in the future.

I believe that the ultimate object of all activities in a republic should be the development of the manhood of its citizens; that such manhood can be developed to the fullest degree only under conditions of freedom for the individual, and that industrial enterprises can and should be conducted in accordance with these principles.

Capital Can Wait for Earnings

I believe that a prime consideration in the carrying on of industry should be the well-being of the men and women engaged in it, and that the soundest industrial policy is that which has constantly in mind the welfare of the employees as well as the making of profits, which, when the necessity arises, subordinates profits to welfare.

In order to live, the wage earner must sell his labor from day to day. Unless he can do this the earnings from that day's labor are gone forever. Capital can defer its return temporarily in the expectation of future profits, but labor cannot.

Interests of Employees in Mine

If, therefore, fair wages and reasonable living conditions cannot otherwise be provided, dividends must be deferred or the industry abandoned.

I believe that a corporation should be deemed to consist of its stockholders, directors, officers and employees; that the real interests of all are one and that neither labor nor capital can permanently prosper unless the just rights of both are conserved.

If, with the responsibilities I have and the opportunities given me, I am able to contribute toward promoting the well-being of my fellow men through the lessening of injustice and the alleviation of human sufferings, I shall feel that it has been possible to realize the highest purpose of my life.

A Company Hotel

Hotels built and owned by coal companies are quite numerous. In fact, every new mining village has its boarding house or hotel, and, like the miners' dwellings, these are built by the company. The Carbon Coal & Clay Co., of Bayne, Wash., however, runs as well as owns its own hotel, serving excellent meals at 30c. apiece. The cost per meal in November of last year was $0.196, the help adding $0.101, making a total cost $0.297. So the company made a profit of $0.003 per meal. The intention is to run the hotel without either loss or profit. The rooms are neat, clean and comfortable. The mines are run on the "open-shop" basis.

A HOTEL WHERE MEALS AND ROOMS ARE PROVIDED BY COMPANY AT COST, BAYNE, WASH.

SCHOOLHOUSE AT THE VILLAGE OF BAYNE, WASH.

The store manager runs both hotel and store. For the hotel he lays aside a monthly rent of $200, which pays a good interest on the investment. Several hundred dollars have been spent in general village improvement and, as will be seen, the town has a creditable school for so small a community. This also was built by the company.

An Analysis of the Anthracite Shipments in 1914

SYNOPSIS—The accompanying comments and tables of shipments, stocks, allotments, etc., were compiled by the "Philadelphia News Bureau" and form a valuable reference on anthracite statistics.

The shipments of anthracite coal in 1914 as reported by A. H. Armstrong, chief of the Bureau of Anthracite Statistics, were 68,342,601 tons, a decrease of 727,027 tons as compared with 1913, in which year shipments were 63,610,578 tons. The tonnage in 1914 was satisfactory in volume and the price of coal was fairly well maintained, though it was apparent during the greater part of the year that the output was larger than the market requirements.

Probably the most important feature of the year was the aggressive movement of some of the carrying companies for tonnage. The figures show that the Reading, which has been the leading company in the ownership of coal lands and in the distribution of coal, again falls behind the Lehigh Valley. The Reading makes comparatively light shipments while the Lehigh Valley makes record shipments. For the year the Reading shows a decline of 916,000 tons as compared with 1913 and Lehigh Valley an increase of 125,000 tons. The C. R.R. of N. J. also fell behind, indicating that the conservative policy of the late George F. Baer is still in force. The absence of any agreement as to production or distribution of coal allows full liberty to each of the companies. There has been much comment in the trade on the subject. It is feared that the tonnage enthusiasm may result in trouble if it continues. The Lehigh & New England, the new anthracite shipper, shipped 1,317,000 tons in the first eleven months and will be on the official list of coal transporters this year.

SHIPMENTS BY HALF YEAR PERIODS SINCE 1903

Year	First Half	Second Half	Calendar Year
1914	32,945,789	35,396,814	68,342,601
1913	34,851,854	34,217,774	69,069,628
1912	26,104,766	37,505,812	63,610,578
1911	35,309,583	34,644,716	69,954,299
1910	32,814,748	32,091,033	64,905,786
1909	31,957,730	30,012,155	61,969,885
1908	33,668,442	31,996,572	64,665,014
1907	32,884,595	34,224,798	67,109,393
1906	25,385,801	30,312,794	55,698,595
1905	30,716,997	30,693,204	61,410,201
1904	29,257,307	28,135,215	57,392,522
1903	31,884,952	27,478,878	59,363,830

PERCENTAGE SHIPPED BY DIFFERENT COMPANIES

	1896*	1910	1911	1912	1913	1914
Phila. & Reading	20.50	19.17	18.96	20.20	18.70	17.56
Lehigh Valley	15.65	17.25	18.02	18.54	18.84	19.22
C. R.R. of N.J.	11.70	13.13	13.18	13.12	13.16	13.04
Del., Lack. & West.	13.35	14.77	14.11	14.25	14.34	14.50
Del. & Hudson	9.60	10.14	10.30	10.00	10.27	10.70
Penna. R.R.	11.40	9.63	9.28	8.72	9.20	9.42
Erie	11.20	11.64	12.58	11.69	11.86	12.10
Ontario & Western	3.10	4.27	3.57	3.48	3.63	3.44

* Allotment made in this year.

STOCKS AT TIDEWATER AT THE CLOSE OF EACH MONTH OF THE PAST 5 YEARS

	1914	1913	1912	1911	1910
Jan. 31	591,094	375,566	521,283	711,877	869,757
Feb. 28	523,682	484,270	379,775	669,485	802,011
March 31	632,989	772,115	300,366	946,713	1,104,232
April 30	453,789	546,243	126,539	601,916	858,976
May 31	485,853	502,626	125,977	619,395	880,303
June 30	554,120	533,029	289,827	754,910	883,461
July 31	514,490	537,404	380,088	826,396	896,064
August 31	582,179	575,384	388,921	881,202	878,598
Sept. 30	645,699	589,690	417,360	908,785	862,693
Oct. 31	745,076	603,223	358,937	818,675	883,567
Nov. 30	811,198	603,031	346,013	754,062	801,735
Dec. 31	669,833	602,328	340,637	712,958	734,898

COMPARATIVE STATEMENT OF SHIPMENTS BY COMPANIES FOR THE PAST 4 YEARS

Company	1914	1913	1912	1911
Phila. & Reading	11,998,779	12,914,887	12,852,386	13,265,758
Lehigh Valley	13,136,759	13,011,370	11,791,601	12,603,000
Cent R.R. N.J.	8,924,936	9,092,433	8,342,477	9,218,802
Del., Lack. & W.	9,912,578	9,903,541	9,065,622	9,869,620
Del. & Hud.	7,313,541	7,094,258	6,361,238	7,206,731
Pennsylvania	6,434,937	6,351,756	5,548,193	6,494,733
Erie	8,268,585	8,192,352	7,435,697	8,800,179
Ont. & West.	2,352,486	2,509,031	2,213,382	2,495,476
Total	68,342,601	69,069,628	63,610,578	69,954,299

SHIPMENTS BY REGIONS

Year	Schuylkill	Lehigh	Wyoming	Total
1898	12,078,875	6,252,109	23,567,757	41,899,751
1899	14,199,009	6,887,909	26,578,286	47,665,204
1900	12,502,732	6,918,627	24,686,125	45,107,484
1901	16,019,591	7,211,974	30,337,036	53,568,601
1902	8,471,391	3,470,736	19,258,763	31,200,890
1903	16,374,790	7,161,783	35,723,258	59,362,831
1904	16,612,055	6,558,182	33,892,285	57,492,522
1905	17,703,099	7,949,205	35,857,897	61,410,201
1906	16,011,285	7,046,611	32,640,692	55,698,595
1907	20,141,288	8,329,953	38,633,452	67,109,398
1908	18,006,464	7,786,255	38,872,295	64,665,014
1909	16,864,147	7,532,271	37,573,467	61,969,885
1910	17,845,020	8,627,539	38,433,227	64,905,786
1911	19,375,369	9,775,018	40,805,912	69,954,290
1912	18,013,406	8,571,861	37,025,311	63,610,578
1913	19,338,870	9,342,583	40,388,175	63,610,578
1914	18,494,087	9,087,111	40,760,803	68,342,601

GROSS AND MARKETABLE OUTPUT SINCE 1881

	Gross	Marketable		Gross	Marketable
1881	25,572,160	23,437,241	1898	47,663,076	41,899,751
1882	31,358,261	29,120,026	1899	53,944,647	47,665,204
1883	34,336,468	31,793,027	1900	51,221,353	45,107,484
1884	33,175,756	30,718,293	1901	60,242,560	53,568,601
1885	34,228,548	31,623,530	1902	36,940,710	31,200,890
1886	34,853,077	32,336,362	1903	66,613,454	59,363,830
1887	37,578,747	34,641,018	1904	65,318,490	57,392,522
1888	41,624,611	38,145,718	1905	69,339,152	61,410,201
1889	50,665,182	35,817,093	1906	63,645,010	55,698,595
1890	41,489,858	36,615,459	1907	76,432,421	67,109,393
1891	45,236,992	40,448,336	1908	74,347,102	64,665,014
1892	46,850,450	41,893,320	1909	72,016,115	61,969,885
1893	48,185,306	43,089,537	1910	74,295,087	64,905,783
1894	46,368,144	41,371,200	1911	80,771,483	69,954,299
1895	51,785,122	46,511,477	1912	75,322,855	63,610,578
1896	48,523,267	43,177,485	1913	81,718,680	69,069,628
1897	46,974,714	41,637,863	1914 (est)	76,543,000	68,342,601

SHIPMENTS BY MONTHS FOR THE PAST 5 YEARS

Month	1914	1913	1912	1911	1910
Jan.	5,175,732	6,336,419	5,763,696	5,904,117	5,306,618
Feb.	4,121,451	5,674,169	5,875,968	5,070,948	5,031,784
March	5,164,703	4,909,288	6,569,687	5,996,894	5,174,166
April	6,072,164	5,966,189	266,625	5,804,915	6,224,396
May	6,281,553	5,995,742	1,429,357	6,317,352	5,679,661
June	6,130,186	5,970,047	6,191,646	6,215,357	5,398,123
July	5,391,857	5,487,852	6,285,153	4,804,065	5,202,059
August	5,483,743	5,369,900	6,576,591	5,531,796	4,996,044
Sept.	6,246,192	5,572,279	5,876,496	5,730,935	4,967,516
Oct.	6,444,476	6,338,194	6,665,321	6,269,179	5,622,005
Nov.	5,928,286	5,786,931	6,165,536	6,193,314	6,071,746
Dec.	5,702,258	5,662,618	5,944,506	6,115,427	6,231,578
Total	68,342,601	69,069,628	63,610,578	69,954,299	64,905,786

RANGE OF STOCKS FOR PAST THREE YEARS

	1914		1913		1912	
	High	Low	High	Low	High	Low
Reading 1st pfd	89⅜	87	92½	82½	93¼	87½
Reading 2d pfd	93	80	95	84	101½	92
Reading common	172¼	138	171¾	151⅜	179¼	148⅛
Lehigh Valley	156¼	118	168⅜	141¼	185¾	155⅞
Cent. R.R. of N.J.	315	300	362	275	395	305
Del., Lack & Western	406¾	388	445	380	597	530
Del & Hudson	159½	135¾	167	147½	175½	162
Pennsylvania R.R.	115½	102½	123¾	106	126¼	119⅞
Erie	32½	20⅛	32½	20¼	39⅛	30
Erie 1st pfd	49¾	32	49½	33½	57⅞	47½
Erie 2d pfd	40¼	26¼	41¼	28¼	48	38
Ontario & Western	31⅝	19⅛	33⅞	25⅛	41⅜	29⅞
†Leh. Coal & Nav., etc.	84¾	72	93½	81	100	87⅞

† Phila. price, dollars per share; par $50.

DIVIDENDS PAID DURING THE PAST NINE YEARS

	'14	'13	'12	'11	'10	'09	'08	'07	'06
Rdg. 1st pfd	4	4	4	4	4	4	4	4	4
Rdg. 2d pfd	4	4	4	4	4	4	4	4	4
Rdg. com	8	8	6	6	6	6	6	4	4
Leh. Val.	10&2½	10	10	10	10	10	6	6	6
C. R. N. J.	8&4	12	12	8&4	8&4	10&2	8	8	8
D. L. & W.	10&10	10&10	20	* 10&10	10&10	20&66	10&10	10&10	10&10
Del. & Hud.	9	9	9	9	9	9	9	9	7
Penna. R. R.	6	6	6	6	6	6	6	7	7
Ont. & Western	0	2	2	2	2	2	2	2	2
Lh. C. & N. Co.	8	8	8	8	8	9&25	8	8	8

* And 35% in stock Lackawanna R.R.

Walter H. Clingerman

Walter Hicks Clingerman has been elected president of the H. C. Frick Coke Co., to succeed Thomas Lynch, who died Dec. 29, 1914. Mr. Clingerman has acted as general superintendent of the Frick company for a number of years.

His early education was obtained in the public schools of Altoona, Penn., where his boyhood days were spent. In 1885 on leaving school he secured his first position as an apprentice in the machine shops of the Pennsylvania R.R. Co. at Altoona.

Four years later, Mr. Clingerman was transferred to the office of the superintendent of motive power in charge of all the drafting work on new construction jobs. In 1895 the Pennsylvania R.R. Co. gave him a leave of absence to superintend the construction of car shops for the H. C. Frick Coke Co. and put car repairs on a piecework basis. This work consumed one year of his time, after which he returned again to the railroad company.

Walter H. Clingerman

In September, 1897, Mr. Clingerman became general foreman of the Everson carshops of the Frick company, and about a year later was appointed assistant general superintendent of all their mines. In February, 1904, six years later, he was advanced to the position of general superintendent of the H. C. Frick Coke Co., and served in that capacity until his recent appointment to succeed Mr. Lynch as president.

Mr. Clingerman is one of the most popular men in the Pennsylvania coke fields, and his advancement to the highest position in the Frick company meets with the general approval of coke men everywhere. He is the logical man for the job that was so capably filled by Thomas Lynch, and there is no doubt but that he will lend himself heartily and vigorously to the continuation of the admirable work on sociological lines so ably planned by his predecessor. The Frick company, in its relations with its employees, is a model corporation and one that might be used as a pattern by other concerns in different fields.

Walter Clingerman is 46 years of age. He is a director of the Madeira-Hill-Clark Coal Co. and of the Memorial Hospital, Mt. Pleasant, Penn. However, practically all of his time and effort in recent years have been devoted to the service of the Frick company. He is the sort of man who concentrates to the utmost on the work in hand, and we predict that the company he now heads will continue its successful course of development under his lead.

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To Illustrate Anthracite-Mine Accidents

The coal-mining department of the Delaware, Lackawanna & Western R.R. is having prepared by the Edison Co. a series of moving-picture "plays" illustrating possible accidents in the mines, with the obvious corollary of how to avoid them. Some of the moving pictures of anthracite mining prepared by the United States Bureau of Mines may be used in conjunction with the Lackawanna films.

No effort is being spared in the Lackawanna's elaborate campaign for safety in the mines, and by stretching a wire to the miner's house these plays can be given with a small projecting machine right in his home. Where it is impossible to stretch a wire, storage batteries may be used for their home entertainments. The moral effect in promoting caution is the company's reward for the trouble and expense.

Prizes will be offered for the most vivid and instructive plays and these will be turned over to the "keg fund" of the locality which wins them. At many of the Lackawanna collieries the empty powder kegs which are returned in good condition are stored by the company, which credits 8c. to the fund for each keg, the exact amount received from the powder company for their return. These funds are devoted to paying sickness and death benefits and funeral expenses for the mine workers. They average from $1700 to $2000 a year.

*

New River Coal Co. Makes Big Deal

A deal of importance, which concerns a large part of the output of the New River Coal Co., of which G. H. Caperton, of Charleston, is president, with headquarters in that city, has been reported, whereby the New England Coal & Coke Co. secures an important tonnage from the mines of the New River Coal Co., which are located in the New River District of the West Virginia Smokeless fields.

The consummation of this deal means that the New River Coal Co. will sell a large block of its coal, or all the coal from its mines shipped into the New England States, to the New England Coal & Coke Co. for a period of years. This coal has heretofore been sold under contract to the Darrow-Mann Co., of Boston, who are controlled through stock ownership by the New River Coal Co.

The new tonnage that the New England Coal & Coke Co. will receive from the New River field through this contract will give it a supply of smokeless coal in the New England markets considerably in excess of 2,000,000 tons a year.

Editorials

The High Price of Coal Land

The Sibyl who tried to sell her books to Rome burned three volumes each time her offer was refused and then asked an unchanged price for those still remaining. A similar obstinacy is manifest in the sale of our coal lands.

For six years we have steadily raised the price of the coal land on the public domain. The acreage price of the lands sold has risen 132 per cent., an increase of 22 per cent. per annum, and even that inadequately represents the increases of valuation of the best coal lands. Meanwhile the sales have dropped from $636,663.18 in the fiscal year ending July 1, 1908, to $307,487.95 in the past fiscal year. Whereas in 1908 there were 303 entries, in 1914 there were 71 or barely one-fourth as many. In the first year almost five times as much coal land was sold from the public domain as in the last. So the American Sibyl has steadily raised prices as the chances of selling coal and other lands declined.

But the public, like the Sibyl, is satisfied, and the West, of course, must needs be also, as its people are clearly in a minority. A few weeks ago, an Easterner opened an address on Alaska with the words: "The people there think they own Alaska." They probably do, and the people in the West think they own the West. But they don't, as you can see by these sales and these prices.

The mother country, east of the Mississippi, still has a money interest in its colonies as the frequent use of "public domain" and "landlord" in government enactments and publications most clearly shows. We wish that at last there may come an awakening, and that the old folks of the East may learn yet to see that the young folks of the West know their own needs and rightly appraise their own difficulties. Regretful it is that old fogyism and absentee governmental management are keeping the West from its merited progress.

Retail Dealers Cannot Refuse Coal Shipments

A growing evil among Indiana retail coal yards to order coal from the mines and then after it is en route cancel the order and request the shippers to effect other disposition has caused some of the Indiana shippers to refuse to make any further shipments to consignees following this practice. Recently the R. C. Whitsett Coal & Mining Co., of Chicago, tested out a case of this kind in the courts of Fort Wayne, Ind., and won their suit.

It seems a coal dealer in Fort Wayne in the usual way ordered a car of coal from the Whitsett Coal & Mining Co., which was shipped promptly from the mines, and before it arrived at Fort Wayne the consignee refused to accept the shipment, stating that he was overstocked and could not use the coal. The Whitsett company refused to act on this request and the shipment went through to destination, as originally consigned, with the result that the consignee refused to accept the shipment upon arrival on account of quality. The suit was decided in favor of the plaintiff, that is, the Whitsett Coal & Mining Co., and judgment was given against the defendant for the full invoiced price of the coal, plus all expenses in connection with the suit.

The operators complain that Fort Wayne is an unsatisfactory city in which to sell coal because of the custom of dealers in that city to refuse shipments on one pretext or another and to ask for allowances which are uncalled for. This case shows that when a dealer orders coal from an operator he must accept it and not refuse it after it has been in transit. The law provides when coal is sold f.o.b. mines that title thereto passes to the consignee immediately upon delivery to the initial carrier for transportation, and the shipper's responsibility is ended, as the law does not make the consignor a guarantor of safe or due delivery, so that the consignee is the lawful owner of a shipment of coal so sold, after it leaves the mines.

If Coal Sold at over $32 a Ton

The Federal Industrial Relations Commission is liable to increase rather than diminish industrial discontent, and not the least of the trouble-makers are those excellent captains of industry like Henry Ford, who, lying in protected harbors, hint that there need never be a ruffled sea and that seasickness is entirely unnecessary.

But the cause of the success of Mr. Ford in industrial sociological work is revealed when he says that, in his establishment, capital of $2,000,000 manufactured $80,000,000 to $90,000,000 of product and *earned $25,000,000 of profits last year.* It is pertinent to inquire what relations these profits bear to the conditions in the coal industry.

The Census reports for 1909 show that $960,289,465 was invested in bituminous-coal mines. The product, as recorded by that Bureau, was 376,865,510 tons. Hence capital to the extent of $2.54 was needed for every ton of product sold.

Henry Ford and his associates multiplied their wealth 12½ times in the course of the year. That gain translated into the coal industry would involve a profit of 12½ times the capital invested in coal operations per ton of product or 12½ times $2.54, or $31.75. Thus every ton produced would have to pay a clear profit of $31.75. Roughly speaking, the market would have to buy coal at $32.75 in order that the coal operators might have as large an amelioration fund as Henry Ford and his associates.

Of course, objections will be made to this line of argument and we will anticipate some of them that our frankness be not impugned. The Ford factory, like the coal industry, does not always work at maximum pressure, but, of course, a large industry like coal mining, as a whole, is not speeded up like the Ford works. As a unit i is not so efficient. Moreover, whereas there is water in the form of excessive coal-land valuations in the coal industry, there is probably none in Ford's capitalization and two millions may not represent the true valu of the Ford plant. But nevertheless the figures are significant. When the automobile industry becomes overcrowded like the manufacturing of bicycles, probably Mr. Ford may find he cannot be so liberal and so feudal.

Meanwhile he exhibits well the generous instincts of American capital and his work will have an excellent effect if the public will only bear in mind that the conditions under which he operates are exceptional.

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Who Gets the Promotion?

In deciding which is the best answer of the nine published last week, with reference to the cartoon problem "Who Gets the Promotion?" no provision was made for awarding the first prize of $10 in case two or more of the contestants were tied. We, therefore, wish to state that in such an event each and all of those participating in the tie will receive the full first prize of $10. As stated last week, the postal card vote closes Feb. 2, and the result will be published in our next issue, Feb. 6. If you haven't already voted, do so today; this is your last opportunity.

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This Winter Marks the Finish of a Number of Middle Western Operations

It is currently reported that several of the older mines in the Indiana field may be shut down or abandoned because of inability to market their production under the prevailing highly competitive conditions. In Illinois it is more than likely that several of the present operations will not be hoisting coal at this time next season; in fact, they are only kept open now in the hope that enough winter weather may be left to warrant the shipment of coal at profitable prices. One operator in Indiana reports that scarcely 50 per cent. of the tonnage covered by contracts has been shipped so far this winter. There was a rush of orders about the holiday period, but just now the country dealer is taking practically no coal whatsoever.

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Freedom of Speech

We have always been delighted with the freedom of speech prevailing in the Geological Survey. Even when it permitted George Otis Smith and George Ashley to write us scathing letters, we still felt such plainness of speech was creditable to the organization, for we object to the attitude that comment should not meet with a reply when the person or body discussed feels the criticism unmerited.

But we are still surprised at Mr. Smith's Gallic frankness of utterance. In his last report he says: "There is no indication that those who really wish to establish mines hesitate to buy at Government valuations." Yet a year ago, when five more sales were made and 1032 more acres were sold, Mr. Smith's chief, Franklin K. Lane, stated: "Our coal land is not being used under this plan (the classification of land and its vending at the price appraised) save under exceptional conditions of local and immediate demand."

We are glad there is a department where the subordinates are so free to take an opposing view to that of the official in charge. It speaks well for F. K. Lane, and convinces us that he is a man of broad views who can respect such a contrasting difference of viewpoint. Still we wish the Director of the Geological Survey used his freedom of speech to a more worthy end and could back it with better evidence.

The higher-priced land seems mostly to have been sold in 40- and 80-acre plots. Those who have experience in mining know that acreages so small are but rarely bought for operating purposes unless adjoining larger areas. Coal land is often bought for saloon and town sites, and consequently the small size of the areas sold at any one definite price is suggestive of the real purpose of the purchaser.

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The Tidewater Coal Situation

The prominent feature in the Eastern coal markets this week is the sharp advance in water freights along the coast. Unfavorable weather during most of the month has shortened the supply of barges and sailing vessels that were available, and now the insistent demand for tonnage off-shore at "war rates" has made it plain to the coal trade that rates are up for the season. What the full effect will be it is too early to say, but the strenuous efforts of a week ago to close contracts on Southern coals have abated.

No prudent shipper now cares to name a delivered price without transportation in hand; the situation is too full of uncertainty. The range of freights is getting so high that buyers will probably prefer taking chances of a drop later in the season, for except in cases where plants are directly on tidewater there is still the possibility of taking Pennsylvania coal all-rail.

It is hard to see wherein vessels are likely to be in any better supply. Those closed on time charters to South America and to the Mediterranean are sure to be away for long periods, and unless a considerable tonnage of the medium-sized type comes from off the lakes most of the Pocahontas and New River agencies are likely to find it difficult to secure transportation for their coastwise trade.

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That Elusive "Boom" in the Middle West

The long expected industrial revival scheduled for the first of the new year has certainly not materialized to the extent anticipated. In the Middle West for instance, there have been a great many statements in the daily press that the business situation has shown signs of marked improvement but it is not apparent to the coal man. However, there are certain movements afoot, within the coal trade there, to better its condition; these are making progress and may gain such momentum by another season as to have a decidedly favorable influence on prices and general selling conditions.

The coal operators can find their own remedies for the major portion of the evils which have existed for several years past if they will adopt coöperative methods, like those prevailing in other industries here and abroad.

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A side-light on the export trade is the arrival of coal from England. Several steamers coming to Portland, Maine, for instance, to take horses and supplies for the British army have brought coal as ballast in thousand-ton lots, a fact that tends to show that England is not short of fuel and is shipping coal regularly in most directions.

Sociological Department

A Miners' Tribune

The Colorado Fuel & Iron Co. has appointed a representative to be a link between the employees and the higher officials and to take care of the interests of the former. He will travel from mine to mine, and where misunderstandings or grievances cannot be adjusted between the employees and the local management, it will be his duty to take up such matters and adjust them.

David Griffiths, the man for this important post, has large acquaintance with the employees of the company and has a known sympathy with them which peculiarly fits him for the work he has to do. With Mr. Griffiths to see that justice is done, no grievances the miners may have will fail to be redressed. In fact, he will really be J. F. Welborn's representative in the field.

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Some Aids to First Aid

By Frank S. Davis*

After the prizes for the annual contest have been awarded, the entertainments are over and the brass band has gone home—the next meeting of the First-Aid Club is apt to be poorly attended. There is a sudden slump in interest, and unless the doctor and the "super," together with the mine foremen, put forth unusual efforts, it is hard to revive the waning enthusiasm, at least until the next "annual" looms imminent. Yet, if first aid is to become as large a factor as it should be; if it is to be so generally comprehended that an accident cannot occur without having someone near who understands its principles; if the victim is to have his sufferings alleviated at the earliest possible moment, interest and enthusiasm must be maintained throughout the year.

Intermittent Interest in First Aid

"Keeping everlastingly at it brings success" is an old saying and a true one. But keeping everlastingly at the same thing, in first aid, gets monotonous. It is necessary to vary the routine, to get new incentives, in order to enlist new men, and keep the interest alive and vital all the time. New schemes must be devised, and new devices tried. The team that has won the trophy three successive years is a valuable organization, and we are all proud of it, but if each member of that team were engaged in training new beginners, of how much greater value would the work of the team become?

Some methods which I have tried are proving successful, and it is with the thought that they might be suggestive to others that this article is written.

After one annual contest here, there was an immediate cessation of interest. The First-Aid Club languished, and there was nothing doing. The hall was only open on special and rare occasions, and then the meetings were slimly attended.

To remedy these conditions, a meeting of the mine foremen, who comprise the executive board of the First-Aid Club, was held. A concert was given, plenty of talent being available, and a fund of about two hundred dollars was thus created. A janitor was hired, and the first-aid hall was open, warmed and lighted, every night. Then a "smoker" was given, and a free-for-all meeting was announced. At this meeting dues were voted, 25c. a month, a secretary, treasurer and president elected, and some enthusiasm aroused. New teams were organized, and everything put in shape for a vigorous first-aid campaign.

The annual contest was held on Labor Day, with five full teams competing. Out-of-town judges were selected, and there was no unpleasant aftermath, although competition was keen, and the contest very close.

Better Safe than Sorry

In addition to the cup and cash prizes, all members o the teams were presented with the company's first-aid buttons. These are handsome little emblems, in blue and gold, with the motto, "Better Safe than Sorry," encircled by the name and location of the company. The men were told that these buttons could be procured only by taking first-aid training, and a Thanksgiving contest for beginners only, with buttons for prizes, was announced.

The contest came off in due time, and the committee i charge added some cash, raised by subscription, to increas the interest. Each team was composed of five men and captain, only the latter being a "button" man, and eve his activities were strictly limited to instructing his men Three teams competed, and all members were adjudge worthy of receiving buttons. There are now about fift "button men" in the camp, and a surprising amount o pride is taken in the tiny decoration.

Not a Cup in a Case but a Sign at the Mine

The next contest is to be a free-for-all affair. A con spicuous sign, containing the words "Champion First-Ai Team," with a reproduction of the first-aid buttons a either end, will be allotted to the winning team. This sig will be placed over the top of the manway at the min from which the team came, and must be held by that tea against all comers.

In other words, if the team from No. 1 mine wins th contest, it must accept all challenges for a certain perio and maintain its supremacy during that time, if it woul retain the sign. If it succeeds in doing this, the da will be added, "for the Year 19—," and the sign will r main at No. 1.

If No. 2 mine wants the sign, and has a team whic they think can beat No. 1, a contest will be arranged o six weeks' notice, and if No. 2 team wins, the sign goes u at No. 2, under the same conditions. It is hoped that th will stimulate and maintain a keen rivalry between t different teams in the camp. These contests are all in a dition to the regular annual contest for a handsome lo ing cup, occurring each Labor Day.

When the keen edge of the rivalry created by the sig wears off, something else will have to be devised, in somewhat different line. At present I have no idea wh this may be, but I have faith that some other scheme will present itself during the interval, so that interest may be again aroused, and the large and enthusiastic membership will continue to grow and thrive.

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*Mine superintendent, Superior Coal Co., Superior, Wyo.

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Cash Prizes for Safeguarding Lives

At every colliery operated by the Coal-Mining Department of the Delaware, Lackawanna & Western R.R., placards have been posted offering $100 in cash prizes for the most valuable and practical suggestions on the prevention of accidents. The first prize is $25; the second, $20; the third, $15; and there are two of $10 and four of $5 each.

The suggestions must consist of not over 1000 words and are to be deposited in one of the 35 large boxes installed at each colliery, and labeled "Safety-First Suggestions."

This is only part of an elaborate and comprehensive plan for the promotion of safety in the mines. The Lackawanna has formed a series of committees to have charge of all safety work and devices and through which all suggestions will be sifted.

Committees of Safety

The central committee consists of the superintendent, who is chairman; the general attorney, who is secretary; the chief engineer, electrical engineer, superintendent of construction and repairs, superintendent of washeries, the superintendents of the four districts into which the Lackawanna operations are divided, and a special engineer.

Next in the system come the four district committees, consisting of the district superintendent, assistant district superintendent, district mining engineer, district electrician, district mechanic, inside foreman, fireboss, a miner, a track layer and a runner.

In addition to this there is a mine committee for each separate district in the mines for which an inside foreman is responsible. These committees consist of the fireboss, safety inspector, a miner, a track layer, a timberman and an electrician inside the mine, and a breakerman, a prop cutter, a carpenter and an engineer from among those employed outside.

The first meeting of the district and mine committees of districts 1, 2 and 3 was held on Wednesday, Jan. 13, at the Railroad Y. M. C. A., in Scranton, and that of the district and mine committees of district 4 convened at the Wilkes-Barre Y. M. C. A. on Friday, Jan. 15.

Frequent Meetings to Consider Many Suggestions

The mine committees will meet frequently, probably once a week, and their secretaries will send the notes of their meetings to the district committees. These will meet every two weeks and their secretaries will send their reports to the central committee which will meet monthly.

This coöperation between the officials and employees of the company is expected to have a markedly beneficial effect. The keys of the boxes in which the safety-first suggestions will be deposited are held by the central committee, so there is no danger of their being tampered with in transit and every suggestion will reach headquarters. The simple and more inexpensive plans will be handled by the local committees, and the more elaborate will be passed upon by the central committee.

Copies of the celebrated Lackawanna Safety-First book with photographic illustrations of the right and safe and the wrong and dangerous way to do everything in the mines have been furnished to every member of every committee.

The first joint meeting of the Central and District Safety-First Committees was held in Scranton on Jan. 4, and several homely sayings and aphorisms relating to safety were suggested.

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Christmas at the Company Store

The United Supply Co., of West Virginia, and the Union Supply Co., of Pennsylvania, subsidiaries of the United States Steel Corporation and its affiliated coal companies, dressed up a Santa Claus in all the 71 stores at the coal mines, and distributed candy to the children, in all giving away 22 tons. This was put up in appropriate Christmas boxes, and to it were added oranges, apples and nuts.

However, Santa, in these mining towns was divested of his recognized characteristic of secrecy, for he was escorted, at least in Gary, W. Va., by the village band. The store companies mentioned sell turkeys to every one at cost at both Thanksgiving and Christmas, and at Easter, eggs and chickens are likewise sold without profit.

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Anthracite Region Prosperous

At no time in its history has the anthracite region of Pennsylvania enjoyed such a period of peace and prosperity as that of the last ten years. Edward W. Parker says in his "Production of Coal in 1913" published by the United States Geological Survey that it requires no stretch of the imagination in order to believe the foregoing claim when the financial concessions made by the operators are taken into consideration.

The first of these was the establishment in 1901 of the summer discounts which have resulted in a marked increase in the number of days the employees have been able to work, and in the uniform distribution of the shipments throughout the twelve months of the year. From a minimum of 195 working days in 1906 the average has ranged as high as 257 in 1913, with a mean average for the last ten years of 220 days. In 1913, the railroad shipments reported to the Bureau of Anthracite Coal Statistics amounted to 69,069,628 long tons, of which 50.3 per cent. were sent out during the winter months and 49.7 per cent. in the summer months, thus distributing employment in the anthracite region evenly throughout the year.

Wage rates since 1902 have been advanced 21 per cent. (10 per cent. in 1902 and 10 per cent. more in 1912), and as the average working time in that decade exceeds that of the previous one by 23 per cent., it may be computed that the average yearly earnings in 1913 were nearly 45 per cent. more than before the spring reductions went into effect and before the strike of 1902 resulted in the first 10 per cent. advance in wages. Thus the mine workers are now getting both more work and more pay.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 23—The discussion of needed mining laws and legislation grows more and more interesting as it advances; and many important points have developed that should be given attention in the framing and revision of mining laws, in the different states. One point that is of great interest in Pennsylvania relates to the danger attending mining operations in oil and gas fields.

In Greene County, of this state, there are thousands of acres of virgin coal that are about to be developed. The fact that countless oil and gas wells penetrate the coal strata, in this section, makes the work of coal mining particularly hazardous. These wells are from 1500 to 2000 ft. in depth; and, since the Pittsburgh seam of coal outcrops on the western bank of the Monongahela River and dips west, there is absolutely no protection afforded against the entrance of gas through these well-holes into the mine workings when this coal is being developed.

In most cases, a 6- or 7-in. casing has been placed in a 12- or 14-in. drillhole, and a packer-ring, or something of the same nature, is supposed to have been placed around this casing, at the bottom, to prevent the gas from circulating about the outside of the pipe.

Discussing this matter with a life-long resident of the section, I was told that when oil was worth as much as $15 a barrel, many property owners would drill a hole on their land, which would yield from 2 to 3 bbl. of oil per day. As a rule, no casings were inserted into these holes. As oil became more plenty and the price fell, many of these private wells were abandoned, because the returns were insufficient to warrant their being maintained. In most instances, these wells have been forgotten and their location lost.

In the section of country to which I refer, there are two gas-bearing strata or sands, namely, the "Dunkard" and the "Big Injun." When boring for oil, it was necessary to bore through these strata. In boring for gas, in order to get a heavy flow, it was necessary to bore to the Big Injun stratum, no attention being paid to the gas coming from the Dunkard sands. I am informed that the gas pressure ranges from 20 to 50 lb. gage. That such a pressure of gas would prove a serious menace in mine workings to which they might gain access is certain. I am informed that one of these gas wells is supplying sufficient gas for use in an eight-room house.

I recall two instances where such wells were struck while driving rooms in the mine. This was due, in one instance, to an error of the mine foreman in locating the hole on the mine map; but, fortunately, this proved a dry well, having been plugged with cement. In the other instance, the trouble was due to an error of the engineer, who failed to record the location of the hole on the surface. In this case, although there was a heavy pressure of gas recorded in the casing, no gas was issuing from the hole when struck. Later, however, this hole gave considerable trouble from gas coming from the Dunkard sands, due to a faulty packer-ring.

It seems quite unreasonable to compel coal operators to leave a large reserve of, say 40 or 50 ft. of solid coal around each of these wells, instead of compelling the gas companies to take proper precautions when boring the holes, so as to prevent the escape of gas therefrom into the workings of a future mine. In my opinion, all abandoned gas or oil wells should be filled with cement so that it would completely surround the casing throughout the depth of the hole. I believe this would go far toward preventing serious disasters arising from the presence of these holes. I hope that this matter will receive the attention it demands at the hands of the law makers that the hazards of mining may be reduced.

D. W. S.

—————, Penn.

Letter No. 24—In discussing the question of mining laws, John Verner, in his Letter No. 16, COAL AGE, Jan. 2, p. 26, presents some very interesting facts in regard to interstate mines. Those who followed the discussion of the certificate law, in COAL AGE, something over a year ago, will recall that attention was drawn to similar conditions to those described by Mr. Verner.

The problem discussed at that time, however, did not relate to the workings of a single mine extending across the border into another state; but related to the certification of mine foremen in one state differing from that in a border state. Attention was drawn to the fact that a mine foreman holding a certificate in one state could not attempt to hold the same position in another state, by virtue of such certificate, even though the mines in question were of the same character and their workings were adjoining each other, in the same seam.

In my Letter No. 8, COAL AGE, Vol. 4, p. 988, discussing the certificate law, I suggested the *classification of mines*, and cited the attempt then being made in West Virginia to classify those mines as "nonhazardous," "hazardous" and "extra hazardous." In his Letter No. 14, COAL AGE, Jan. 2, p. 25, John Rose informs us that the mining laws of Tennessee provide for the examination of foremen in four separate classes, A, B, C and D. It seems to me that some such classification of *mines* should be made by Federal legislation, or by providing a uniform standard in the mining laws of the coal-producing states. In my opinion a similar classification should apply to all legislation relating to safety in mining. While I would not carry this classification to extremes, I believe that it should be so drawn as to make possible the proper safeguarding of life and property in and about mines, without imposing undue hardships on the operators, certified mine officials, or miners. I would suggest that such a classification should have reference to mines as being "gaseous," "nongaseous" or "dusty," and should specify with respect to the roof conditions as being "safe" or "treacherous."

I believe fully in uniform state examinations for the positions of mine foreman, fireboss, etc., and in a legal provision for a suitable interchange of certificates issued in different states. A foreman who is competent to take charge of a mine in *one* state is certainly competent to take charge of a mine presenting the same general conditions in *another* state.

I agree fully with Mr. Rose's suggestion that a foreman holding a certificate of *any* class should be permitted to act as assistant foreman in the next higher class. With Mr. Rose, I believe that this would give him an opportunity to gain the experience and training that would enable him to secure the higher certificate. Such a provision, by law, would in no way lower the standard of safety, as the responsibility and authority would still rest upon the foreman in charge.

I do not believe in lowering the standard of examinations for certificates of competency. The man who is to be held responsible for the safety of mine operations should be qualified for such position by education and training, and his character should stand the necessary test. The law should provide for the revocation of a certificate, in any position of responsibility, on sufficient proof of drunkenness, neglect of duty, or other act of incompetence.

In respect to interstate mines, I would suggest that state laws should provide for the inspection of the entire mine by one inspector only. I would place the whole mine under the jurisdiction of the inspector of the state in which the surface equipment of the mine is located. Where two inspectors of different states are obliged to coöperate in the inspection of the same mine, it would not always be possible to adjust matters as easily as was done in the case cited by Mr. Verner.

In closing, permit me to say that all the various phases of coal mining should be discussed at this time. I gladly welcome criticism or further comment on my suggestions. Legislators cannot be expected to be as familiar with mines and mining operations as those who are connected with the industry; and the purpose of Coal Age, in this discussion, I understand, is to put before law makers such a summary of the important needs and requirements as will enable them to act intelligently. To this end, the hearty coöperation of all practical men engaged in mining is solicited.

G. N. Lantz.

New Straitsville, Ohio.

Letter No. 25—In reading the interesting letters bearing on the question of mining laws and legislation, I am persuaded that, generally speaking, the present mining laws cover many important points; and that if these laws were strictly obeyed greater safety in mining would result. It is quite obvious to everyone, however, that there is a bad kink at present existing between the inspector, superintendent and mine foreman. In too many cases, the orders issued from the office fly off at a tangent, so to speak, and are absolutely lost before reaching their point of application.

As has been clearly shown, the position of mine foreman is, in too many instances, an anomalous one. Practically, this individual is 90 per cent. a company man and 10 per cent. a government agent. He is, in fact, a "bumping block" between the inspector and the company; and, in this respect, is admirably placed to act as receiver-general for knocks coming from both directions. The company is too prone to regard the mine foreman as the responsible party in respect to the compliance of mining operations with the mining law, while at the same time withholding from him their support and coöperation in this regard. Indeed, the ability of the foreman to successfully dodge an issue with the mine inspector makes him, too often, more valuable in the eyes of his superintendent.

As an illustration of the lack of support of and coöperation with the foreman, on the part of the company, in the matter of carrying out a mine inspector's orders, let me suggest a common instance, as follows: The mine inspector visits the mine, and, after making his examination, orders the mine foreman to make certain improvements to comply with the law. The improvements will necessitate an outlay of, say $200 or $300. The foreman appreciates the benefit to be derived therefrom and is as anxious as the inspector that the work be done at once. It is necessary, however, that the superintendent authorize the work before this can be done; and his comment on the inspector's order is, "We have too much deadwork expense on this pay, and we will let that matter go for the present." As a result, the inspector finds on his second visit that the work has not been done and threatens the foreman with prosecution if the order is not complied with immediately. This is a quite frequent occurrence at the present day.

While there has been much discussion of this knotty question, few remedies have been suggested for its amelioration. In order to stimulate thought along this line, I offer the following suggestion, in the hope that it may lead to a practical solution of the problem and prove a benefit to all concerned, particularly the mine foreman, who at present occupies an extremely nebulous position. The suggestion is as follows:

Mine inspectors' orders should always be written in duplicate, on properly prepared forms supplied to him by the government. Such orders should state, in clear, concise terms, the particular improvements required in order to comply with the law. The mine foreman should be required to read the order and sign his form in the presence of the inspector, thereby signifying that he fully understands what is required. The order, in duplicate form, and signed by the mine foreman, can then be handed by him to the superintendent to obtain his authorization that the work should be commenced and completed at a certain specified date. In case the work should not be accomplished in the time specified, it would then be possible to trace and fix the responsibility on the proper party. Such an arrangement, or a similar one, would certainly be fair and just to all; and anyone who would object to its adoption would probably stand watching.

I want to refer, here, to a similar condition as existing between the mine foreman and the miners in his charge. This condition is well illustrated by the instance cited in Letter No. 8, Coal Age, Dec. 12, p. 958. Referring to a fatal accident, the correspondent states as follows:

> It is claimed by the mine foreman that he directed the man, an hour before the accident occurred, to set props under the roof as it appeared to be unsafe. Having done this, he proceeded to inspect other working places and was so engaged when news reached him of the accident.

In this case it appears that the mine foreman was prosecuted by the mine inspector for not staying and seeing that his (the foreman's) orders were obeyed. The lesson taught by this instance is that, while the foreman probably instructed the miner, as he claimed, he had no proof that he had given the order to set the props, and merely made this claim to shield himself from any apparent neglect of duty on his part.

The general adoption of some form of compensation law in most of the coal-mining states, today, makes it more necessary than ever that mining laws should be so written as to fix the responsibility for neglect of duty as well as for any accident, on the proper party. In the case cited, if the mine foreman gave the order and the accident occurred after a reasonable time for the work to have been done by the miner, the responsibility clearly rests on the victim of the accident. On the other hand, if no order had been given by the mine foreman, the responsibility for the accident clearly rests on that official.

In order to avoid the quandary and fix the responsibility in such cases, I would suggest that all orders of the mine foreman should be delivered in writing to the miner, the order to specify the time of the day and the date when given, and be nailed to a post in the miner's room, after being signed by the miner himself. The law should fix a penalty for the removal of such an order from the post by any unauthorized persons. This would provide the necessary evidence required to fix the responsibility of a possible accident that might occur as a result of the neglect of a miner to comply immediately with the orders of his foreman.

I believe, also, that the time will come when, in order to secure the greatest immunity from accident, due to explosions of gas and dust in mines, a law will be placed on the statute books of all coal-producing states, prohibiting the use of open lights in *all* mines. While I realize that a host of mining men would oppose such an enactment, I am fully convinced that every intelligent mining man should favor such a law.

SUPERINTENDENT.

Pittsburgh, Penn.

The Foreigner in Mining

Letter No. 14—My special attention was drawn to Letter No. 13 in the recent discussion of The Foreigner in Mining, COAL AGE, Jan. 16, p. 137. There has been much talk over this subject, with the result that the coal operator or the officer in charge begins to feel that, in the future, a foreign miner or laborer will be of better value to him than an American-born miner, because he does more labor for less money, and as writer Mr. Wesvania points out this class should be Americanized and become good citizens and they would be better workers.

But this seems to be a hard problem to solve, because naturalization laws require an applicant for citizenship to live in one place for five years and to furnish witnesses that have known him for five years. My personal experience is like that in Letter No. 12, and it is a fact that foreigners are not treated in the same manner as American-born miners. For example, Johnny got wet place in mine, and hard push-cars; boss come in his room for inspection; Johnny complains that he cannot make enough to feed his family; boss make promises that whenever he finishes his room he will give him a good, dry place. So Johnny is compelled to work in the wet place and got less cars than his American fellow workmen. Then he put up a kick that he was not given an equal turn by the drivers; and result was that a driver called him a "Hunkey" and told him to "shut up or move out." It was different with Willie. He came and got the job. Boss took him to Johnny's place and advised him how he could do with this place, and gave him 50c. yardage and a free turn.

In my own case I had spent my money for two patents (U. S. A. and Canada) and became penniless. In the mine, I was treated same as Johnny; and appeared before the superintendent and asked him to give me just enough to keep my family. I showed him that boys from town were working every day while those in company houses are left behind and only get work enough to pay rent. So they feel that they are not treated as American labor.

The writer of Letter No. 13 says that "many foreigners come to this country for the purpose of making easy money in a short time," and "are sending this home to pay for the farm." That is a fact; but he fails to show *why* they come in such numbers that every mining camp is so crowded, in nearly every state. It is because they do not feel *free* in their native country; and so they are forced to seek freedom, liberty and higher wages for their labor here. Back home every able man is paid for his day's work (from sunrise to sunset) about 2 kronen and 40 fillers (48c.), which is the highest wages, and only paid on farms, during the summertime. Many coal operators employ these men in the mines, as low-class labor; but they are always willing and able, and work in good faith. Education is needed; but how?

About 50 per cent. of all foreign miners have properties and families or parents in the old country, and they are just waiting for the war to cease to bring them over. The other half would gladly become Americanized if they could do so according to law. One thing is true and that is our men (foreigners) do not enjoy the short-day work (8-hour day). Further, if you want to make them progress in education, you must clear the mining camps from booze and forbid to ship any intoxicating drink, and you will find that every wheel will be running right. Also, foreigners don't look to furnishing their homes elegantly, but they enjoy good meals and common, cheap clothing, with the intention of saving money for old age. I will gladly give more facts, if desired, as I am well acquainted with all this class of my countrymen and know their habits in every respect.

JOHN MAJER.

Garrett, Penn.

Letter No. 15—In his Letter No. 11, COAL AGE, Jan. 2, p. 27, Charlton Dixon, either deliberately or unwittingly, misapplies my reasoning in the analysis I offered of the character of the class of foreigners coming to America. Mr. Dixon styles my reasoning as being *"a priori,"* or from cause to effect, instead of *analytical* or from effect to cause.

I have stated, as a fact derived from years of personal intercourse and study, that Latin-Europeans are, as a class, morally perverted. This is an effect. In the study of probable causes, I find that mal-government and mal-instruction are both productive of moral perversion; and, therefore, conclude that the Latin-European has been subject to these influences, which have formed his character.

The same conclusion could also be reached by reasoning *a priori* from the same cause. As long as the foreigner is subjected to mal-government and mal-instruction, so long will he remain in the same moral condition. Since such a cause does not align with the principles of

American society or American citizenship, it is immaterial to the truth of this proposition whether the effect be the direct or indirect result of the cause; it proves the conclusion.

Mr. Dixon's intimation that my statements are inimical to the foreigner is true only in the sense that the physician's diagnosis is inimical to his patient. If to express a vital truth be *inimical*, to be silent would be *criminal*.

In support of his statement that the foreigner becomes as good a coal miner as the American miner of 25 or 30 years ago, Mr. Dixon quotes the enormous coal production of the present time. He seems to forget that coal mining was then, practically, an industry of manual labor and personal skill on the part of the workman; while today it has become a mechanical industry in which the workman is regarded as a part only, but not a very essential part, of the machine; and the present time does not, therefore, offer the same opportunity for the development of skilled miners.

Mr. Dixon's reference to the "industrial supremacy" of this country being so dependent on foreign labor is no doubt highly flattering to that class; but would it not be more pertinent to ask, what are we going to do with the foreigner? If the proper answer to this question is not found it may soon be necessary to ask, what will these foreigners do with us?

In reference to my "recanting" when I say that the foreigner "is still capable of mental education," I would remind Mr. Dixon that the education of which I consider the foreigner incapable is that of his perverted moral nature. Education may be mental, moral, or physical, all of which are necessary to the full development of man.

In his closing remarks, Mr. Dixon claims to see, in the loyalty displayed by many foreigners now returning to the defense of their homeland, "excellent material with which to make good American citizens." This loyalty of the foreigner is exhibited with respect to foreign institutions; but to become an American citizen, he must forswear allegiance to all foreign potentates and take oath to support the Constitution of the United States which, by that act, he adopts as his own, together with the institutions that the Constitution considers sacred. From Mr. Dixon's previous arguments, one is forced to conclude that this loyalty of the foreigner is demonstrated in support of the very principles that he is supposed to have found unbearable in his own country—and this after enjoying years of the blessings of American freedom. I would ask, Do these facts reveal the foreigner as an element for absorption into American social and political life?

I. C. Parfitt.

Jerome, Penn.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

This principle known as the **law of tangents** can always be applied when one angle and the including sides are given, to find the remaining angles and side of a triangle.

Example—Given, in a triangle, a = 300 ft., b = 500 ft. and C = 120 deg.; to find A, B and c.

Solution—The two unknown angles are first found by applying the law of tangents to find their half difference, which added to their half sum will give the greater; or subtracted from their half sum will give the lesser of the two angles. In this case, since b is greater than a; the angle B is greater than the angle A; and we have

$$\begin{aligned} Tan\ \tfrac{1}{2}(B - A) &= \frac{b - a}{b + a}\ tan\ \tfrac{1}{2}(B + A) \\ &= \frac{500 - 300}{500 + 300}\ tan\ \tfrac{1}{2}(180° - 120°) = \frac{200}{800}\ tan\ 30° \\ &= \frac{1}{4} \times 0.57735 = 0.14434 \end{aligned}$$

and ½ (B — A) = 8° 13′. Then, since ½ (B + A) = 30 deg.,

$$B = 30° 00' + 8° 13' = 38° 13'$$
$$A = 30° 00' - 8° 13' = 21° 47'$$

Then, applying the law of sines, to find c, remembering that sin 120° = sin 60° = 0.866,

$$c = \frac{sin\ C}{sin\ B} \times b = \frac{sin\ 120°}{sin\ 38° 13'} \times 500 = \frac{0.866 \times 500}{0.6186} = 700\ ft.$$

2. The principle known as the **law of cosines** can, also, be applied, in the solution of triangles when one angle and the including sides are given, to find the remaining parts. This principle is expressed by the formula

$$a = \sqrt{b^2 + c^2 - 2\ bc\ cos\ A}$$

In applying this formula, the letters can be changed correspondingly to conform to any given case. Thus, in the last example where a = 300 ft., b = 500 ft. and C = 120 deg.; and it is required to find c, A and B, we have the following:

Solution—Here, C = 120 deg.; and cos 120° = —cos 60° = —0.5; hence,

$$\begin{aligned} c &= \sqrt{a^2 + b^2 - 2ab\ cos\ C} \\ &= \sqrt{300^2 + 500^2 - 2 \times 300 \times 500\ (-0.5)} = \sqrt{490{,}000} = 700\ ft. \end{aligned}$$

Then, applying the law of sines to find the angles A and B,

$$Sin\ A = \frac{a}{c}\ sin\ C = \frac{300}{700} \times 0.866 = \frac{3 \times 0.866}{7} = 0.3711$$

and A = 21° 47′. Then, since A + B = 180 — 120 = 60°,

$$B = 60° 00' - 21° 47' = 38° 13'$$

3. There is still a third method of solution that applies when one angle and the including sides of a triangle are known. This method embraces the three circular functions, sine, cosine and tangent; and may be styled the **law of circular functions.** It is expressed by the formula

$$Tan\ A = \frac{a\ sin\ C}{b - a\ cos\ C}$$

As before, the letters of this formula can be changed correspondingly, giving the following:

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Solution—Given a = 300 ft., b = 500 ft. and C = 120 deg.; sin 120° = sin 60° = 0.866; and cos 120° = —cos 60° = —0.5; and substituting these values in the last formula, we have

$$Tan\ A = \frac{a\ sin\ C}{b - a\ cos\ C} = \frac{300 \times 0.866}{500 - 300\ (-0.5)} = \frac{259.8}{650} = 0.3997$$

and A = 21° 47′. Then, as before, B = 60° 00′ — 21° 47′ = 38° 13′.

The remaining side c is then found by applying the law of sines, as previously explained.

Case 4—When the three sides of the triangle are given, to find the three respective angles, it is only necessary to apply the law of cosines, solving the formula previously given so as to express the value of the angle A, in terms of the sides a, b, c; thus,

$$Cos\ A = \frac{b^2 + c^2 - a^2}{2\ bc}$$

Example—Taking the same triangle as in Case 3, the three sides are given as follows a = 300 ft., b = 500 ft. and c = 700 ft.; the angles A, B, C are found thus:

Solution—Substituting the given values in the last formula given above,

$$Cos\ A = \frac{b^2 + c^2 - a^2}{2\ bc} = \frac{500^2 + 700^2 - 300^2}{2\ (500 \times 700)} = 0.92857;\quad A = 21° 47'$$
$$Cos\ B = \frac{a^2 + c^2 - b^2}{2\ ac} = \frac{300^2 + 700^2 - 500^2}{2\ (300 \times 700)} = 0.78570;\quad B = 38° 13'$$
$$Cos\ C = \frac{a^2 + b^2 - c^2}{2\ ab} = \frac{300^2 + 500^2 - 700^2}{2\ (300 \times 500)} = -0.5;\quad C = 120°$$

Or, having found two angles, as A and B, the remaining angle C can be found by subtracting their sum from 180 deg.

$$C = 180° - (21° 47' + 38° 13') = 120°$$

Case 5—When two parts of a **right triangle** are known, other than the right angle (90°), the remaining parts are found by applying the following principles or formulas:

1. The square of the hypotenuse is equal to the sum of the squares of the two sides (altitude and base).

Let a = altitude, b = base and c = hypotenuse; then,

$$a^2 + b^2 = c^2$$
$$a = \sqrt{c^2 - b^2}$$

2. The laws of sines, cosines and tangents all apply to right triangles; but it is important to remember that, since C = 90 deg., sin C = 1; and cos C = 0. Also, since A + B = 90, tan ½ (A + B) = tan 45° = 1.

By the **law of sines,** $a = c\ sin\ A$
$b = c\ sin\ B$

By the **law of cosines,** $a = c\ cos\ B$
$b = c\ cos\ A$

By the **law of circular functions,** $a = b\ tan\ A$
$b = a\ tan\ B$

By the **law of tangents.** $tan\ \tfrac{1}{2}(A - B) = \frac{a - b}{a + b}$

Inquiries of General Interest

The Formation of a Flame Cap

I was much interested in the answer given to the inquiry in regard to the formation of a flame cap, Coal Age, Dec. 12, p. 961. It seems to me, however, that this question, in its relation to the detection of gas in mines, by means of safety lamps, will warrant a yet further investigation.

It has long been known that a certain type of safety lamp, burning gasoline, will generally show a very distinct cap even when burning in pure air containing no gas; and it is practically impossible to distinguish this cap from one formed by the presence of marsh gas (CH_4) in the air surrounding the lamp. I may say that it would require an acute observer and one having a remarkably good eyesight to distinguish between the cap formed on the flame of such a lamp burning in pure air, and the cap formed on a lamp burning ordinary sperm or cottonseed oil, when placed in air containing a small percentage of marsh gas or in the gaseous mixtures commonly found in mines.

It has been suggested that, in some cases, possibly, a rather slack wick or a defective stopper in the lamp may be responsible for an excessive evaporation of the gasoline contained in the lamp. It is my experience, however, that even when using a lamp that is in perfect condition, the cap to which I have referred is plainly in evidence; and, I believe there is no doubt that this cap has, in many instances, been mistaken for a cap produced by the presence of gas in the mine air.

I would suggest that a comparative analysis of gasoline vapor and marsh gas or methane (CH_4), together with gaseous mixtures containing other hydrocarbon gases, such as olefiant gas (C_2H_4), which is frequently found in mines, associated with marsh gas, would be both interesting and instructive to Coal Age readers. It would be interesting to know the specific gravities, temperatures of ignition, color and appearance of the flame caps, together with the composition of such mixtures as are commonly found in coal mines.

W. H. Moore.

Nanaimo, B. C., Can.

Attention has been frequently drawn, in Coal Age, to the fact that any lamp burning a highly volatile oil is not a good lamp for testing for gas, owing to the ready volatilization of the oil, which is greater as the lamp heats in gas. The following quotation, referring to the use of a bonneted lamp burning volatile oil, for testing for gas, is taken from Coal Age, Vol. 1, p. 619:

> The lamp is not a good testing lamp, for several reasons, namely, the lamp is bonneted, which fact together with the vaporous oil burned modifies, at times, the atmosphere in the combustion chamber, so that it does not truly represent the gaseous condition of the outside air. The lamp heats readily in gas, the oil volatilizes more quickly, and the lamp gives higher indications than it should, after being exposed to gas a short time. The lamp flame is easily extinguished and when relighted, after a short period of extinction, the lamp may flash or pass flame.

The evaporation of the volatile oil from the wick of the lamp cannot be prevented and varies with the temperature of the lamp. As is well known, a testing lamp exposed to gas for a short time frequently becomes so heated that it cannot be held in the hands with comfort. Under these conditions, a lamp burning volatile oil will give a higher indication than a lamp burning an ordinary nonvolatile oil. As stated by correspondent, such a lamp frequently exhibits a clearly discernible cap when burning in pure air, owing to the oil vaporized in the combustion chamber.

Another quotation from Coal Age, Vol. 3, p. 816, giving the essential features of a good safety lamp for testing for gas in mines reads as follows:

> A pure sperm or cottonseed oil is better adapted for testing than a volatile oil, because the latter volatilizes more rapidly as the lamp heats in gas, and gives unreliable results in testing.

In regard to a comparative analysis of gasoline vapor, methane and other hydrocarbon gases and gaseous mixtures, it may be stated that these mixtures commonly found in mines consist chiefly of methane and variable quantities of olefiant gas (ethene, C_2H_4), carbon dioxide (CO_2) and possibly slight quantities of carbon monoxide (CO), due to the presence of fine dust floating in the air and which is converted into this gas, in contact with the flame.

The flame cap produced by methane, in the absence of other gases, is a pale blue cap that is difficult to discern when a small percentage of the gas is present; but which becomes plainly visible when the proportion of gas reaches 2.5 per cent.

The presence of even a small percentage of olefiant gas, associated with the methane, increases the luminosity of the cap and renders it more readily discernible. Larger percentages of olefiant gas, when present, render the flame somewhat unsteady, due to the presence of the gas increasing the explosive condition of the mine air. When fine dust is present in the air its conversion into carbon monoxide (CO) lengthens both the flame and its cap, owing to the increase of the heat of the combustion and the temperature of the flame. Because of these variable conditions, due to the varying composition of the gaseous mixtures in mines, the comparative analyses of gasoline vapor and the gaseous mixtures found in mines would have only a suggestive value, by indicating the relative effect that these gases have on the lamp flame, which effect we have just explained in general terms.

The average specific gravity of gasoline, which is a product of the distillation of petroleum, may be taken as 0.70 (Coal Age, Aug. 29, p. 356). The vapor of gasoline flashes or takes fire, in contact with flame, when the gasoline has a temperature that is considerably below zero (Fahr.). The average composition of gasoline may be assumed as: carbon, 85 per cent., by weight, and hydrogen, 15 per cent., with less than 1 per cent. of water vapor. The calorific power or heat value of gasoline is practically 20,000 B.t.u. per lb., as compared with 23,500 B.t.u. for methane, assuming complete combustion.

Examination Questions

Alberta, Canada, Examination for First-Class Certificates, Held June 23-25, 1914

(Selected Questions, Continued from Last Week)

Ques.—It becomes necessary to wall off a gob fire; and, to do so effectively, several working places have to be included in the area affected by the stoppings. By what means would you ascertain when the stoppings could be removed? What dangers would you guard against in removing them?

Ans.—Assuming that the stoppings have been well built and sealed, careful tests should be made, from time to time, to ascertain the condition of the air within the inclosure. To provide for doing this, pipes should be built into the stoppings near the intake and return ends, respectively. Such pipes, for testing the air, are placed near the roof. It is customary also to leave another pipe at the bottom, to drain the area. These pipes are supplied with stop-cocks. To test the air behind the stopping, the stop-cock in the pipe close to the roof is opened and the air flowing therefrom tested with a safety lamp. Evidence that fire still exists within the inclosed area may be found by cautiously sniffing the air coming from the pipe. The temperature of the air should also be taken, as evidence of the progress made in the extinction of the fire.

Great precaution is required in the removal of stoppings, under these conditions. First, a small hole should be made in the stopping at the return end of the section; and time should be given for the air pressure to adjust itself within the inclosure. Only safety lamps should be used when performing this work. The hole in the stopping may then be enlarged sufficiently to permit of a good circulation of air through the opening. A small hole should now be made in the stopping at the intake end, and time should be given for the air entering this opening to create a circulation through the inclosure. The results should be carefully watched at the return end, by making frequent tests at this point with a safety lamp. Upon observing any indication of increase of temperature or other evidence of fire within the area, the intake stopping should be promptly closed, and the stopping at the return end rebuilt and more time allowed for the extinction of the fire.

Ques.—During rescue work underground, after an explosion, a rescue party wearing breathing apparatus and on returning along a roadway that was previously clear of gas, finds that it contains a considerable percentage of carbon monoxide (CO). How do you account for this and what instructions will you give to guard against disaster from this source?

Ans.—Assuming that the previous observations showing the entry to be clear of gas were carefully made, the presence of carbon monoxide observed in this entry, on the return of the rescue party, can only be accounted for on the ground that this gas was accumulated in one of the rooms, or has been generated since by a gob fire in some adjoining workings and had escaped the notice of the rescuers on their trip inby.

To guard against such danger, it will be necessary to make a more thorough investigation when passing into the mine. When going in, the rescue party should not close any door after passing through the same, unless the section of the mine in which the ventilation is controlled by such door has already been explored and found to be safe and free from gas. By closing such a door affecting the ventilation of an unexplored section, the rescue party endanger their own lives, since the gas from that section will then be forced out upon them.

Ques.—Of what value are regular readings and records of the barometer and thermometer? Under what conditions are readings of the hygrometer of value? If a barometer, at a mine, registers an average of 27 in., what would be the approximate elevation above sea level and the atmospheric pressure, in pounds per square inch?

Ans.—Regular barometer readings, in connection with mining operations, are important in respect to their indicating the expansive effect produced on the mine air, which expansion always accompanies a sudden fall of the barometer or decrease of atmospheric pressure. As a result of this, the air and gases confined in large abandoned areas are forced out into the live workings, causing the explosive condition of the mine air to be considerably increased for a time.

Regular readings of the thermometer taken inside and outside of the mine are important as showing a greater or less capacity of the air for carrying moisture or absorbing moisture from the mine. Hygrometer readings are of greatest value in a dry and dusty mine. They show the relative humidity of the mine air and thus indicate its capacity for absorbing moisture from the mine and rendering it dry and dusty. A surface reading of 27 in. of mercury corresponds, under normal atmospheric conditions, to an elevation of 2800 ft. above sea level. The corresponding atmospheric pressure is $27 \times 0.491 = 13.257$ lb. per sq.in.

Ques.—The underground workings of a mine are divided into three districts, each district being ventilated by a separate split of air. If the resistance to the passage of air in each split is unequal, describe fully by what means you would provide an equal quantity of air for each district.

Ans.—Assuming that the resisting powers of the several splits are unequal, to obtain an equal distribution of air between them, it will be necessary to introduce regulators to control the circulation in two of these splits. By adjusting the openings or areas of passage through these regulators, it is possible to produce an equal distribution of the air in the several splits. For this purpose, either the box regulator or the door regulator can be used. The former is generally located on the back entry near its mouth; while the latter is always located at the intake end of the split. The regulator, in either case, should be so arranged as not to interfere with the haulage of the coal.

Coal and Coke News

Harrisburg, Penn.

Although he did not refer directly to either the agitation for better surface protection in the anthracite coal region or the litigation now before the courts relative to a tax on anthracite coal, provided by the Roney bill, Governor Martin G. Brumbaugh, in the course of his inaugural address delivered on Jan. 19, intimated strongly that he favors both for the people of the anthracite region of the state. His language cannot be misconstrued, especially when he said:

> Once Pennsylvania was rich in natural resources and unequaled in beauty. Much of its wealth has been taken from it. Much yet remains. It has passed to private and corporate agencies. They have rights that must be respected. So also have the people of the state a claim upon these great natural assets. In their marketing the commonwealth plays an important part. In the returns the people ought to have a share. A reasonable tax upon our great natural resources as they flow to our markets is both fair and wise.

On the matter of surface safety, the governor's message says that, after all the people are the great asset of the commonwealth. "That they may be safeguarded in their health, their education, their homes, their worship, their property, their regulated freedom, their toil, should be our constant endeavor."

The appointment of Francis Shunk Brown as attorney general is important to the coal industry in connection with the fight on the Roney anthracite tax act, as he is one of the men who drafted that measure.

Judging from the personnel of the Senate and House mines and mining committees the outlook for legislation in the interest of the anthracite workingman is not particularly bright. No members from the anthracite region hold places on this committee. The House chairman is Mr. Hess, of Lancaster County, and the Senate chairman is Mr. Thompson, from the bituminous region.

In the 1913 session every bill affecting anthracite miners that was introduced in the House saw the light of day and was either defeated on the floor of that branch or killed by the Senate committee. To prevent a repetition of this is evidently the intention of the House leaders, and the committee will not, under any circumstances, promiscuously release all bills referred to it.

The Question of Taxes

State taxes on real estate, on bituminous coal, gas, oil and gasoline are being considered by some of the legislators as a means of making up the deficiency in the state revenues for the next two years. The adjudication of the anthracite tax will take months, and practically $5,000,000 to $6,000,000 in state funds are already tied up. It was contended in the Dauphin County Court that the anthracite tax was unconstitutional as class legislation, and it is likely that the present legislature will pass a bill placing a tax on bituminous coal.

This action would be in keeping with the recommendations of the Tax Commission two years ago. Francis Shunk Brown, now attorney general, was counsel for the commission which recommended a state tax on anthracite, and suggested also taxing bituminous coal, natural gas and oil. It recommended a commission to consist of Pennsylvania, Ohio and West Virginia men, and a resolution carrying out this suggestion was passed by the Pennsylvania Legislature of 1913, but the other states never took action.

The present legislature cannot appropriate within $17,000,000 of what the 1913 session did unless the State Treasury balance is to be endangered, but it is known that Governor Brumbaugh wants to carry out many governmental projects that will run the appropriations high, and also he is desirous of carrying out a comprehensive road building program. The appropriations two years ago exceeded $66,000,000.

The failure of the people to pass the $50,000,000 road bond issue in 1913 left the state with its 10,200 miles of highways on hand and only the ordinary revenues with which to build roads. Governor Brumbaugh, in his inaugural message, said it might as well be admitted that it was a mistake to take over so many miles of roads before it was certain the bond issue would be provided.

A return to a state tax on real estate would be met with considerable opposition. The Governor's views on the subject are not known as yet. But it is conceded that the state cannot lay a heavier burden upon the corporations, which now furnish most of the state's revenues. Members of the legislature here this week were of the opinion that a land tax, if levied, would provide sufficient funds for the carrying out of a comprehensive road building scheme. A state tax of ¼ or ½ of a mill on the assessed valuation of all real estate assessed for taxable purposes would bring into the treasury sufficient funds, it has been suggested. In 1913 the assessed valuation of the state's realty was $5,867,775,686 and a ¼ mill tax would raise $1,467,000.

The matter is receiving considerable thought from the members of the senate, especially, and it will be placed squarely before the Governor soon.

PENNSYLVANIA

Anthracite

Shenandoah—While five men were repairing a throttle on a high pressure steam line at the Cambridge Coal Co.'s breaker engine house on Jan. 21, a heavy steam pipe carrying 150 lb. pressure burst, catching the men in the volume of steam and scalding water, hurling them in all directions, blowing the sides out of the engine house and wrecking part of the breaker and probably fatally injuring three men.

West Pittston—Schooley shaft, that part of the Pennsylvania Coal Co. on the west side of the Susquehanna River, is rapidly being placed in shape to mine the entire output. A new washer has just been completed and this will be used to prepare the coal in the adjoining bank that it may be used for fuel for the boilers which are used there.

Shamokin—Ten inches of snow fell here on Jan. 23, blocking railroads and collieries. A number of the latter were abandoned for the day. Several hours after the snow a heavy rain started, continuing most of the day. By night there was more snow. Water flowed into a number of the mines in such quantities that a score of operations are badly flooded, and it is feared some will be idle for a lengthy period.

Wilkes-Barre—At a meeting of the Wilkes-Barre District Mining Institute, held on Jan. 21, the date for the big mining institute dinner, which will be held May 5, at Irem Temple, was announced and a committee on program for that event was named as follows: Charles Enzian, J. J. McCarthy and R. P. Thomas. The directors all agreed to visit the mining school at the Y. M. C. A. and talk to the students when they find it convenient.

Bituminous

Uniontown—Announcements were made recently by the W. J. Rainey Coke Co. of a reduction of 7 per cent. in the wages of employees. The firm thus returns to the scale of 1910. The cut affects 5000 employees at 11 plants.

Connellsville—The production of coke in the Connellsville region is now slightly over 200,000 tons per week, with shipments slightly less than the production. A considerable quantity of stock coke was recently moved out of the region, however.

The sixth annual banquet of the Keystone Mining Institute will be held Saturday evening, Feb. 6, with prominent mining men from all parts of the state attending.

On Jan. 25, 15,000 employees at the 68 plants of the H. C. Frick Coke Co. were placed at work on full time. For many months these plants have been operating four days or less per week. Officials of the company refuse to state whether the full time will continue or otherwise. The output of the company will be increased approximately 25 per cent. It is believed, however, that the officials of this firm anticipate a general revival in the coke trade within the next few weeks.

Pittsburgh—The date for the sale of the property of the Pittsburgh-Buffalo Co. has been fixed for May 27. The holdings of this firm consist of five separate mines, which will be sold separately. Foreclosure proceedings were entered against the Pittsburgh-Buffalo Co. by the Union Trust Co. some time ago, the latter firm holding mortgages on the coal property, which with accrued interest amounted to nearly $4,000,000. Stockholders of the coal company objected to the immediate sale of the holdings, claiming that this would be prejudicial to the interest of the unsecured creditors, and the court was asked to withhold the sale until a later date, as it would then be possible to secure a better price for the property

Ralphton—The output of the seven mines of the Quemahoning Coal Co. for the year 1914, in spite of the slump in the trade and other handicaps was 630,000 tons, according to the report just completed by State Mine Inspector F. W. Cunningham. Five of the company's mines are at Ralphton, one at Rockwood and one at Husband. Coal orders received thus far this year indicate that the business of the company in 1915 will be fully up to the standard.

WEST VIRGINIA

Charleston—A deal which concerns a large part of the output of the New River Coal Co. has been reported whereby the New England Coal & Coke Co. secures an important tonnage from the mines located in the New River district. This signifies that the coal company will sell a large portion of its coal, or all of that shipped to the New England states to the New England Coal & Coke Co. for a period of years. This coal has heretofore been sold under contract to the Darrow-Cann Co. of Boston. It is said that the output involved exceeds 2,000,000 tons per year.

Huntington—Earle A. Henry, chief of the State Department of Mines, has given out the information that while the business depression made large reductions in the coal production of other states, it merely retarded the growth of the industry in West Virginia. The output for the calendar year amounted to 72,800,000 short tons, while the coke produced was 1,600,000 tons, approximately 1,344,000 short tons of coal were used in the mine operations, 896,000 tons were furnished to the local trade and tenants, and 3,136,000 tons were used in coke ovens, and approximately 67,200,000 tons were shipped from the mines, at least $\frac{9}{10}$ of which went to points outside of the state. Exclusive of foremen, office employees, store clerks, etc., 78,000 men were employed in and around the mines of the state, and 5500 mules, together with 1000 horses and 1700 locomotives, were employed for haulage. During the year about 20 new mine fans were installed, 30 new tipples were constructed, 600 new mine cars were purchased, and 400 new dwellings built. Reports indicate that there were at least 100 mines closed by reason of the depression in business, while about 75 more were in early stages of development. These figures are not final, but are based on information available at the present time.

ALABAMA

Birmingham—The remaining physical property of the bankrupt Oak Leaf Coal Co. was sold a short time ago for $4643.38, and the sale approved by E. H. Dryer, referee in bankruptcy. W. G. Lunsford and J. S. Shannon, the purchasers, announce that they will organize a new company and begin operations within 30 days. It is understood that they have also obtained the land and mineral rights.

Seeking to recover the amount of commissary license alleged to have been wrongfully collected in 1911, William Bibby, a well known coal operator of Littleton, Ala., has called a meeting of all commissary owners and managers throughout the state to join in a movement to have the money refunded through the present legislature. The commissary license act was passed four years ago. Some of the larger corporations owning commissaries paid the license under protest, and as the act was later declared unconstitutional, the money was refunded. Mr. Bibby states that a great number paid the license without protest and as the money had passed out of the hands of the probate judge and had been distributed to the county and state, nothing but an act of the legislature will enable them to recover the amount of license paid, amounting approximately to $10,000.

KENTUCKY

Greenville—Muhlenberg County operators and miners for the time being are enjoying a season of good cheer, as every mine in the county is working, with almost full time prevailing. The output is being moved out as fast as it is produced. There is little definite information as to how long the activity will continue but the people of the county are making hay while the sun shines.

OHIO

Salem—J. H. Steffel, who purchased the Ely Bros. mine last October, has filed an assignment for the benefit of his creditors and appraisers have been named to value the coal property.

Columbus—J. M. Roan, Ohio chief deputy and safety commissioner of mines, in his second bulletin for the year shows the serious injury of a miner through the careless use of calcium carbide for lamps and as a result makes an order calling upon all mine bosses and superintendents to enforce the law governing the use of this illuminant. The law provides that only sufficient calcium carbide shall be taken into a mine to supply the lamp for one day and this supply shall be kept in an airtight container.

INDIANA

Indianapolis—The Indiana Public Service Commission has approved a rate of 50c. a ton for coal shipments over the Chicago & Eastern Illinois R.R., from Brazil to Indianapolis. The road is not required to readjust its rates from intermediate points. The order opens up additional fields for the Indianapolis coal supply and puts the C. & E. I. on an equal basis with the Big Four and Vandalia in hauling coal to Indianapolis.

Cannelton—The American Cannel Coal Co. has closed a contract with the municipal electric light and power plant to furnish current for operating its mines, about two miles from the city. Under the terms of the contract the expense of installing the poles and wires will be divided while the company has bound itself to use current to a minimum amount of $500 a year.

ILLINOIS

Hillsboro—Sheriff Wheeler, of Sangamon County has advertised for sale the properties of the Illinois Colliery Co., to satisfy a judgment in favor of the Pittsburgh Coal Co. This sale will be held in Springfield, Feb. 4. The property to be sold includes the Litchfield coal mine with 10 acres of surface and 225 acres of coal rights, also 11,300 acres of coal rights around Waggoner lying in Montgomery and Macoupin Counties.

Virden—Fire on Jan. 21 destroyed the engine, boiler, and dynamo rooms of the Montour Coal Co., entailing a loss of about $25,000. Two hundred and fifty miners are affected by enforced idleness.

Murphysboro—The Harrison mine of the Big Muddy Coal & Iron Co. is being dismantled after 40 years of service. This is the oldest producing mine in all southern Illinois, and at the time of its abandonment was getting out from 800 to 1000 tons per day. On account of working into the out-crop and the exhaustion of most of its acreage, the cost of production became so high that it was decided to abandon the mine. The remaining acreage will be worked from the No. 9 mine on the east side of the Big Muddy River, and tunneling is now in progress under the river bed to reach this coal, which lies at a depth of 165 ft. below the surface. Judging from the remaining acreage in the Big Muddy field, it is likely that in the next 10 or 15 years this body of coal will be entirely worked out and the field abandoned.

MINNESOTA

Warroad—Analysis of samples of coal secured while digging a well here and sent to the State University for analysis show the material to be a high grade lignite, said to be superior to that found in North Dakota. The coal measure was about 14 ft. in thickness. Although it is believed that another measure underlies the first, the present deposits are considered to be sufficient to be a paying proposition, and many people are watching the work of the well drillers.

OKLAHOMA

Alderson—The Rock Island Coal Mining Co., 139 West Van Buren St., Chicago, has sunk a new shaft at this point in the center of the Alderson coal basin and reached the well known McAlester vein of 4½-ft. thickness at a depth of approximately 804 ft. This is expected to be one of the most modern, up-to-date plants in the Southwestern coal fields, and will be equipped with steel tipple, washery, picking tables, box car loaders, and the latest equipment. A daily output of 1000 tons is planned.

Hartshorne—The Rock Island Coal Mining Co. has sunk a new shaft near here which will be known as Mine No. 10, to penetrate the Lower Hartshorne vein. This reached the coal of 4 ft. 2 in. thickness at a depth of 595 ft. A wooden tipple is temporarily being used until the underground workings are fully developed, when a steel structure will be erected. It is expected that the company will award contracts for the steel tipple and other machinery and equipment required at this new mine some time early in the spring of 1916, the permanent plant to be operated by electricity.

PERSONALS

D. H. McGee has taken charge of the Buffalo office of W. A. Stone & Co., coming from the home office at Uniontown, Penn.

The Retail Coal Dealers of Birmingham, Ala., recently met and elected the following officers for 1915: Asa L. Hoyt, president; J. E. Hawkins, vice-president; M. G. Guggenheim, secretary-treasurer.

A. D. Macfarlane, chief engineer and assistant manager for the receiver of the LaFollette Coal, Iron & Ry. Co., is on a visit for a week at Kingston, Penn., the home of his father, who is quite ill.

N. Bowland, formerly advertising manager of the Buffalo Forge Co., and more recently of the Duff Mfg. Co., has just accepted a position as advertising manager of the A. W. Byers Co., of Pittsburgh, Penn.

Edward H. Coxe, of LaFollette, Tenn., former manager of operations for the receiver of the LaFollette Coal, Iron & Ry. Co., will move to Knoxville, Tenn., Feb. 1. His address there will be "The Marion."

J. M. Page, until recently superintendent for the LaFollette Coal, Iron & Ry. Co., LaFollette, Tenn., first at Rex No. 2 mine and then at Rex No. 1 mine, is now superintendent of the Sunny Side Coal Co. in Colorado.

David Kelso and Thomas Roscoe, of Birmingham, Ala., were reappointed associate state mine inspectors for fill-in terms, by Governor O'Neal, recently. The short term will expire Apr. 27, and they must either be appointed again at that time or their successors be selected by Governor Henderson, who was inaugurated on Jan. 18.

Warner Shook, of Birmingham, Ala., has been placed in charge of the reorganization of the New Orleans Transportation Co. Failure to complete work on Lock 17 has delayed the original plans of the company, but as this work will soon be completed, the company is planning to build a fleet of barges, sufficient to handle a large tonnage of coal from the Alabama coal fields to New Orleans.

OBITUARY

Thomas Jacobs, who mined coal until after he was 77 years old, died at his home recently in Glen Carbon, Ill. His death was the occasion of the mines in that vicinity closing down for the mining fraternity to attend the funeral. This is something that isn't customary in that section, but on account of the record of over 50 years as a coal miner it was a mark of tribute.

CONSTRUCTION NEWS

Craftsville, Ky.—The Roberta Coal Co. expects to begin work looking toward a big development of the Wright coal land tract near here on the Lexington & Eastern R.R. Several hundred men will be employed from the start.

Pittsburgh, Penn.—Plans have been submitted by the Pittsburgh Coal Co., to contractors for estimates on a hoisting engine house and substation at Montour mine No. 4, located at Hill Station about six miles above Marshalsea.

Sciotoville, Ohio—The Dravo Contracting Co. is making rapid progress on the bridge spanning the Ohio River at this point, and a larger number of men will be employed within a short time. At present about 100 men are upon the work every day, including Sunday.

Henry, W. Va.—The work of reopening the mine of the Davis Coal & Coke Co., at Henry, is now well in hand, the water being well pumped out of the shaft. There will also be built at this place during the spring, 26 houses to be occupied by miners and other employees.

Huntington, W. Va.—Unless some unforeseen contingency arises, the new operations of the Maher-Purseglove Co. will start shortly. The tract of land to be developed is located 10 miles from Logan on Island Creek. Work preliminary to the starting of the operation is being rushed.

Whitesburg, Ky.—G. W. Hopkins and others, of Glamorgan, Va., are leasing the E. M. Webb coal land tract at Sergent, on the Lexington & Eastern R.R., and will put in a coal mining plant, beginning within 30 days. They expect a daily capacity of 800 tons from the beginning.

Prestonsburg, Ky.—The Alum Creek Block Coal Co., recently organized at Ashland, has leased a 1000-acre coal land tract at Alum Creek, near here, and will begin development at once. The company will employ several hundred men for the initial work. This development will be on the Big Sandy branch of the Chesapeake & Ohio R.R.

Jellico, Tenn.—The work of surveying for the Jellico, Cappachine & Western Ry., has been begun in the Jellico mountains. This road is to be about 30 miles in length, and will be constructed for the purpose of opening the coal and timber fields lying in the mountain country west of this city. It is believed that grading will be started within a short time.

Penny, Ky.—The Penny Coal Co., beginning Feb. 1, will put 200 men to work building miners' houses and opening additional mines. It began the shipping of coal a few days ago. L. B. Abbott, formerly with the Consolidation Coal Co., is manager of the new operations. The development is on the Sandy Valley & Elkhorn branch of the Baltimore & Ohio.

Steubenville, Ohio—It is reported that the West Virginia-Pittsburgh Coal Co. will open a new mine on the Wabash R.R., in the Cross Creek district of Brooke County, W. Va. It is said that two large turbine engines will be installed at the new operation. Further that this firm intends to establish a boat yard in Wellsburg, and will manufacture and repair river barges.

Colliers, W. Va.—The new houses started some time ago at the Locust Grove mine of the West Virginia-Pittsburgh Coal Co. a short distance above Colliers, were completed recently, and were occupied at once by employees. All available houses at this operation are now occupied with the exception of one which was only recently vacated. The new car shops being constructed at this mine will be completed within a short time.

Mater, Ky.—The South East Coal Co., a subsidiary of the Slemp Consolidated Coal Co., is starting the preliminary work on a coal mining plant about midway between Mater and Fleming on the Lexington & Eastern branch of the Louisville & Nashville R.R. in the Boone's Fork coal field. The company proposes a good sized development, and will start work at once building miners' houses, coal tipples, doing grade work, etc.

Garrett, Ky.—The Ambursen company has about completed the installation of a Lawson automatic tramway for the Elk Horn Mining Corporation at one of its mines. The tramway takes the slate from the tipple in the bottom of the valley, carries it a distance of about 1000 ft. up the mountain back of the tipple to an elevation of 320 ft. and automatically dumps it into the valley beyond where there is abundant room. The capacity of the tramway is 20 tons per hour.

NEW INCORPORATIONS

Youngstown, Ohio—The Western Reserve Mining Co. has filed amended articles of incorporation reducing its capital stock from $100,000 to $15,000.

Coalmount, Ky.—The Watts Creek Coal Co. has been organized with a capital stock of $10,000. The incorporators are W. L. Moore, M. M. Stanaford, F. S. Lawson and E. L. Stephens.

Chicago, Ill.—The Black Star Coal Co. has been organized with a capital of $100,000 to operate coal mines, gas and oil wells. The incorporators are Frank E. Doherty, John T. O'Connor, and Albert G. Miller.

Columbus, Ohio—Papers have been filed with the secretary of state changing the name of the Whyel Coal Co. of Columbus to the Sunfish Creek Coal Co. This firm holds a large acreage in Morgan County which will be developed.

Lexington, Ky.—Amended articles of incorporation increasing the amount of indebtedness that may be incurred by the Lexington & Eastern Ry. from $10,000,000 to $20,000,000 have been filed in the county clerk's office here. W. A. McDowell, Younger Alexander, Charles N. Manning and Samuel M. Wilson, directors of the company, signed the paper.

Martins Ferry, Ohio—An application has been sent to the Secretary of State for a charter for a new coal corporation to be called the Maher-Purseglove Co. The stockholders of this corporation are the same as those composing the Purseglove-Maher Coal Co. The new firm will operate the mines which will be opened in the Logan field of West Virginia.

McKeesport, Penn.—A charter has been granted to the Allegheny Byproduct Co., with a capitalization of $350,000; extensive repairs and improvements are now being made to the plant at Otto and within 60 days it is said that work will be started to its fullest capacity. About 225 men will be given employment, approximately one third of whom will be skilled workmen.

Blairsville, Penn.—A charter of incorporation has been granted to the Bradenville Coal & Coke Co., presaging an important change in local mining circles, involving the transfer of the Duquesne plant of the Bessemer Coal & Coke Co. to the Graff interests of Blairsville. It is said that the sale of this plant has been pending for several weeks and its consummation in the near future is believed to be assured provided the survey of the coal proves satisfactory to the purchasers.

INDUSTRIAL NEWS

Hazard, Ky.—Williams & Wilson are reported to have leased 1000 acres of coal land for development.

Birmingham, Ala.—The Edgewater mine of the Tennessee Coal & Iron Co. produced last year the largest tonnage of any mine in the state—716,000 tons. This was in excess of any other two mines in the commonwealth.

LaFollette, Tenn.—The bankruptcy case of the Electric Corporation, of Boston, Mass., against the LaFollette Coal, Iron & Ry. Co., which was to have been tried in the Federal Court at Knoxville, Tenn., on Jan. 19, has been again postponed.

Toledo, Ohio—The Lee J. Sandridge Coal Co. will establish a general office in Toledo. This will be in charge of S. M. Stanley, formerly of Chicago, who has been appointed general western agent of the company. This firm mines and markets Meriden smokeless coal.

Washington, D. C.—Proposed increased joint rates over the Mobile & Ohio R.R., on coal from mines in Alabama, Illinois, Kentucky and Tennessee, to Memphis and other points which were to become effective Feb. 1, were suspended Jan. 22 until Apr. 30 by the Interstate Commerce Commission, pending investigation.

Chattanooga, Tenn.—Heirs of William Clift have instituted suit in the Chancery Court of Hamilton County against the New Soddy Coal Co. seeking to recover between $150,000 and $200,000 in royalties. A hearing of the case before A. W. Gaines, special commissioner, recently began. The suit is based on a lease of 11,000 acres of land by the coal company under date of 1901.

Alliance, Ohio—J. H. Steffel, of Salem, who purchased the Ely Bros. coal mine, west of Alliance, last October, has made an assignment to J. P. Davis for the benefit of his creditors. G. Thomas, J. Ashman and J. T. Reese, have been appointed as appraisers. After they have completed their work the mines will be sold to settle up affairs. Mr. Steffel claims assets double the amount of liabilities.

Toledo, Ohio—The convention of the Michigan, Ohio, Indiana Coal Association will be held at Cedar Point in June. The exact date of the convention will be announced by President H. H. Beam. Last summer the convention was held at Indianapolis. Officers reported the association in excellent condition and that the number of claims and collections handled by it had doubled during the last year.

Milwaukee, Wis.—The Manierre loader, designed to load lump and sized coal into boxcars, has been adapted to load soda ash by the Solvay Process & Michigan Alkali Co. Soda ash is about the consistency of table salt, and is very dusty. The company, which had tried many loaders of its own unsuccessfully, was skeptical about the Manierre. The Manierre Engineering & Machinery Co. guaranteed the first loader it installed. It was successful and now three are at work.

San Francisco, Calif.—In its fight for a new trial before the Federal circuit court of appeals the Western Fuel Co. has filed a bill of exceptions. The officers convicted and sentenced in the original trial were James B. Smith, vice-president; Edward Mayer, a weigher; and Fred C. Mills, superintendent. Smith and Mayer were sentenced to San Quentin for 18 months while Mills received a county jail sentence of one year. None of the convicted officers have yet begun to serve their sentences.

Greenville, Ky.—Returning five new indictments growing out of investigations into the "possum hunter" depredations of the last few months the Muhlenberg County grand jury has adjourned, having brought in a total of 36 indictments. Owing to conditions of roads and weather the several investigations were allowed to go over to the next term of court. The case involving alleged intimidation of employees of the Bevier Coal Co. will probably be heard on a change of venue from Muhlenberg County.

Pittsburgh, Penn.—The demand for coke among founders is growing, this change being particularly noticeable during the recent past. For more than two years founders have been using less coke than for many seasons previously. It is stated, however, that orders have been coming in more freely of late. Some good contracts have been closed, and in nearly all cases the buyers have insisted on a contract specification that will enable them to call for larger quantities at the same price for the contract period.

Pittsburgh, Penn.—In the United States District Court on Jan. 21, W. W. Keefer, of Pittsburgh, and F. M. Wallace, of Erie, Penn., were appointed joint receivers with D. W. Kuhn, for the Pittsburgh-Westmoreland Coal Co. Keefer and Wallace take the place of the Fidelity Title and Trust Co., whose resignation as receiver was accepted by Judge Orr. The Fidelity company also filed its report, which showed that the coal company was earning money and that it has paid off several bonds with money from the sinking fund.

Uniontown, Penn.—The appointment of receivers for J. V. Thompson was not entirely unexpected even some time ago, and was obviously a necessity when the bank of which he was president was closed. The proceedings thus far are friendly, and hopes are entertained that the complicated task of arranging matters will remain in friendly hands under the supervision of Mr. Thompson himself. The opinion in disinterested quarters is that heavy losses would follow a legal contest between the different parties in interest.

Sandusky, Ohio—Official figures on the coal shipments handled at the Pennsylvania R.R.'s docks here, just made public, indicate that the tonnage handled last year was not materially below that of 1913, in spite of the general falling off in Lake shipments. The business at these docks for 1914 was only 85,000 tons less than that of 1913, the total being 2,533,250 tons for 1914, as compared with 2,618,250 for the former year. This business represents 53,982 carloads of coal, while 543 vessels took cargoes from the docks for Lake ports.

Wilmington, Del.—Alleging that the Elliott-Chapman Coal & Coke Co., of Gaston, Ala., a Delaware corporation now in bankruptcy failed to comply with certain requirements of the Alabama law imposed upon foreign corporations, a meeting of creditors opposed the allowance of claims of certain Alabama creditors holding that the alleged failure of the company to do certain things required by the Alabama law invalidated these claims, which were for supplies, material, etc. The point will be argued before Referee Wales on Feb. 3.

Charleston, W. Va.—The statement of shipments of coal and coke over the lines of the Chesapeake & Ohio Ry. during the month of November and 11 months of the year 1914, shows that 1,568,002 tons of coal and coke were shipped over the line during the month of November, as compared with the shipment of 1,558,521 tons for the same month of 1913, or an increase of 9481 tons. For the 11 months of the year, 19,465,505 tons were shipped, as against 16,018,039 tons for the corresponding period of the previous year. This revealed an increase of 3,447,466 tons over the 11 months of the previous year.

Whitesburgh, Ky.—There is much speculation in railroad circles here regarding the prospective race between the Louisville & Nashville and the Baltimore & Ohio for territory in the Rockhouse Creek section in Letcher County. It is known that the B. & O. a few days ago secured $5,000,000 by mortgage with which to make the extension, and about the same time the L. & E. branch of the L. &. N. made arrangements to increase its indebtedness to $20,000,000 instead of $10,000,000. Both railroads have engineers in the field locating lines, and those in a position to know say there will be "something doing" in the coal fields ere the ides of March. It is believed that both roads will build through Rockhouse Creek.

Pittsburgh, Penn.—That officers of the Bank of Pittsburgh had attempted to force foreclosure proceedings and the sale of the $14,000,000 properties of the Four States Coal & Coke Co. a subsidiary of the Pittsburgh-Buffalo Co., was the charge made at a meeting of the stockholders of that firm held on Jan. 23. It was alleged that bank officials had flatly refused to agree to any reorganization plan that would not contemplate wiping out all the common stock interest and also that of preferred stockholders, the owners of which had refused to contribute to the expenses of reorganization. The stock of the coal company is largely held in small allotments by men employed by the Pittsburgh-Buffalo Co. and its various subsidiaries.

Cleveland, Ohio—Business depression and the miners' strike were the grounds on which a receivership was granted for the Card & Prosser Coal Co. recently by Judge Pearson. The application was made by the Union National Bank, which holds a judgment of $10,900 against the coal company. C. T. Brooks was named as receiver. The company was capitalized at $150,000 and the petition in bankruptcy asked that the receiver be given authority to carry on the business of the firm. It is stated that owing to the present coal strike, it is impossible to operate the mines owned by the company in and about Lisbon, Ohio. The depression in the furnace business at present has also operated against the company. It is impossible for the firm to make a profit until conditions improve.

Coal Trade Reviews

General Review

Large accumulations of anthracite and prices are weakening. Bituminous output rigidly curtailed but still in excess of market requirements. The expected improvement in the industrial consumption has failed to materialize.

Large surpluses of anthracite are noted in all directions, and unless there is some unusually severe weather there is little prospect of the trade righting itself before the close of the season. The market is distinctly flat with operations heavily curtailed, and the independents slashing the company circulars. Accumulations are large, particularly in the hands of the dealers, and it will take more than a slight cold snap to develop any important buying movement.

The spot bituminous market is absolutely flat. Accumulations are large at all the distributing centers while mining operations have been cut down to about 60% of the running schedules in effect a year ago; but, in spite of this heavy curtailment, shippers are exceedingly hard pressed to find a disposal for their product. A spectacular advance in ocean freights to New England points threatens to develop complications as regards the Hampton Roads coals in the Down East markets, and Pennsylvania operators are watching closely for an opportunity to broaden their activities in that direction. At the moment the movement is confined entirely to contracts, and the outlook for the future hinges largely on weather conditions.

A slight broadening of the market is noted in the Pittsburgh district due partially to the stormy weather and to a very light increase in operations at the steel mills and on the railroads. There is scarcely any renewing of old contracts. If the situation does not take a turn for the better shortly, operators are beginning to fear that negotiations on new contracts will open at a low level. Sacrifice prices are becoming more frequent in Ohio, and the effects of the long continued pressure under which the market has been laboring are becoming acutely evident. The domestic trade stiffened up somewhat as a result of the heavy snow storms and lower temperatures, but prices continue unchanged and the outlook for the steam grades is as uniformly discouraging as ever, with consumers showing a distinct tendency to hold off in closing.

The steam coals are somewhat steadier in the Southern market, but the domestic grades continue heavy, and a great deal is accumulating on track awaiting disposal. Mine operations are at about half capacity. Middle Western dealers are apparently loaded up to full capacity, and in spite of the extremely cold weather and heavy snows, the trade is remarkably apathetic with prices showing a distinctly weakening tendency. The situation is being further aggravated by poor collections both retail and wholesale, and operations are rigidly curtailed in all fields.

ATLANTIC SEABOARD

BOSTON

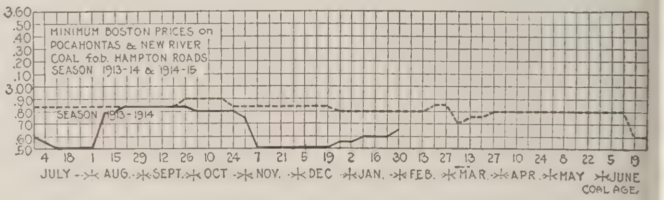
Sharp rise in water freights a new factor in outlook. Less talk of contracts and bulk of coal may this year be sold f.o.b. where prices continue about the same. Georges Creek shippers well supplied with orders. Pennsylvania grades may have much better outlet all-rail. Anthracite still dull.

Bituminous—Prices f.o.b. Hampton Roads seem no firmer than last week. Coal is coming down in ample volume, and is in fact beginning to again accumulate in a large way. Some of the agencies controlling their own transportation are understood to have closed some season contracts on a delivered basis, but it is probable that from now on, at least until the situation clears, what contracts are made will be on an f.o.b. basis. Buying will not be very free on such a program and a further period of reduced tonnages and dull trade is the outlook for Pocahontas and New River.

The flurry in freights stimulated spot business for a few days but there is now a disposition not to take on coal except as matter of necessity, lest buyers further bid up vessel terms. On-car prices have stiffened in response to conditions along the Seaboard.

The larger shippers of Georges Creek are apparently waiting until they are caught up with orders before they announce a policy with regard to delivered prices. A large proportion of their Tidewater coal is placed in bottoms which they control and it will be interesting to watch developments in that direction. As it looks now, if they name prices at all within reason, they will probably be able to gather in all the business they want.

The outlook is decidedly interesting for operators in Pennsylvania. There is an amount of anthracite-carrying transportation at their disposal but the more promising phase is the broader outlet for these coals all-rail to New England points that are normally reached from rehandling plants at Tidewater. There are mill centers where the Tidewater delivered price cannot be raised too high without throwing the business to Pennsylvania mines for delivery all-rail. Shippers of the better known grades are already actively canvassing for business of this kind.



Water Freights are now $1@1.10, Hampton Roads to Boston on large vessels. Several additional schooners have been chartered on a monthly basis off-shore and it is extremely difficult to secure an option on Coastwise boats even for a single trip, so excited are transportation owners over inquiries for over-sea tonnage. Rates from the Chesapeake advanced 25c. within a few days; $10 is rumored to have been paid a sailing vessel to Buenos Aires.

Anthracite continues very dull for the season. All sizes are in easy supply, but the demand is still very light. Dealers are cautious about buying; with the mild weather that still prevails they feel the backbone of winter is about broken. The Boston retailers advanced prices, however, Jan. 19, 25c. on broken, stove, and chestnut, making current prices $7.75 for egg, $8 for stove, and $8.25 for chestnut. The move was more to restore the basis of a year ago than because of any extra demand for fuel.

Wholesale prices on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.65@2.75
Boston†	....	....	....	3.78@3.83
Providence†	....	....	....	3.73@3.78

* F.o.b. †On cars.

NEW YORK

Bituminous slowing up still further and the outlook is discouraging. Anthracite situation also becoming worse. Conditions hinging almost entirely on the weather.

Bituminous—The local soft-coal market has seldom ever been so completely flat. Mines as a rule are only producing about 60% of the January output last year. Some slight improvement is noted in railroad circles, though it is so small as to be practically negligible, and it is clear that agencies are crowded for business. In spite of the great activity in shipping, the bunkering trade does not seem so good at the moment, though this business fluctuates to such an extreme that this cannot be regarded as a reliable criterion of the situation.

Negotiations on expiring contracts are now engaging the attention of the sales agencies, and the situation is beginning to shape up. So far operators have apparently succeeded in closing on the same basis as last year. Whether these prices will be held throughout the season depends largely on developments over the next 30 to 60 days.

There are persistent rumors to the effect that the Berwind company is beginning to take active steps toward building up a market in the line trade. It is clear that some disposal must be found for their tonnage, and it is only logical to expect such a move. It is stated that their mine operations have been increased recently.

The New York market is quotable on approximately the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal trade has been slowing down to such an extent that complaints are becoming almost as general as in bituminous. Practically all sizes are in easy supply, with the possible exception of Nos. 2 and 3 buckwheat, though plenty of these can be had without any great difficulty.

Unless there is a decided change for the better, it is becoming clear that the large companies are going to carry over large stocks into the summer business. This probably means that this coal will be carried through next winter also, since the companies will no doubt stock heavily against the possibility of a long suspension when the wage agreement expires, a year from next April. The independents are cutting the circular in all directions, and there is only the thinnest pretense of obtaining circular prices.

Restrictions in buying, indicating an economy in consumption, is the feature of the anthracite trade this season. The question of credits is also being more carefully considered. Where sales agents have heretofore allowed consumers long-term payments, this is now being refused with the result that the purchaser is restricting his current requirements to the lowest possible minimum.

The market is quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.10@5.35	5.30	4.80@5.30
Stove	5.35	5.20@5.35	5 30	5.15@5.30
Chestnut	5.60	5.45@5.60	5.55	5.30@5.55
Pea	3.55	3 45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.25@2.30	2.00@2.25	1.80@2.25
Barley	1.80	1.70@1.80	1.75	1.35@1.75

BUFFALO

Still quiet in both anthracite and bituminous. Resumption of wintry weather will help some, but bituminous is reported to be in large surplus Westward. Large amount of anthracite going into Lake vessels.

Bituminous—There is but a small improvement in the trade; some shippers do not see any, and the fear is now that spring prices will have to be lower than they were last spring. This leaves the shipper with the option of tying himself up for a year on low-priced contracts, with the possibility of an active market shortly. There are reports current that there are likely to be 2,000,000 tons of bituminous on the Upper Lake docks when navigation opens in the spring. This is quite different from the report of a few weeks ago, which made it appear that coal was selling so fast Westward that there was likely to be a shortage.

There is not much doing yet in bituminous contracts. The price of bituminous is still rather weak at regular base quotations, $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack somewhat stronger than sizes, but not so scarce as it was a month ago. Allegheny Valley prices remain at 25c. lower than Pittsburgh. There is talk of not giving out these base prices from Pittsburgh this year, partly because it is so difficult in late years to adhere to them and partly because as it looks now they will have to be lowered, which nobody likes to do.

Anthracite—The demand is not strong, even for the time of the year when the first fall clamor is supposed to be past; it is sure to improve with colder weather, though it appears that the consumer has rather more coal on hand than is the rule at this time of the year. Shippers say that when the demand becomes slack in midwinter it is a hard matter to start it up again. The demand for egg is stronger than for stove, with chestnut leading much as it used to before the additional price was put on. All small sizes are quiet, some local dealers offering everything from pea down at a discount.

Coal is still going into Lake vessels on winter storage, though tonnage is hard to get and heavy freezing will make it still more scarce. Shippers who have not taken any tonnage yet are now in the market, so that it looks as if there would be a large fleet ready to move as soon as the Lake season opens.

PHILADELPHIA

General indifference among anthracite consumers. Curtailment still found necessary. All sizes in easy supply. Depressing conditions in bituminous again prevalent.

Anthracite—While this section of the country has been visited with fairly good coal burning weather, the stocks of the dealers are so large that they are in splendid shape to take care of any spasmodic demand that may take place. There is likely to be no active demand at all the balance of the winter, unless there be some exceedingly heavy weather. It will require weeks of low temperatures to create anything like an active market, in the face of the weak condition that now characterizes the trade. Concessions on stove coal are being made by the individual operators in order to move their output, and it is understood that it is commencing to accumulate on the large companies.

The month of January has been a distinct disappointment. It was the general feeling in the trade at the inception of the new year, that the surplus had about been absorbed and the market would support continuous operations at the mines until at least the middle or latter part of February, but such has not been the case. Outside of buckwheat, for which there is more of a sustained call than any of the other steam sizes, the market is distinctly flat, and 50% operations are the rule. Chestnut seems to be in even better shape than stove, just at the present time, although all domestic sizes are inclined to drag.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.80@4.90
Stove	5.00	4.90@5.00
Chestnut	5.25	5.00@5.10

Bituminous—The prospective improvement anticipated some two or three weeks ago, has resolved itself into another depressing period. The market at that time showed a marked tendency toward better demand and higher prices, but this has now disappeared. There is still a slight shortage of the Georges Creek coals at Tidewater, but it is understood that sufficient is coming forward to relieve this situation.

BALTIMORE

Warm weather has hurt the trade severely. Coastwise and foreign movement comparatively light.

The week just closed has been a poor one for both the hard and soft-coal business. The temperatures were so high that there was a distinct falling off in the demand for domestic coals. Smaller sizes of anthracite were especial sufferers.

Gas and slack of West Virginia showed particular weakness. The best three-quarter was freely offered at 85c. a ton, while slack sold around 65c. to the trade. West Virginia steam coals of low grade sold at 80c., while select qualities were offering at $1.15 to $1.20. High-grade Pennsylvania coals were selling at $1.25 at the mines to the trade, and ordinary grades at from 95c. to $1.05.

Coastwise movement and foreign business are quite flat as compared with several weeks ago. Italy and Cuba are taking most of the export coal now moving from this port.

While business here just now is most unattractive there are signs of better times ahead. The Maryland Steel Co. has secured contracts to build four large steamships, assuring more activity at that plant. The Consolidation Coal Co. is preparing to float $7,000,000 in bonds for extensions to increase its coal output. The Davis Coal & Coke Co. interests have also announced a financial plan to practically double the output of the mines of that concern.

OCEAN FREIGHTS

Rates still continue their spectacular advance and charters are very difficult to negotiate.

The freight market continues to advance. Owing to the very high rates now offered on sugar from Cuba, it is becoming extremely difficult to secure steamers for coal outward to Cuban or West Indian ports, as owners of the few available steamers state that it pays them better to send them in ballast.

Early last week the British steamer "Auchencrag," about 6000 tons cargo, was chartered in London to load coal at Baltimore for the Plate at $9.60. Numerous boats were offering here for the same voyage at $9 at which rate they are still being offered.

The market is hardly quotable, but approximate prices may be taken as follows:

To	Rate	To	Rate
Havana	**$2 50**	Guantanamo	**$3.00**
Cardenas or Sagua	**3 00**	Demerara	**5 00**
Cienfuegos	**3 00**	Bermuda	3.50@4.00
Port of Spain, Trinidad	**3.25**	Vera Cruz	**3.00**
St. Lucia	3.00@3.25	Tampico	**3.00**
St. Thomas	**3 00**	Rio	**9.60**
Barbados	**3 00**	Montevideo, Buenos Aires or La Plata	**9 00**
Kingston	**3 00**	Mediterranean	**9.60**
Curacao	**2 75**	Valparaiso	7.20@7.50
Santiago	**3 00**		

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Rates noted in **bold face** type are only approximate.

HAMPTON ROADS

Shipments for week about fair. Export movement poor. Bunker requirements about the average.

Dumpings over the Tidewater piers during the past week have not been as large as expected. Several of the large coasting steamers have been taken off this trade and placed in the general cargo service and a large percentage of the coal moving has been taken care of by sail or barges. The export movement has also been less than the standard. There have been quite a number of foreign vessels in port but they have been calling principally for bunker supply. Of the export coal shipped during the week the greater part has gone to Panama, at least three steamers having been loaded for this port during the week. There has also been some movement to St. Lucia and Italian ports.

Prices are being held at circular but with the large accumulation now at Tidewater it is quite likely that some of the shippers having coal on demurrage will be making some slight cut and it is not believed that even this will create a demand. The general opinion seems to be, however, that market conditions will improve greatly during the coming week.

The bulk of the shipments made during past week has been contract business. Although the accumulation of coal is somewhat above normal, shipments are being made continually from the storage plant at Sewalls Point.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Vinland	Norwegian	Norfolk	Manzanillo	661	
	Norwegian	Virginia	Bermuda		$4.00
Ellen Little		Virginia	Bermuda	807	
Tottenham	British	Philadelphia	Tampico	1998	
Norrbotten	Swedish	Philadelphia	Narvik	3691	
Beacon	Norwegian	Baltimore	Guantanamo	715	2.75
Elizabeth Gilbert		Norfolk	Porto Cabello	482	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Demand slightly increased all along the line, with mines operating at about 55% of capacity. A twelvemonth contract at $1.25 for ¾-in. coal.

The coal market has shown some further improvement, more important in the fact that it is well distributed than on account of there being any abnormal increase in any particular direction. The domestic demand has been broader, owing to weather conditions, but is still not normal for the season. Demand from manufacturers has shown a slight further increase, particularly in the steel industry, where mill operations have been increasing a very few per cent. per week since the end of December. Railroad demand shows only a very slight increase. A particularly gratifying item to the local coal trade is that a byproduct coke interest in the Northwest has bought some 50,000 tons for quick shipment. Normally this interest depends on lake shipments, taking relatively little during the winter by the all-rail route.

As indicated in previous reports, regular contract business is very light, and contracts for a twelvemonth period are the exception rather than the rule. One such contract, however, for a few carloads a week, has just been closed direct with a consumer at $1.25 for ¾-in. If this were taken to mean that the seller would have given the dealer the usual trimming if the transaction had been made through a dealer the price would be rather a low one; otherwise it may be taken as about representing the market. We quote, subject to some shading for prompt lots, except in the case of slack: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district. The mines are operating at about 55% of capacity, taking the district as a whole.

TOLEDO

Demand only fair. Miners' strike will not affect the local situation. Prices rather weak.

There is little if any change in the coal situation here. The domestic demand is quite low and the steam trade only slightly better. It is believed by all that a really cold spell will result in a heavy run of orders both domestic and steam. The snow has caused no apparent congestion of railroads which has generally been the result of storms in Toledo.

Owing to the slow demand prices have not strengthened although they are holding fairly close to the list. It is not believed that the strike of the miners in this state will make any difference with the general coal situation here. The West Virginia and Kentucky mines make up the shortage easily.

COLUMBUS

A snow storm has caused a firmer tone in the domestic trade. Steam business is still quiet and there is little hope for the future.

Colder weather followed by a heavy fall of snow has stiffened up the local domestic trade and there has been a rush of orders from retailers. Buying was general from all of the territory which looks to Ohio for its coal supply and requests for immediate shipment were frequent.

Prices were not advanced under the better buying but a continuation of present conditions might help in the way of quotations. Retail prices are still firm and there are no signs of a decline. Pocahontas is one of the favorite varieties as well as the West Virginia splints. Hocking lump is selling for $3.50 while there is also a good demand for anthracite.

Production during the past week has not increased to any extent. The Hocking Valley produced about 65% of the average while other fields such as Crooksville, Cambridge and Jackson produced about 50%. Reports from Pomeroy Bend show that the output during the week was about 85% of normal.

Little is doing in the steam trade. Buying on the part of manufacturing establishments is slow and the outlook is not very promising. A considerable amount of the buying for steam use is on the open market. Contracting is slow and many of the users are not renewing their contracts as they expire. One of the best features is the better demand from railroads which appear to have a larger freight movement.

The coke trade is slow in sympathy with steam business.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.60	.....
Inch and a quarter	1.45	1.50	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.70	0.75	0.65
Coarse slack	0.60	0.65	0.55

CLEVELAND

Light receipts, demurrage and small demand continue to keep the spot market from advancing. Small amount on consignment. Stocks at Upper Lake docks heavy.

A heavy snow storm over Sunday delayed coal in transit and receipts the first of the week amounted to only about 250 cars or half the usual Monday tonnage. It is not expected much coal will arrive here during the next few days, but the inquiry is not broad enough to make the market brisk. The weather increased the demand for slack, but prices were not advanced.

Three-quarter inch coal from West Virginia, including Fairmont gas, was sold at $1.65 on track here Monday; this was brought in on consignment and was under car service. Fairmont coal netted less than 45c. a ton after paying brokerage. There are only about thirty cars of consignment coal left on the market, twenty-five of which are from West Virginia No. 8 mines. Spot slack sold the first of the week at $1.70 for the best grades. Less desirable kinds sold down to $1.60.

The outlook for an early Lake season is none too bright. Upper Lake docks report a slow movement of steam coals and a fair movement of domestic grades. Duluth-Superior docks, Jan. 15, held 7,000,000 tons of coal and were shipping 24,000 tons a day. The brokers who made the report estimated the stocks on Apr. 15 will amount to 4,000,000 tons as compared with 2,000,000 tons Apr. 15, 1914.

The Lorain Coal & Dock Co. and the Pursglove Maher Coal Co. expect to have properties in the Island Creek, West Virginia district shipping Lake coal and to be able to take care of their lake trade with West Virginia coal of their own mining even if No. 8 field is not working when the season opens. Heretofore these companies have been dependent upon No. 8 for all of their coal.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.60	......	......	......	......
Lump, 6 in.	......	......	$2.35	......	......
Lump, 1½ in.	......	......	2.20	$1.95	......
Lump, 1¼ in.	......	$2.35	......	......	......
Lump, ¾ in.	......	2.25	2.10	1.90	$2.05
Egg	3.60	......	......	......	......
Egg, 6 in.	......	......	2.00	......	......
Mine run	2.60	2.15	1.90	1.85	1.95
Slack	......	1.80	1.75	1.70	1.75

CINCINNATI

The persistent pressure on the market has resulted i lower prices. The amount of distress coal increasing in spit of colder weather. Retailers are doing well, but larger buying has not developed.

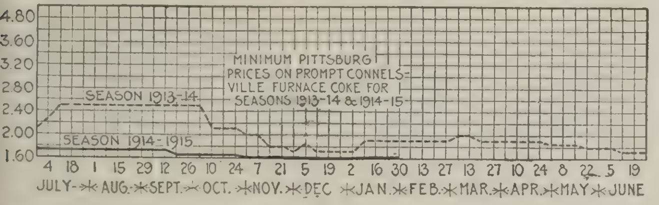
The retailers have experienced the active business whic is the usual accompaniment of wintry weather, but the whole sale market is suffering from the relative slowness in manufacturing lines. Wholesalers and operators' agents find it next to impossible to take care of their outputs, especially in the steam grades, and the effect of this condition has made itself felt in poor prices. Sacrifice prices are commoner than at any time since early December, as the trade is beginning to feel discouraged over the failure of the market to improve, though it is still hoped that the long-expected revival will develop before long.

COKE

CONNELLSVILLE

More receiverships at Uniontown, and no progress toward untangling the Thompson involvement. Prompt furnace coke a shade easier. Production and shipments slightly decreased, but prospects for consumption improved.

Following the closing of the First National Bank of Uniontown Monday of last week and the receivership the following day for Josiah V. Thompson, the famous dealer in Greene County and other coking coal acreage, as reported a week ago, receiverships have been thick in the Fayette County court at Uniontown, and there will probably be others. Mr. Thompson and the majority of his associates are now in the hands of receivers, and at least one coke company, the Tower Hill Connellsville Coke Co., has gone the same route. Mr. Thompson has been endeavoring to straighten matters out, even at a great personal sacrifice, by disposing of a large part of his holdings to capitalists, or to the United States Steel Corporation, but apparently without definite progress thus far. There is a rumor that the steel corporation has offered $18,000,000 for the aggregation. This would, of course, be unacceptable as in the legal papers leading to the receiver Mr. Thompson put his liabilities at $22,000,000 and his assets at $70,000,000.



While the situation is of the most serious moment to holders of coking coal acreage the effect on the coke market s hardly likely to be noticeable, as prices were down close to the cost of production, based on a very low rating for the coal in the ground, and sales of late have been chiefly by strong concerns with little bonded or other indebtedness. Prompt furnace coke has softened about 5c. a ton, while t is reported that $1.60 has been paid for delivery over 30 days. There is no doubt that coke could be bought for de-ivery to Apr. 1 at $1.60, while there is no regular contract market, $1.75 being quotable as nominal, based on sales some time ago. Prompt foundry is $2@2.20 and contract foundry $2.10@2.25, per net ton at oven.

The "Courier" reports production in the Connellsville and ower Connellsville region in the week ended Jan. 16 at 206,650 tons, a decrease of 2752 tons, and shipments at 204,398 ons, a decrease of 12,490 tons. The Carnegie Steel Co. has blown in five additional furnaces within the past week and has used up 21,000 tons from its stock of pig iron, so that he trend seems to be toward increased coke consumption on he part of the steel interests if not by the merchant furnaces.

Buffalo—The demand for coke does not improve. So far as the reports from jobbers go there is no stir in sight and none expected at present. There must be a decided increase n furnace operations before there is need of more coke. Prices remain weak on the basis of $4.25 for best 72-hr. Connellsille foundry and $3.30 for stock coke.

Baltimore—Coke remains an unattractive feature. Connellsville foundry was held at $2.25 and furnace at $1.75. West Virginia foundry sold at $2 and furnace at $1.50.

Columbus, Ohio—The coke trade is slow in sympathy with he steam business.

Birmingham—There is some contract business in foundry oke, but the tonnage is not large. Until conditions improve nd foundries resume full operations, no increase is expected.

Chicago—In a general way it may be said that the Chicago oke market is weak. There is a considerable volume of coke eported to be moving, and prices of domestic grades have shown wide fluctuations. Consignment coke has been sold at heavy cuts on the list prices. Prices are as follows: By-product, $4.60@4.95; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.60@4.75; gas coke, $4.00@4.25.

THE STEEL INDUSTRY

Situation continues unsatisfactory though there appear to be more resumptions. Some large rail orders are appearing.

On the whole the reports from works give rather a better account of the steel trade than current sales. But it is to be noted that mills have been shutting down and resuming, and that only the resumptions get publicity. The Steel Corporation's report of $10,900,000 earnings in the last quarter of 1914, or $2,500,000 less than the previous low record, in 1904, shows that the last two months of the year were worse than was generally known at the time.

Some further rail orders have been given out—close to 75,000 tons in the West, of which 40,000 tons went to the Colorado mill. The St. Paul and the Rock Island are inquiring for about 25,000 tons. Recent rail orders will give the Gary mill work for two months, and in view of its starting up on Feb. 8 one of the idle blast furnaces there has been blown in. The Steel Corporation is also to blow in this week a furnace at Lorain, Ohio, and two in the Pittsburgh district. Active ingot capacity of the corporation is now close to 50%.

In structural work a somewhat better prospect is indicated. About 37,000 tons is represented in live projects in the East and for track elevation at Indianapolis 20,000 tons will be required.—"The Iron Age."

SOUTHERN

LOUISVILLE

Market continues weak in spite of the colder weather. Steam demand picking up.

Though it was expected that the return of cold weather could be counted upon to improve conditions, the Kentucky coal market is virtually unchanged from a week ago. The industrial demands are said to be improving considerably and prices on those grades are better than they have been. The domestic grades, however, do not show the activity the operators would like to see, the retail dealers still having large stocks on hand.

The highest price being received for any Kentucky coal is $1.85 for high-grade eastern Kentucky lump. Other prices for lump range down to $1.50 while there are reports current of domestic coals on demurrage selling as low as $1.40. Nut and slack from the eastern sections range from 75 to 80c. for the best grades and 45 to 50c. for the lower grades. Low grade western Kentucky nut and slack is going at from 40 to 45c. or thereabouts.

BIRMINGHAM

Steam coal shows some improvement and lump is slightly better.

Steam coal seems to have shown improvement during the past ten days, the demand being some brisker, with prices about the same as for the past month or two. Lump coal shows very little, if any, improvement, many of the producers of this grade having a large tonnage on cars at the mines waiting for orders. On an average, the mines are working about three days per week. Blacksmith coal is normal, business being satisfactory to the operators and prices holding up.

MIDDLE WESTERN

CHICAGO

Stagnation the rule. Prices of Illinois coals spotty, but Indiana grades are held more firmly. Trend of screenings not encouraging. Anthracite situation healthy.

The last week has been more or less discouraging to the Indiana and Illinois trade, and it is quite evident that the demand has shown a decided slump. Although snow and colder weather have made their appearance, stagnation in the movement and demoralization of prices are quite apparent. Production has been curtailed, but not sufficiently to affect prices. Indiana coals show more resistance than the Illinois product.

The stocks of retailers are low, but they are placing very few orders. A number of shippers complain of inability to collect promptly from country dealers, who report that they are unable to effect collections from the public with any degree of promptness.

There is a great difference of opinion as to the future prices of screenings and steam coals. Apparently there is an over-supply of steam coals on the market at this time, which is mainly the cause for the recession in quotation. The existing uncertainties make a policy of caution wise.

Franklin County operators have reduced their circular on lump, egg and No. 1 nut from $2 to $1.75, and it is said that in a considerable number of cases shipments have been made as low as $1.50. Screenings have declined about 5c. per ton. The situation is about the same in Williamson and Saline Counties.

The production of the Indiana mines is still on a reduced scale, but prices have been maintained on a fairly firm basis. Mines are operating on about a three day basis per week. Block coal shippers in Indiana report a fair demand at good prices.

Eastern Kentucky coals are not very strong, and the fluctuation in prices shows a wide range.

Hocking grades are in the doldrums, and there has been quite an accumulation of unsold coal on hand; $1.50 for lump is about the maximum price.

A few unsold smokeless shipments were sacrificed at low prices this week, but the forwarding of free coal to this center has been restricted and prices are comparatively firm.

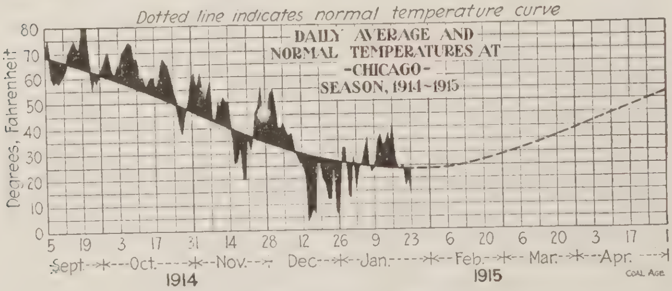
The anthracite situation is in marked contrast to the bituminous. The tonnage absorbed is as great as in any January of previous years. The supply of chestnut hardly equals the demand, and at times there is a small over-supply of egg and stove. Increased shipments from independent operators are noted at prices approximately 15c. per ton under circular.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.50@1.75	$1.50	$1.50@1.75	$1.50@1.60	$1.50@1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	1.15	....	1.15@1.20	....
2½-in. lump.	....	....	1.50@1.60	....	....
1¼-in. lump.	....	....	1.35@1.50	....	....
Mine-run...	1.15@1.25	1.05	....	1.10	....
Egg........	1.50@1.75	....	....	1.40@1.50	....
No.1washed	....	....	....	....	1.60
No.2washed	....	....	....	....	1.60
6x3-in. egg.	....	1.40@1.50	....	....	1.50@1.60
Nut.......	....	1.35	....	1.25	....
No. 1 nut..	1.75	....	....	....	....
No. 2 nut..	1.50@1.60	....	....	....	....
Screenings..	0.65@0.70	0.60@0.65	0.60@0.75	0.60@0.75	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.50@1.75	$1.60@1.90	....	....	....
1¼-in. lump.	....	....	....	....	$1.35@1.50
Lump & egg	....	....	$2.00@2.25	$2.25	....
Mine-run...	1.20	....	1.25@1.40	1.25@1.40	1.15@1.25
Egg........	1.50@1.75	1.40@1.75	....	....	....
No. 1 nut..	1.50@1.75	....	....	....	....
No. 2 nut..	1.30@1.60	....	....	....	....
Screenings..	0.65@0.75	....	....	....	....

Greene County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40; 5-in. egg, $1.25@1.35; 3-in. egg, $1.30; mine-run, $1.10; screenings, 65@75 cents.



INDIANAPOLIS

More snow fell just as the trade was expecting a falling off in orders. Buying renewed, both wholesaler and retailer benefiting.

Just as the coal trade was settling down to a duller situation, on account of the milder weather, a heavy fall of snow came, covering nearly the whole state to the average depth of about fifteen inches and accompanied by low temperature. The usual spurt in orders to retailers and wholesalers followed.

The mines are on fair schedule, some of the larger companies operating full time. Prices have not changed, either at the mines or at retail. Slack is in good demand at around 80c. It is expected the snow will have some effect on transportation, especially if the temperature stays around zero. February in Indiana is usually a stormy month and a good one for the coal trade, so the operators are fairly comfortable over the present situation.

ST. LOUIS

Low temperatures and heaviest snows of the season fail to stimulate any business. Steam consumers are apparently well stocked.

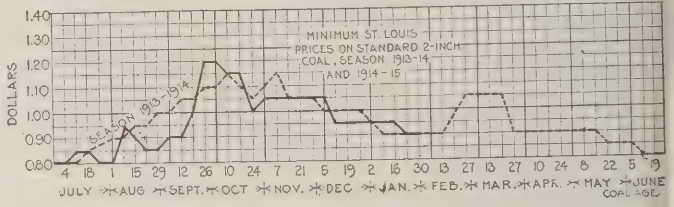
In spite of extremely favorable weather conditions that should bring about a bettering of the market, prices remain the same, and there has been a marked inactivity in the trade. With the heaviest snow of the season and a temperature around zero, prices are the same as they have been for the past two or three weeks, with a tendency to weaken. This applies to domestic sizes, screenings and the steam coals. The slow movement of domestic grades is accounted for by the fact that the retail yards throughout this section are loaded up with contract coal, and there is no open buying. Steam plants are well stocked up and a great many of them are not working at all.

Conditions in the Williamson and Franklin County field have not been as bad at any time since last August. The only strong coal right now is No. 1 washed. In the Standard field coal is sold at the cost of production, and there seems to be no demand even then.

Very little anthracite is moving in, and practically no smokeless. If this weather continues for a week or ten days, the market should be in a healthy condition, as all stocks will have to be replenished. Retail dealers find business exceptionally good on small quantities only.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump........	....	....	$1.25	$1.00@1.05	$1.05
3-in. lump........	....	....	1.30	....	....
6-in. lump........	$1.30@1.50	....	1.40	1.15@1.25	1.20
Lump and egg....	1.85@2.15	$2.00	....	....	1.35
No. 1 nut........	1.20@1.30	....	....	0.90@1.00	....
Screenings........	0.50@0.55	....	....	0.40@0.50	0.50
Mine-run........	0.95@1.05	....	....	0.85@0.90	....
No. 1 washed nut.	1.65@1.75	....	1.60	....	....
No. 2 washed nut.	1.30@1.40	....	....	....	....
No. 3 washed nut.	1.15@1.20	....	....	....	....
No. 4 washed nut.	1.10@1.15	....	....	....	....
No. 5 washed nut.	0.40@0 50	....	....	....	....



KANSAS CITY

Demand for coal has been increased somewhat due to the colder weather. Dealers stocking up. No change in prices.

For the second time this season Kansas City has had a touch of winter but the market has not been affected as much as it would have been had this change occurred in a normal winter. It has, however, shown some change for the better. Steam coal is in good demand, though there has been no change in prices. Illinois grades are still strong. Kansas coal is also moving well, but the Missouri product is a little weak. There is a slight prospect for a change in prices about Feb. 1, but this will not occur if the weather should turn warm again.

SPOKANE

The first fluctuation in prices since last winter have occurred. A moderate winter with but one short span of cold weather has in no way depleted the stocks of local dealers. The following standard coals are now holding firm to the prices noted:

Kind of Coal	Cost	Selling	Kind of Coal	Cost	Selling
Rock Springs nut....	$5.50	$7.50	Peacock Rock Springs	$5.50	$7.50
Monarch...........	5.50	7.50	Bear Creek.........	6.50	8.50
Carney............	5.50	7.50	Kooi	5.50	7.50
Castle Gate.........	6.75	8.50	Kirby nut..........	5.45	7.50
Corbin Steam.......	4.25	4.75	Kirby lump.........	5.85	8.00
Smith..............	6.50	8.50	Kirby egg lump.....	6.35	8.25
Owl Creek..........	6.50	8.50	Bellview steam......	4.25	5.00

PORTLAND

The possibilities of extending the anthracite trade i looked upon as very favorable with the opening of the Par ama Canal and the promised opening of the Celilo Canal i the upper Columbia River next summer. With the completio of the government locks at Celilo it will be possible t reship coal from the ocean steamers here to barges or rive steamers for points in the great Inland empire where coal in much greater demand per capita at the rate of six to on than in western Oregon by reason of the lack of wood fu there.

Coal Contracts Pending

Contracts listed in this department are authoritative in very respect except where the source of information is uestionable, in which event it is noted. All contracts re listed promptly on receipt and only repeated when dditional information becomes available or in the last ssue previous to the day on which bids will be closed. iberal remuneration will be paid for all legitimate otices of this kind sent in.

Contract No. 24—United States Navy—This contract, which rovides for coaling naval vessels at 82 different ports (p. 33, Vol. 6), is being held up because of the European war. t is probable that awards may be made covering ports on ne east and west coasts of Mexico; but with the uncertaines regarding deliveries at European ports, it is not condered advisable to attempt covering the naval requirements t those points. For the time being coal will be purchased s required without making any advance contracts. Address aymaster-General, United States Navy, Washington, D. C.

Contract No. 47—Batesville, Ark.—The Municipal Electric ight & Water Plant of Batesville will be in the market for 00 tons of mine-run coal on Feb. 1. The approximate price $3.35 per ton, and the coal is bought on a competitive basis, ne usual test being the cost of evaporating 1000 lb. of water the company's boiler plant. Address W. H. Walkup, supertendent, Batesville Water & Light Plant, Batesville, Ark.

Contract No. 49—Harlan, Iowa—The Municipal Electric ight Plant of Harlan will be in the market for 2800 tons of al about the first of next month. They commonly use Colx (Iowa) steam coal, and the contract is let on a competive basis, usually about Feb. 1. Address C. D. Lutton, supertendent, city of Harlan Light Plant, Harlan, Iowa.

Contract No. 60—Detroit, Mich.—Bids on this contract (p. 9), which provides for furnishing the Department of Public orks with its coal requirements for the next year, were as llows:

UNITED FUEL & SUPPLY CO.—For the ash plant, Richood, ¾ lump, $2.30; mine-run, $2.20; for the B. I. Bridge and ump Station, Richwood, ¾ lump, $2.85; mine-run, $2.75; anracite chestnut and stove, $7.20; egg, $7.10; Pocahontas, $4.

THE P. KOENIG COAL CO.—For the ash plant, Meadow rook, ¾ lump, $2.40; mine-run, $2.30; for the B. I. Bridge d Pump Station, Meadow Brook, ¾ lump, $2.95; mine-run, .90; nut, pea and slack, $2.75; anthracite chestnut, $7.50; ove and egg, $7.25; Pocahontas, $3.50.

MICHIGAN BUILDERS SUPPLY CO.—For the ash plant, mbridge, $2.30; for the B. I. Bridge and Pump Station, Camidge lump, $4; mine-run, $3.90; anthracite, $8; Pocahontas, .40.

R. T. AYLWARD—For the ash plant, Island Creek, $2.50; r the B. I. Bridge, Island Creek, $3.50; for the Pump Station, land Creek, $3.25; anthracite chestnut, $7.35; stove and egg, .25; Pocahontas, $3.85.

J. CALVERT'S SONS—For the ash plant, West Virginia ine-run, $2.50; ¾ lump, $2.60; for the B. I. Bridge and Pump ation, mine-run, $3.24; ¾ lump, $3.34; anthracite chestnut, .49; Pocahontas, $4.25.

Address George H. Fenkell, Commissioner of Public Works, ty Hall, Detroit, Mich.

Contract No. 64—Columbus, Ohio—The city of Columbus ill receive bids until Feb. 4 for furnishing 725 tons of tuminous lump coal. Shipments are to be made at the rate 200 tons per month, deliveries to be at Columbus, Ohio. ldress B. L. Bargar, Director of Public Safety, Columbus, hio.

Contract No. 65—Columbus, Ohio—Bids will be received by e city of Columbus for furnishing coal as follows: Twelve ousand tons for the municipal lighting plant; 6000 tons for e Scioto River Pumping Station; 2500 tons for the Garbage duction Works; 380 tons for miscellaneous departments of e city government. Bids will be opened Feb. 5. The coal is be delivered to the various departments as required and ch bidder must submit specifications for different grades coal. The law requires that any corporation making a bid ust submit their own full name or title, as well as that of all other parties interested, and all bids must be accompanied by a bond amounting to 50% of the contract.

Contract No. 66—Guantanamo Bay, Cuba—Telegraphic bids were requested by the Naval Department until noon, Jan. 27, for furnishing and transporting 5000 tons of coal to Guantanamo Bay, Cuba. Navy standard coal is required and a daily discharge rate of 300 tons per day is guaranteed. Address Samuel McGowan, Paymaster-General of the Navy, Washington, D. C.

Contract No. 68—Sheridan, Wyo.—Sealed bids will be received until 10 a.m., Feb. 2, for furnishing and delivering coal for one year to the City of Sheridan, commencing Feb. 5, 1915. Address James T. Withrow, County Clk., Sheridan, Wyo.

Contract No. 69—Millvale, Penn.—Sealed bids will be received until 5 p.m., Feb. 2, for furnishing three-quarter or run-of-mine coal for the Millvale Water Works. A certified check of $100 must accompany each bid and the contract requires delivery to be made in bins. William Fox is Pres. of the Borough Council. Address H. H. Dixon, Borough Clerk, Millvale, Penn.

CONTRACTS LET

Contract No. 33—Yonkers, N. Y.—This contract (p. 1009, Vol. 6), which provides for furnishing 300 gross tons of steam coal and 60 tons of nut coal, to be delivered at the bath houses; 250 tons of Scranton pea coal to the crematory; 280 tons of egg coal and 10 tons of steam coal to the City Hall building, has been awarded to Hays & Randolph, Yonkers. Address E. P. Walsh, Secy., Board of Contract and Supply, City Hall Building, Yonkers.

Contract No. 34—Newark, N. J.—This contract (p. 1009, Vol. 6), which provides for furnishing and delivering 800 gross tons of buckwheat coal has been awarded to Joseph H. Lucking, Sussex Ave., Newark, at $3.10 per ton. Address, M. R. Sherrerd, Ch. Engr., Board of Street and Water Commissioners.

Contract No. 39—Youngstown, Ohio—Bids on this contract (p. 39), which provides for furnishing and delivering 20,000 tons of coal f.o.b. cars at the City Water Works Pumping Station, Filtration Plant, and City Crematory, were made as follows:

Name	Run-of-Mine	Nut	Slack	Nut and Slack 1½ In.	3 In.	Crusher Mine-Run	Nut and Slack
H. K. Wick & Co.	$1.85	$1.75	$1.62	$1.70*	$1.75	....	....
Youngstown Ice Co.	1.85	1.80	1.50	....	....	$1.98	$1.70
Verner Coal & Coke Co.	1.85	1.80	1.60	....	....	2.15	1.67
Valley Camp Coal Co.	1.70	1.80	1.47	....	....	....	1.65
Pittsburgh Coal Co.	1.90	1.84	1.60	....	....	1.95	1.75
Henderson Coal Co.	....	....	1.60	....	....	1.68	1.65
Youghiogheny & Ohio Coal Co...	1.90	1.90	1.60	....	....	....	1.75

*Contract awarded.

Address H. C. Fox, Clerk, Department of Public Service, Youngstown, Ohio.

Contract No. 42—New York—This contract (p. 108), which provides for furnishing and delivering coal to the College of the City of New York, has been awarded to Meeker & Co., for 1000 tons of No. 1 buckwheat coal and to Pattison & Bowns, for 600 tons of No. 3 buckwheat coal and 200 tons of semi-bituminous run-of-mine. Bids were as follows:

	1000 Tons No. 1 Buckwheat		600 Tons No. 3 Buckwheat		200 Tons Semi-Bituminous Mine Run	
Name	Ton	Total	Ton	Total	Ton	Total
John W. Peale.....	$3.53	$3,530	$2.97	$1,782	$3.95	$7.90
Meeker & Co.......	3.28	3,280	3.13	1,878	3.78	7.56
Pattison & Bowns....	3.47	3,470	2.39	1,434	3.43	6.86
Charles D. Norton & Co........	3.39	3,390	2.67	1,602	3.75	7.50
Burns Bros.	3.57	3,570	2.80	1,680	3.82	7.64

Address, Curator, College of the City of New York, Room 114, Main Building, 139th St. and Convent Ave., New York.

Contract No. 43—New York—This contract (pp. 108, 189), which provides for furnishing and delivering coal for the Department of Parks, has been awarded to Burns Bros., at

$8797.97. Address Department of Parks, Municipal Bldg., New York.

Contract No. 44—New York—This contract (p. 108), which provides for furnishing and delivering white ash anthracite coal has been awarded to Burns Bros., New York. Bids were as follows:

Amount	Streat Coal Co.	Olin J. Stephens	Burns Bros.	John S. Conabeer	S. Trimmer & Sons, Inc.
150 tons egg......	$1,084.50	$1,018.50	$1,014.00	$1,042.50	$1,108.50
50 tons egg.......	344.00	325.50	338.00	347.50	369.50
20 tons egg.......	142.60	135.80	135.20	139.00	147.80
20 tons egg.......	142.60	135.80	135.20	139.00	147.80
150 tons pea......	709.50	700.50	693.00	705.00	724.50
150 tons pea......	717.00	700.50	693.00	705.00	724.50
Totals.........	$3,140.20	$3,026.60	$3,008.40	$3,078.00	$3,222.60

Address, Mr. McCoy, Contract Clk., Municipal Bldg., Crotona Park, 177th St. and Third Ave., New York.

Contract No. 46—New York—The important bids, including the awards, on this contract (p. 149), which provides for furnishing and delivering white ash anthracite coal, as required, to the various office buildings, clinics, hospitals, day camps and disinfecting stations of the Department of Health, in New York, and at the tuberculosis sanitarium at Otisville, Orange County, N. Y., were as follows:

CLASS NO. 1—For delivering 2000 tons No. 1 buckwheat and 100 tons stove coal at the Willard Parker Hospital: Charles D. Norton Co., $6740; John W. Peale, $6656; George D. Harris & Co., $6160; Meeker & Co., $6728; Pattison & Bowns, $6619 (awarded contract); Commercial Coal Co., $7690.

CLASS NO. 13—For delivering 2500 tons No. 1 buckwheat and 100 tons stove coal to the Riverside Hospital: Charles D. Norton Co., $9117; John W. Peale, $8818 (awarded contract); George D. Harris & Co., $8325; Meeker & Co., $8918; Pattison & Bowns, $9014; Commercial Coal Co., $10,264.

CLASS NO. 21—For delivering 2500 tons No. 1 buckwheat and 75 tons stove coal to the Kingston Ave. Hospital: Charles D. Norton Co., $10,051.25; John W. Peale, $10,367.75; George D. Harris & Co., $9700; Meeker & Co., $10,245; John F. Schmadeke, $9984.25 (awarded contract); Bacon Coal Co., $10,077.50.

CLASS NO. 24—For delivering 250 tons of stove and 250 tons of pea coal to the Riverside Hospital: Meyer Denker, Sinram Co., $2550 (awarded contract); Burns Bros., $2710.

CLASS NO. 26—For delivering 1000 tons of stove and 100 tons of nut coal at the tuberculosis sanitarium, Otisville, N. Y.: John W. Peale, $6985; Pattison & Bowns, $6600; L. R. Wallace, Middletown, N. Y., $6284 (awarded contract).

Address Chief Clerk, Department of Health, Center and Walker Sts., New York.

Contract No. 48—New York—The bids on this contract (p. 149), which provides for furnishing and delivering 15,000 tons of mixed coal at St. George, Richmond, and 6000 tons of mixed coal at 39th St., Brooklyn, were as follows: For 15,000 tons, Geo. D. Harris & Co., $2.84; Chas. D. Norton Co., $2.89; Meeker & Co., $2.97; Gavin Rowe, $2.98; H. H. Lineaweaver & Co., Inc., $2.81; Pattison & Bowns, $2.97; Cullen Transportation Co., $2.75; W. P. W. Haff, $2.83. For 6000 tons mixed coal, Geo. D. Harris & Co., $2.79; Chas. D. Norton Co., $2.89; Meeker & Co., $2.97; Gavin Rowe, $2.98; H. H. Lineaweaver & Co., Inc., $2.81; Pattison & Bowns, $2.97; Cullen Transportation Co., $2.75; W. P. W. Haff, $2.83; John W. Peale, $3.19. Cullen Transportation Co. was awarded the contract. Address T. J. Slattery, Dept. of Docks and Ferries, Pier A. foot of Battery Place, North River, New York.

Contract No. 56—Milwaukee, Wis.—This contract (p. 189), which provides for furnishing 2000 tons of coal to the Menominee special sewerage pumping works, has been awarded to the Milwaukee-Western Fuel Co., 4 Grand Ave., Milwaukee, at $3.70 per ton (14,400 B.t.u.). Other bids were: Pennsylvania Coal & Supply Co., Milwaukee, $3.95 (14,200 B.t.u.); Wisconsin Coal & Dock Co., Milwaukee, $3.97 (14,300 B.t.u.). Address Frederick G. Simmons, Comr. of Public Works, or Percy Braman, deputy, Milwaukee, Wis.

FOREIGN MARKETS

GERMANY AND AUSTRIA

Some acute shortages have developed but the situation is now generally easy. Changes in transportation routes. Austrian government takes over a British colliery in Koenigswart.

East and West Prussia—Before the war the cities of Hamburg, Berlin and the Baltic depended chiefly upon Great Britain for household coals, on account of the better quality and the low ocean freights. These towns are forced now to seek their coal supplies from the Upper Silesian fields and, unfortunately, deliveries were greatly held up by the scarcity of railway transportation. Finally, the requirements of East and West Prussia were filled by shipping the coal down the Oder in barges to Stettin, this means of transportation having been developed a few years ago in consequence of a labor strike.

The Ruhr—This market has reached nearly normal conditins. There is a strong demand from Belgium and Holland which has been met, in part. Low water in the Rhine has affected shipments unfavorably. The demand for anthracite is unusually strong and these coals are scarce. The Syndicate has given notice of an advance of 29c. a ton which took effect, Jan. 1.

Vienna—The middle of November found Vienna facing a coal famine, deliveries from Silesia having fallen off 60% as the railway facilities were taxed to the limit by the military necessities of the campaign in Poland. The municipal authorities obtained an Imperial order forcing the soft-coal and lignite mines of Northwest Bohemia to make good the deficiency, and arrangements were perfected with twenty coal operators, to forward 3000 tons lignite. Further trouble was experienced in Vienna in the house deliveries, about one-half the teamsters having gone to the front; but the absolute wants of all are now being satisfied and the winter's supply is assured. The Britannia Coal Works, Limited, in Koenigswart, has been taken over by the Austrian government, which has appointed a commission to administer its affairs. The capital of the company is 2,568,000 kronen, of which 2,183,000 kronen are owned by John R. W. Griffith, Hendersyde Park, England—"Zeitschrift des Verbandes der Bergbau-Betriebsleiter."

GREAT BRITAIN

Jan. 15—Owing to scarcity of tonnage the position is a little irregular for prompt loading. For forward loading the tone is firm. Quotations are approximately as follows:

Best Welsh steam.......	$4.92@5.04	Best Monmouthshires....	$4.26@4.32
Best seconds...........	4.56@4.68	Seconds................	4.14@4.20
Seconds................	4.32@4.44	Best Cardiff smalls......	3.12@3.24
Best dry coals..........	4.56@4.68	Cargo smalls...........	2.64

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Tonnage is scarce and rates show a further considerable rise. Long delays are still being met with at various discharging ports. Rates are approximately as follows:

Gibraltar.........	$5.04	Naples..........	$7.20	Las Palmas......	$5.52
Malta............	6.00	Venice, Ancona...	9.00	St. Vincent.......	5.76
Marseille........	7.92	Alexandria.......	7.20	Rio Janeiro......	6.00
Algiers...........	5.52	Port Said........	7.20	Monte Video.....	5.88
				River Plate......	6.12

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for November and the five months of the fiscal years 1913 and 1914, in short tons:

	November				Five Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater......	246,545	16	255,344	17	1,609,526	17	1,313,390	1
East...........	210,076	13	248,297	16	1,054,787	11	1,029,925	1
West...........	1,057,626	68	891,521	58	6,282,760	66	4,831,363	6
Total........	1,514,247		1,395,162		8,947,073		7,174,678	
From Connections								
Bituminous.....	41,242	3	133,599	9	543,353	6	561,420	
Anthracite......	1,209		1,225		7,753		7,689	
Total........	1,556,698	100	1,529,986	100	9,498,179	100	7,743,787	10
Coke..........	11,304		28,535		79,670		147,918	

NORFOLK & WESTERN

Destination of shipments over this road for December an the twelve months of last year and the year before wer as follows, in short tons:

	December		Twelve Months	
Coal	1913	1914	1913	1914
Tidewater, foreign.......	150,886	108,820	1,542,950	1,904,3
Tidewater, coastwise.....	331,829	255,138	3,805,847	3,763,4
Domestic...............	1,427,236	1,277,207	19,512,118	19,804,2
Coke				
Tidewater, foreign.......	575	1,076	31,082	1,4
Domestic...............	121,379	71,999	1,567,323	1,017,1
Total...............	2,031,905	1,714,240	26,459,320	26,490,5

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

VOLUME 7 FEBRUARY 6, 1915 NUMBER 6

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The miners' officials finally consented to arbitrate the eastern Ohio strike. The coal companies are not disposed to concede the straight run-of-mine scale, formerly offered, believing a slack differential desirable and wholly legal. John D. Rockefeller, Jr., meets some of the officers of the United Mine Workers of America at his office. John R. Lawson and John Mitchell testify before the Industrial Relations Commission. A strike occurs in the anthracite region. COAL AGE, Vol. 7.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,250

None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

RUNNING A COAL mine is some responsibility — there's no doubt about that. But still there are many mine managers and superintendents who are actually assuming more responsibility than they have to.

I mean that today the wise super shifts the burden of responsibility in buying equipment, for instance, off his own shoulders and puts it onto advertising.

He buys only goods that are backed by the guarantee of continuous advertising and thus takes no unnecessary chances.

▫ ▫ ▫

J. H. NEEDHAMMER, Superintendent of Mine No. 2, Jackson Hill Coal Co., at Sullivan, Indiana, writes us as follows, on this subject:—

> "Your advertising pages have kept me in close touch with the new equipment, and I have frequently recommended the purchase of supplies and equipment advertised in your publication.
>
> "I have just decided to purchase the mining instruments advertised by the Davis Instrument Mfg. Co., Inc., of Baltimore, Md., and if they prove as satisfactory as previous purchases of other equipment I shall be well satisfied.
>
> "Past experience has taught me the reliability of Coal Age advertisers, and when I recommend the purchase of supplies advertised in your paper I do so without misgiving, and am willing to assume the responsibility for the order."

▫ ▫ ▫

YOU KNOW, if you come right down to it, a good part of modern efficiency in buying depends upon your familiarity with the advertising pages and advertised products in your technical paper.

If you haven't realized this truth, think it over.

Let Advertising Take Part of the Burden off Your Mind.

COAL AGE

Vol. 7 NEW YORK, FEBRUARY 6, 1915 No. 6

Power Plant Economy and Conservation of Coal

Of late the question of natural resources and their conservation has had much attention and has been the subject of scientific and congressional investigation, and, to some extent, legislation.

One great natural resource, coal, can be conserved to the extent of utilizing what is now a waste product of mining operations, and be thus made to accrue to the immediate financial benefit of the mine owner.

As there is no cheaper fuel at the mine than its product—coal—in the average mine boiler plant, little attention has been given to securing the maximum production of power from the coal used. The cheapness of the fuel has apparently made it unnecessary to go to any expense to insure proper combustion.

Consider the waste products of anthracite mines—culm — silt — washery refuse, etc., having a good heat content, but no market value—of bituminous mines, refuse with 25 to 35 per cent. ash and slate; plenty of heat units, but again an unsalable product.

Many anthracite mines are burning the smaller sizes of buckwheat in their boiler plants and piling up immense heaps of waste, just as bituminous developments are burning run-of-mine and slack and piling up refuse banks. With the exception of a few large operations it has been, and is still, the practice to use a marketable coal hand-fired by cheap labor.

Some of the large anthracite producers have modernized their power plants by installing large boiler units, fired with mechanical stokers, by means of which culm or silt can be economically burned. This releases for the market the coal formerly consumed. The same stoker has created a demand for the size of fuel employed, so that contracts are now being made for the shipment of what is commercially known as No. 3 and No. 4 buckwheat.

By the use of stokers and conveying machinery for coal and ashes, there is also a great saving in non-productive labor. Although some large bituminous producers have installed modern equipment and are utilizing refuse, the possibilities have hardly been touched, as millions of tons of this material are thrown away annually. Each mine probably disposes of more than enough to operate its own power plant.

To burn a low-grade fuel containing 25 to 35 per cent. of ash, by hand-firing, is difficult, if not impracticable. Only by the use of mechanical stokers and conveying machinery can it be utilized to advantage.

With a properly-designed equipment of boilers and stokers, with forced draft, together with coal and ash conveying machinery, it is possible to operate boilers considerably in excess of their rated capacity with refuse of this character; and at the same time the labor cost per ton of fuel fired is greatly reduced.

Coal that was formerly used at the mine will then be available for market.

The cost of refuse as fuel may be taken as the fixed charges, maintenance and operating expense on the stokers and conveying machinery, plus the boiler room labor. Comparing this cost with that of using a salable fuel charged against the boiler plant at the market value, plus boiler room labor, it will be seen that the net saving is a large one which cannot well be overlooked.

The difference would pay for the stokers and conveying machinery in a short time.

This general proposition applies to both anthracite and bituminous operations. Each plant, however, presents its own peculiar problems.

If these are intelligently studied, the proper selection of equipment cannot but result in large savings in operating costs and an increased production of marketable coal.

—By John Van Brunt.

Generating Stations and Some Features Governing Their Design

By E. A. Lof*

SYNOPSIS—Modern power stations are of three distinct varieties according to the working fluid employed—steam, water or gas. Although the prime movers and generators vary radically in these various types the control and transmission apparatus in all three classes of plants are strongly similar.

Electricity is not in itself a primary source of energy. To become available for conversion into electric power, the forces found in nature must first be converted into mechanical energy by some form of prime mover. In all practical cases electric current is again transformed before being utilized. Electricity is therefore the most convenient form in which, for many purposes, energy may be transmitted and distributed.

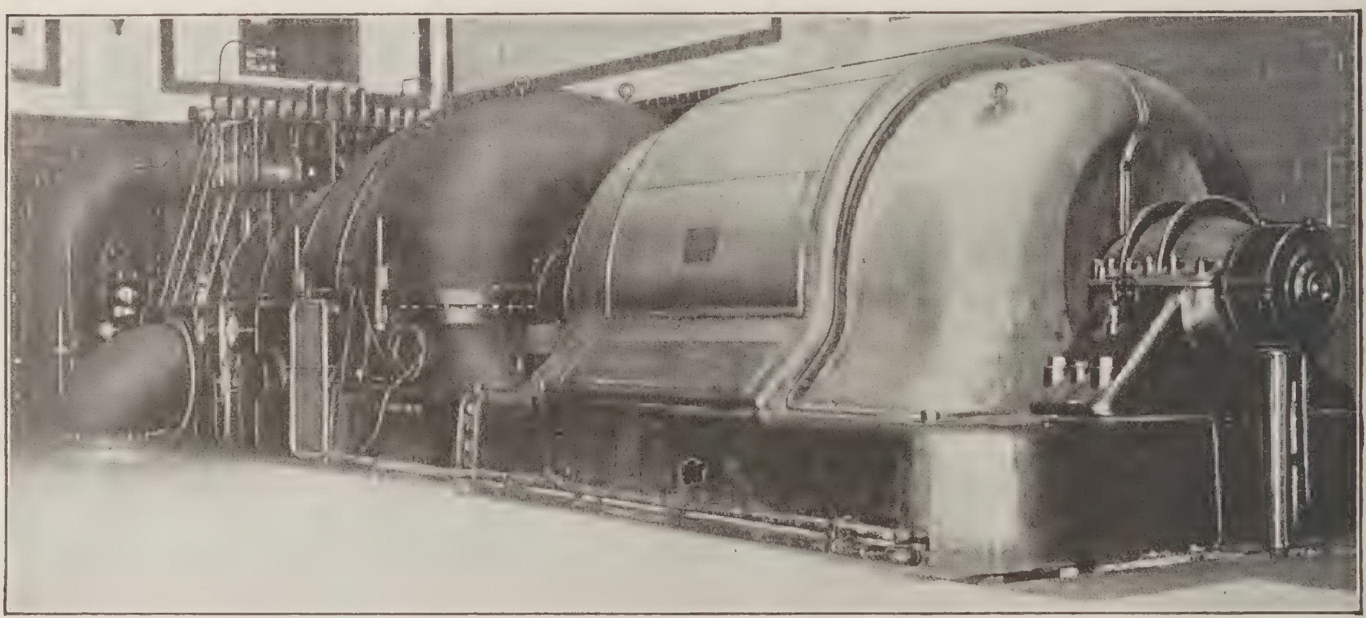
It is needless to dwell upon the enormous increase that has taken place in the use of electric power during the past 10 or 15 years. The rapid advance is best illustrated by a reference to the accompanying curves, which are self-explanatory. For the generation of this power, the steam turbine and the waterwheel stand foremost, and it is an astonishing rate at which the size, as well as the efficiency of these prime movers, has increased of late. A single-unit 35,000-kw. steam turbo-generator is now under construction and there is every reason to believe that the 50,000-kw. mark will be passed in the not very distant future.

Comparing the above unit with those of 10 years ago it is interesting to note that the over-all efficiency has been increased something like 20 per cent. while the weight per kilowatt has been reduced more than half.

Similarly with waterwheels and internal-combustion engines, the former are now being built in sizes of 17,500 kw., and while an active development of the latter took place a few years ago in connection with the steel industry, their use during recent years has mainly been confined to small and medium-sized isolated plants.

This marked increase in the efficiency of prime movers and electric apparatus, besides the equally pronounced decrease in their cost, has made it possible even for the smallest town to support its own electric lighting plant. The introduction of extensive transmission and distributing systems has, on the other hand, still further lowered the cost of power and makes possible the supply of very small quantities throughout rural districts.

There is at present a strong tendency to connect together two or more plants or systems with a view of interchanging power as conditions require. The result is necessarily increased reliability and improved service conditions. The consolidation of a number of properties under one management and the concentration of a large number of small power plants in one or more large ones have had a marked effect in reducing the cost of electric energy.



A 30,000-Kw. Horizontal Steam Turbine and Generator

There are numerous advantages in such consolidation. The first cost per kilowatt of the large units entering into the construction of a big plant is lower than that of the small units entering into a small plant. The initial expenditure necessary for a given service is therefore reduced as is also the annual fixed charge thereon. A large plant can obviously be operated more economically than a small one. It can afford to maintain a more efficient engineering staff and take advantage of economies which would be out of the question in a small plant.

Another advantage of the large central station lies in serving a diversified load, since one kilowatt capacity of such a station is equivalent to considerably more than one kilowatt if each part of the combined load were to be served separately.

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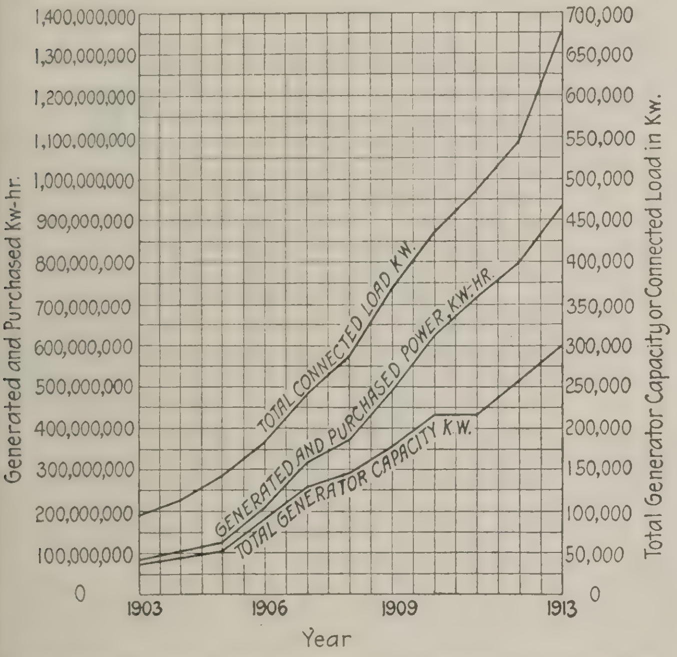
*General Electric Co., Schenectady, N. Y.

Admirable examples of what consolidation can accomplish is found in our public-service corporations and the large central stations in our great cities. Notable among the latter is the Commonwealth Edison Co., of Chicago, the enormous expansion of which is clearly illustrated in the accompanying curves.

The load factor of a plant or system is the ratio of the average to the maximum power during a certain period of time. The average power is taken over a certain interval, such as a day, a month or a year, and the maximum over a short period of the heaviest load within that time. In each case the interval of maximum load and the period over which the average is taken should be definitely specified, such as a "half-hour monthly" load factor, the proper interval and period being usually dependent upon local conditions.

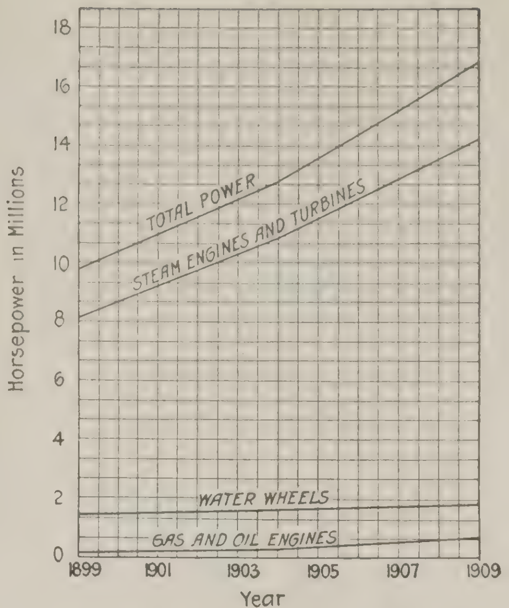
The load factor is therefore in a sense a measure of the extent to which the investment is being utilized, this in turn affecting the cost of the power generated. The ideal conditions would obtain if the station could be operated at its rated capacity for the full 24 hours of the day, but this is evidently out of the question and even a close approach thereto is only possible under special conditions, such as for example in electrochemical industries.



Growth of the Commonwealth Edison Co., Chicago

The subject of load factor is nowadays given careful study and consideration, and marked improvements have been made in increasing the same by our large central stations by combining lighting, street-railway and industrial loads. Thus the Commonwealth Edison Co. operates with a 44 per cent. load factor, while from 30 to 35 per cent. is the average for central-station service.

Reliability is naturally one of the main considerations in any power-supply undertaking. It follows that the more reliable the service is, the higher will be the charge for power, due to the increased investment in reserve equipment and protective devices.



Primary Power Used in Manufacturing Industries

For a steam plant the reserve equipment usually consists of one or more spare units, and while such are also provided in important hydro-electric developments, it is becoming a general practice with the latter to provide auxiliary steam stations.

The function of such stations depends principally upon the hydro-electric development in question, the load and its nature. It may be any one or a combination of the following:

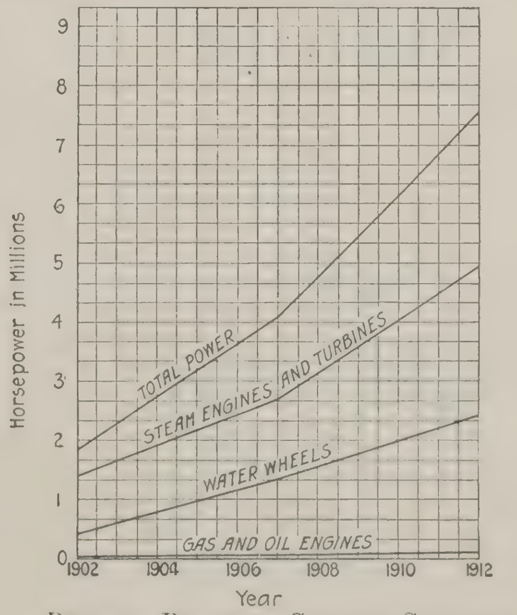
1. To be held as an emergency reserve to take over the load in case of a breakdown in the hydro-electric plant or transmission line.

2. To be held in reserve for periods of low or insufficient water supply.

3. To be held in reserve for peak-load periods.

4. To be operated continuously in conjunction with the hydro-electric plant.

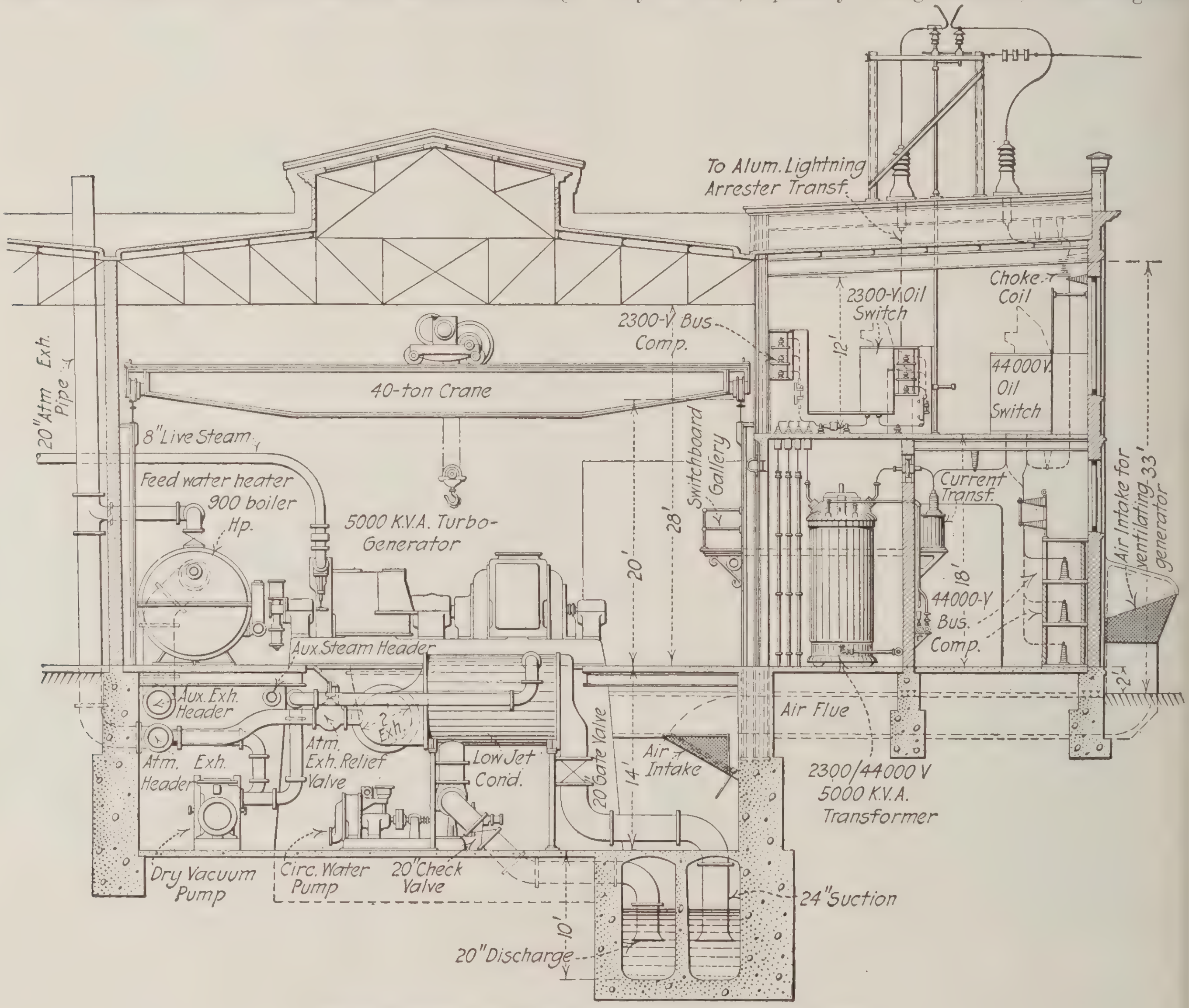
Almost all systems of any importance generate three-phase alternating current on account of its economy and the ease with which it can be transformed and trans-



Primary Power in Central Stations

mitted. Should direct current be required, as for example for traction service, it can readily be obtained by means of converters or motor-generator sets.

The standard frequencies in this country are 25 and 60 cycles, the choice depending upon the service and local conditions of the development. Sixty cycles is, of course, preferable as it is better adapted for lighting, and gives many more possible speeds for generators as well as motors. For long transmission lines or extensive underground systems, the 60-cycle frequency may not be permissible on account of its detrimental effect on the voltage regulation. Changing over from one frequency to the other or tying together two systems of different frequencies can, however, readily be accomplished by means of frequency changers.



Cross-Section of a Steam-Turbine Power Station

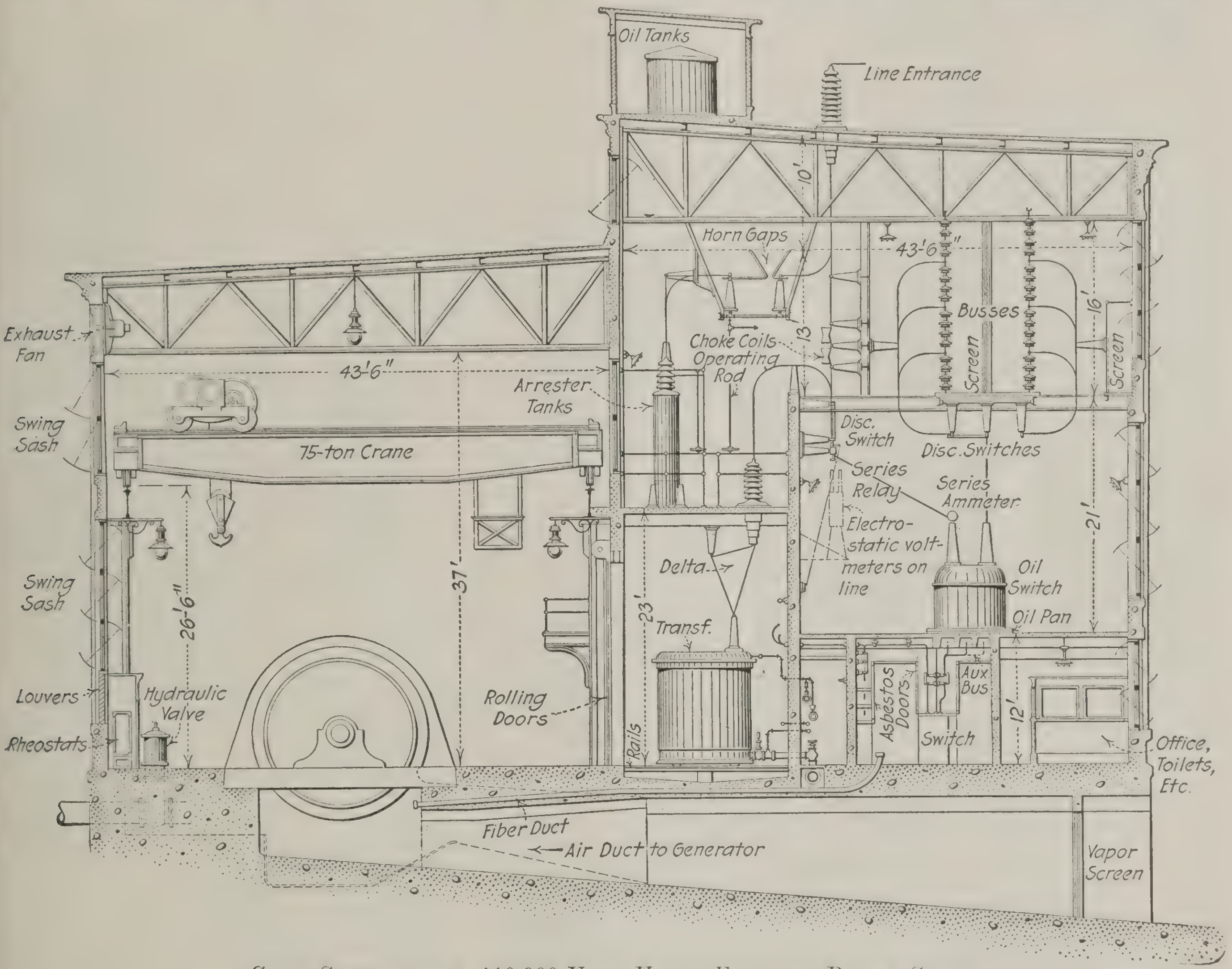
The generator voltage is determined by the nature of the load and the distance of transmission, the standard values ranging from 240 to 13,200 volts. Whether the generators are to be wound for high voltage and direct transmission, or for a lower voltage and used with step-up transformers, is to a certain extent decided by the relative cost of the two methods. If economically feasible the latter method is the more reliable and to be recommended especially for small and medium-sized plants. In other instances the nature of the local load may be such that, by installing high-voltage generators, power for this load may be directly transmitted at the generator voltage, while step-up transformers may be provided for raising the pressure of the current which is to be transmitted for greater distances.

When arranging the apparatus in any kind of power station, simplicity and reliability of operation should be carefully kept in mind. Provision must also be made for symmetrical extensions to the plant to provide for future requirements. The unit principle of installation is generally followed, especially in large stations, the distinguishing feature of which is that the prime movers, generators, transformers, etc., are arranged in separate units or groups, each one of which embodies all the essential features of a complete generating plant, with the great advantage that trouble with any single piece of apparatus is localized and its effect only felt in that unit of which it forms a part.

The boilers may be arranged either in a single or double row facing a firing aisle, running the full length of the station, or there may be several lateral firing aisles, each serving a double row of boilers. Where ground space is valuable, the double-deck feature may be utilized. This, however, requires a heavy building, while on the other hand it complicates operation to a considerable extent

The prime movers and generators are as a rule installed on the main floor in a line parallel with the major axis of the building, and with a sufficient spacing between units to provide for a free passage. With vertical water turbogenerators the turbine proper is located in the basement. This is usually also the case with the condensers in a steam plant. All piping is carried below the main floor, thus avoiding the objectionable appearance of exposed piping.

The exciters should be located in the center of the generator room, so as to reduce the field leads to a minimum and simplify the sectionalizing of the system. Where one exciter is furnished for each generator, they should of course be located as closely to their respective units as possible and are often direct-connected to them.



Cross-Section of a 110,000-Volt Hydro-Electric Power Station

The transformers are mostly placed in compartments on the main floor directly back of the generators, and a track is provided in front of these compartments so that they can be readily removed for repairs.

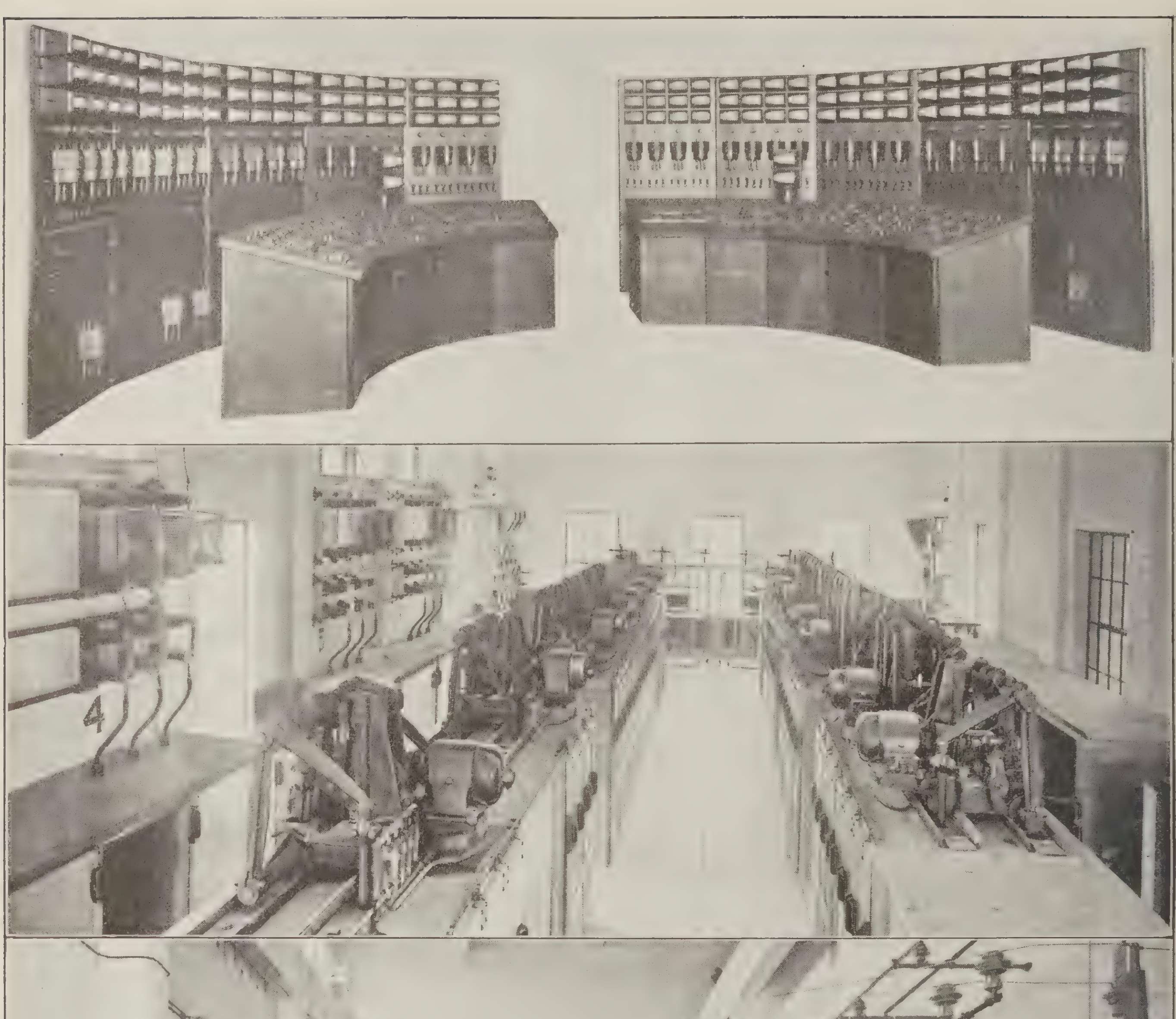
The busbars and oil switches are located on the various floors of the switch-house, with the control board so situated that an unobstructed view can be obtained of the station. It is difficult to fully describe the complete arrangement of all the apparatus in detail, but a reference to the accompanying cross-sections of two modern steam and hydro-electric power stations will clearly explain the same.

For important installations water-tube boilers are the only kind suitable, their design permitting of high steam pressures and the easy application of superheaters and economizers. There exists quite a difference of opinion as to the sizes which should be used. While in large installations, boilers with a rated capacity of 2400 hp. have been installed and are giving excellent results, there are many engineers who think that a 1200-hp. unit is as large as is desirable. For medium-sized installations, on the other hand, units of from 500 to 600 hp. are generally employed.

The particular type of prime mover depends, of course, on the working fluid, i.e., whether steam, gas or water.

Steam turbines are now almost exclusively used even in sizes below 500 kw., as well as for driving auxiliary apparatus such as feed and condenser pumps, etc. High-pressure condensing units are operating at steam pressures from 150 to 250 lb. and for all installations where efficiency is of great importance superheat is used, this varying from about 125 to 150 deg., the vacuum generally employed ranging from 28 to 29 inches.

Marked improvements have been made in the efficiency of steam turbine installations during the past few years. This has been due not only to improvements in design, but also to a wide use of superheated steam and higher vacuum. A 500-kw. unit, for example, when operating on a steam pressure of 150 lb., 125 deg. of superheat and



A Large Switchboard of the Bench Type, a Number of Motor-Operated Oil Switches in a Substation, and the Interior of a Substation Showing Motor-Generator Sets and Step-Down Transformers a 28-in. vacuum, has a steam consumption of approximately 17½ lb. per kilowatt-hour, while a 15,000-kw. unit operating at a steam pressure of 250 lb. with 125 deg. of superheat and a 29-in. vacuum, has the remarkably low consumption of only about 11½ lb. per kilowatt-hour.

When internal-combustion engines are used the gas is usually manufactured in producers, although in steel plants it is obtained from the blast furnaces. It is mainly in this industry in which the gas engine has been used to any considerable extent, the units ranging in capacity from 4000 to 6000 hp., the latter size being the largest available.

The Three Kinds of Head

Water-power plants naturally divide themselves into low-, medium- and high-head installations, requiring wheels of entirely different characteristics. Many developments are also subject to a wide variation in water level, and in many low-head installations the back water may bring about a change in the head which is beyond the capacity of one wheel to accommodate, so that in some plants additional wheels must be mounted on the same shaft and cut into service at times of low head.

The reaction type of turbine is generally used for heads from 10 to 600 ft. and the impulse wheel for heads ranging from about 300 to 3000 ft. The proper system is, therefore, well fixed for low and high heads, while for the intermediate range between 300 and 600 ft. the correct type must be determined by comparing the unit speed characteristics.

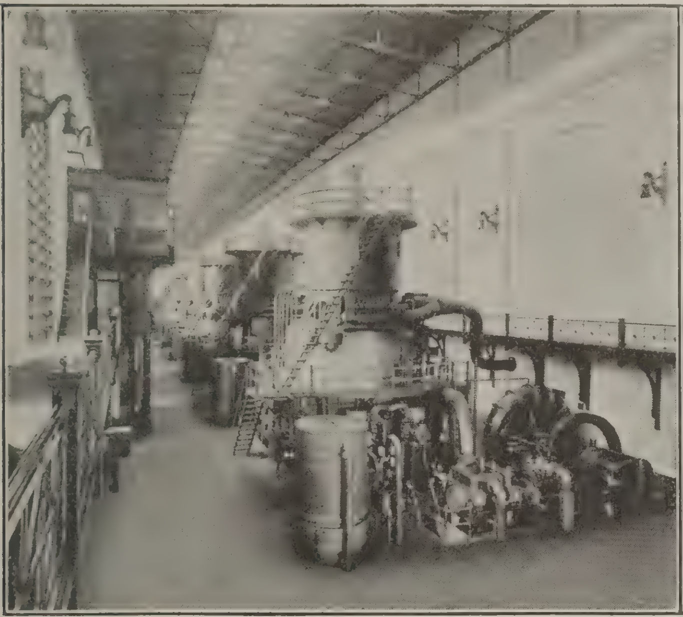
In determining the proper rating and capacity of the generators for a power station, both this machine and its prime mover must of necessity be treated as a combination so as to secure the highest operating efficiency. With steam engines the point of maximum efficiency is rather marked, and the ratings are usually such that the engine is working under its most economical load at the rating of the electrical generator. With gas engines, however, the efficiency increases with the load beyond the capacity of the machine, and for this reason the rating of such an engine is generally made as nearly as possible to its maximum capacity with only a small margin for regulating purposes. With steam turbines the efficiency curve is almost flat so that it is a question of desirable overload capacity which limits the rating of the turbine. In the waterwheel unit, the efficiency usually falls off rapidly above and below the maximum point, so that the rating of the generator should correspond to the point of maximum efficiency of the wheel.

The number and size of the units are usually indicated by some condition in the proposition. When this is not the case the load factor, the nature of the load, the reserve capacity, the reliability and flexibility of the service should be most carefully considered. For this reason single units are never desirable, except for multiple-plant systems, in which case the necessary reserve can be obtained from other stations.

The effect of the power factor should also be considered when determining the prime mover as well as the generator capacity. Many mistakes have been made in this respect. The generator may, for example, have been designed and rated on the basis of unity power factor operation with a prime mover having a corresponding capacity. After installation it may be found that the actual operating power factor is 0.80, with the result that only 80 per cent. of the prime-mover capacity can be utilized without overloading the generator.

Most alternating-current generators are wound three-phase with the armature windings connected in star. This is preferable to delta connection, as a smaller number of conductors is required for a given voltage, while on the other hand the danger of the circulation of triple-frequency currents in the closed armature winding is avoided.

Whether the generator neutral should be grounded or not depends on the operating conditions. If an uninterrupted service is the most essential consideration, the system should not be grounded, while if it is more desirable to limit the voltage stresses, it may be advisable to ground the neutral, thus limiting the stress to the Y-voltage. Grounding may also be advisable where selective action is desired on a number of outgoing feeders, especially underground, so that individual conductors may be disconnected even in the case of grounds.



Interior of a Large Steam-Driven Power Station

Interior of a Large Hydro-Electric Power Plant

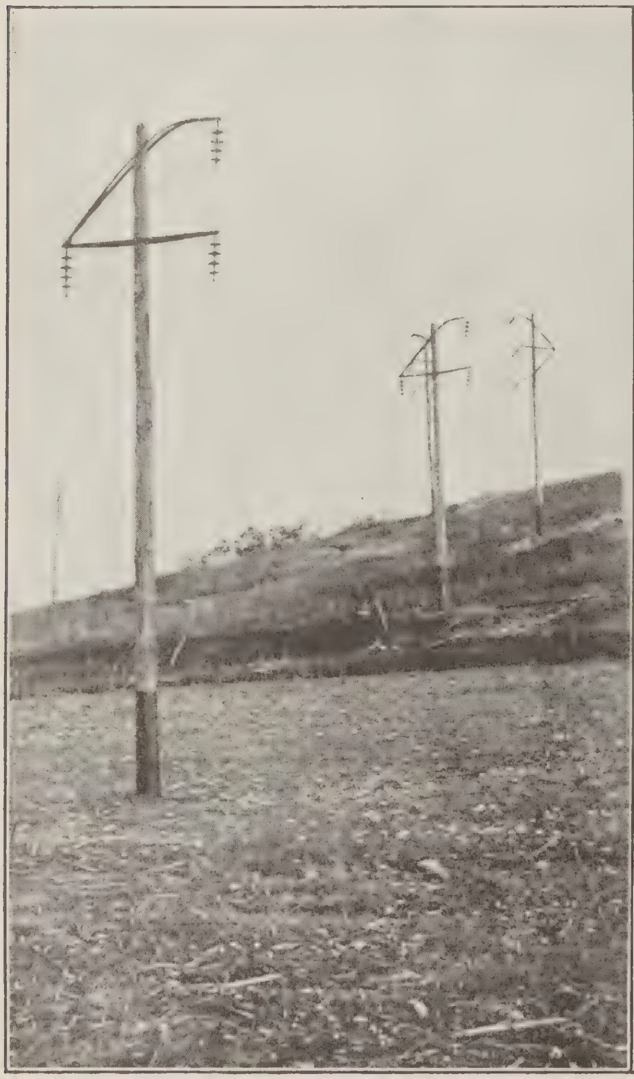
In transmission systems with one or two lines except for extreme voltages the isolated system seems to be the most favored. The apparatus must therefore be designed to withstand the full delta-voltage. If this is not advisable the neutral must be dead-grounded; but in this case the mechanical design of the apparatus must be such that it can safely withstand the stresses due to frequent short-circuits which occur when grounds take place.

Generators May Be Grounded through Resistance

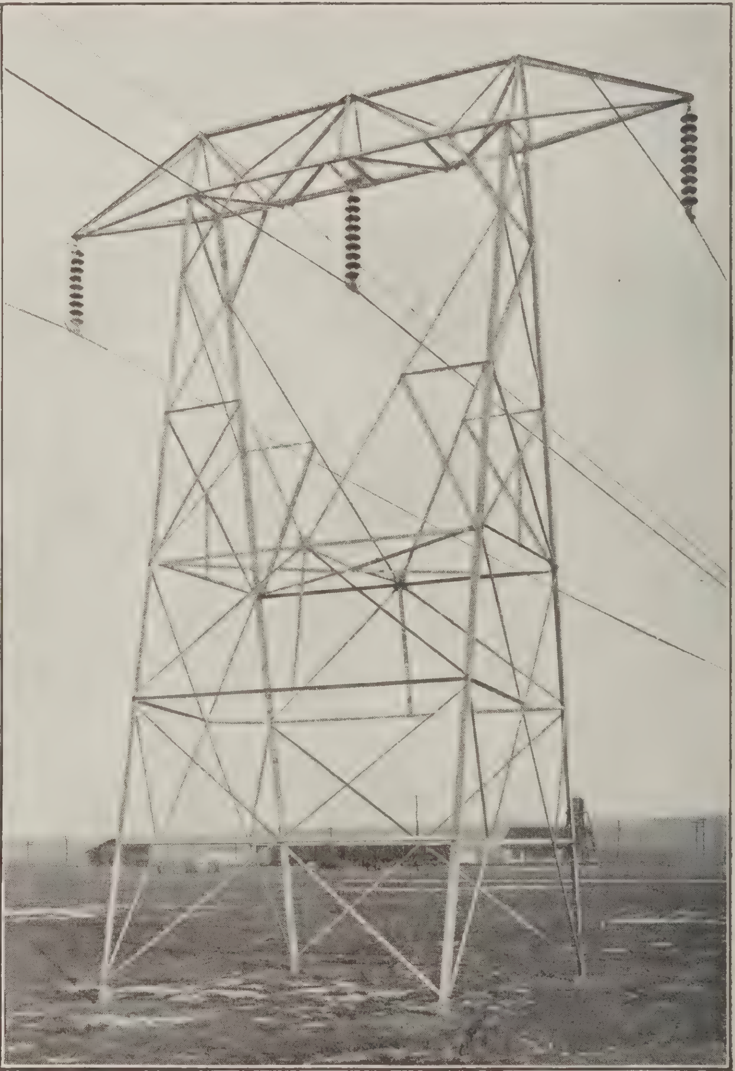
If the grounding is done to insure selective action of feeders, it may be advisable to ground the generators through a resistance. In this case, however, the voltage strain is not limited to the Y-voltage and this must be given due consideration. The resistance should have a value high enough to limit the neutral current, but still low enough to insure that, if a ground occurs in one phase, it will permit a sufficiently large current to flow in the neutral to open the protective circuit-breakers.

Non-inductive resistances are preferable to reactances, since they eliminate the danger of high-frequency oscillations between line and ground through the generator reactance in the path of the third harmonic, by damping the oscillation in resistance. The grounding of the neutral through a resistance may therefore be dangerous, owing to the possibilities of a resonance voltage rise.

Close inherent voltage regulation requires a low reactance, which means an expensive machine. This is possibly not as important as the fact that a low-reactance machine, in case of short-circuits, allows a heavy current to flow through the machine and through any other apparatus that may be within the circuit inclosed by the short-circuit. The mechanical stresses set up by these short-circuit currents, which reach enormous values in large concentrated central stations, are liable to severely damage the apparatus, and in order to reduce the currents to safe values large reactances are necessary.



A 66,000-Volt Transmission Line with Wishbone Cross-Arms



Steel Tower on a 15,000-Volt Transmission Line

External Reactances Are Usually Provided

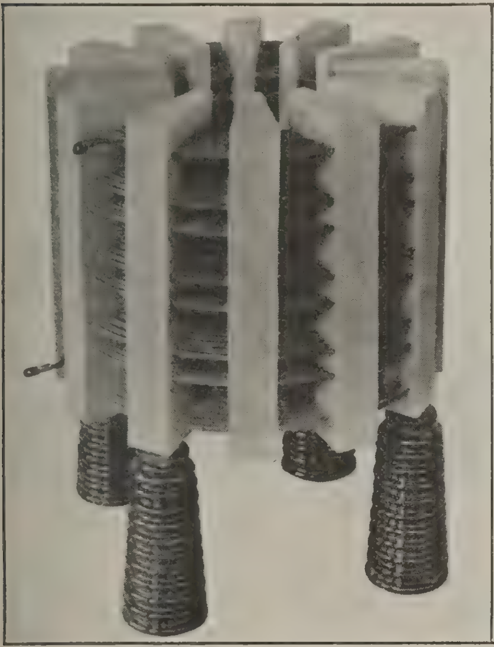
It is not possible to design high-speed turbo-generators for the necessary reactance, and external reactances must usually be provided and inserted in the generator leads or between the bus sections. By so limiting the abnormal flow of current into a short-circuit the generating system as a whole is relieved from their disastrous effects.

Not the least important part of the generating station is the exciter system, many more or less satisfactory combinations being possible.

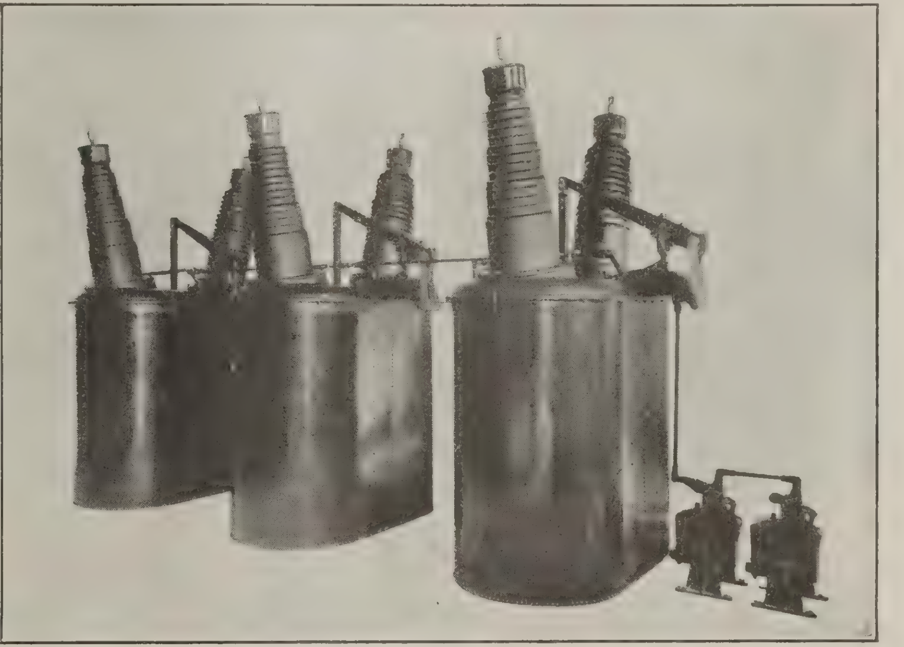
The exciters should have a capacity sufficient for all of the synchronous apparatus in the station when these machines are working at their maximum load and true operating power factor. It is not enough to provide for the excitation when running at unity power-factor, because the excitation which is required at lower power-factors is considerably higher than at unity power-factor.

For small and medium-size plants a 125-volt exciter pressure is generally chosen, while for larger installations a 250-volt excitation will prove more economical.

Although many systems of excitation are in use the one which seems to be the most widely employed and which offers the greatest reliability is that in which the exciting current is obtained from a common source, consisting of as few machines as possible. One or two units are then generally provided for normal excitation, a third being installed as a reserve. It is also common practice to have the regular exciters driven by prime movers, such as steam engines or waterwheels, while the reserve unit is motor driven.



A Current-Limiting Reactance



A Triple-Pole Solenoid-Operated Oil Switch

Still another system which is becoming quite common is to install low-voltage generators, driven either by a non-condensing steam turbine or a waterwheel. The exciters are then motor driven, current therefor being obtained from the low-voltage generator. The steam from the turbines is exhausted to the feed-water heaters. In addition to the exciters all the other auxiliaries, such as circulating pumps, etc., are also motor driven.

In order to insure a close voltage regulation of the system automatic regulators are almost always installed in connection with the exciters. These maintain a constant a.c. busbar voltage regardless of the load.

For low- and moderate-voltage installations it is the general practice to install one transformer bank for each generating unit and of the same capacity. For high-voltage transmission systems, the transformer should form a unit with the transmission lines, i.e., the number of groups or banks should be equal to the number of lines. In this manner all high-tension switching, which is highly objectionable, can be avoided, and the same done on the low-tension side of the transformers.

The transformers may be either of the single-phase or three-phase type, and no specific rule can be given regarding the choice, this being usually governed by local conditions. Single-phase transformers are preferable where only one group is installed and where the expense of a spare is unwarranted. In such installations the burning out of one phase of a three-phase unit causes considerable inconvenience, since the whole transformer would have to be disconnected before repairs could be made. If single-phase transformers are used and connected delta on both primary and secondary, the damaged unit can be readily cut out and the other two operated with normal temperature at 58 per cent. of the normal capacity of the group until the damaged unit can be replaced.

With a three-phase, shell-type transformer, if both the primary and secondary windings are delta-connected, trouble in one phase will not prevent the use of the other two in open delta. By short-circuiting both the primary and secondary of the damaged phase and cutting it out of the circuit, the magnetic flux in that section is entirely neutralized.

Three-phase transformers may be used in moderate voltage installations with a large number of units. For high-voltage developments, where the transformer banks should be of equal capacity to the lines, it is, however, usually necessary to select single-phase transformers so as to obtain the required capacity, and also reduce the cost of the spare unit.

According to the method used in dissipating the heat generated by the losses, transformers may be classified as oil-cooled, water-cooled and air-blast.

In the oil- or self-cooled types the oil heated by contact with the exposed core and windings rises to the surface, flows outward and descends along the transformer case, from which the heat is radiated into the air. The tanks of self-cooled transformers are therefore usually made of corrugated sheet steel to give a greater radiating surface. This type of transformer is the one most generally used.

Where water is available for cooling purposes, the water-cooled transformer is the variety most economical to install. In this type the oil circulates in a manner similar to that in the self-cooled type, but the bulk of the heat is carried away by water forced through a pipe coil submerged in the hottest oil at the top of the transformer. Ordinarily the water rate is approximately one-half gallon per minute per kilowatt loss, the temperature of the incoming water being 59 deg. F.

In the air-blast transformer type the cooling is effected by a forced draft of air which is directed through spaces provided between the coils and in the core structure. This class of transformer is applicable for voltages up to about 33,000, but it is being rapidly superseded by the self-cooled type.

The System of Connections Is Important

The system of connections and the switching equipment have a most important bearing on the successful operation of any power installation. When laying out the same the first consideration should be reliability and continuity of operation, while at the same time economy must not be lost sight of.

By carefully planning the connections and by providing switches with selective devices at certain points it is possible to reduce the interruptions to a minimum without exceeding economical limits.

The engineering problems involved in this phase of the subject are rather complicated and differ considerably, depending on the type of installation. As a rule, generators should be paralleled on a low-tension bus, which should be sectionalized if their total capacity exceeds the safe rupturing capacity of the switches. In certain stations no paralleling bus is provided, but simply a transfer bus of light dimensions.

For moderate-voltage stations the step-up transformers, if such are present, are usually also paralleled on the high-voltage side, while for systems employing extreme potentials the different transformer banks should form a part of the line and not be paralleled on the high-tension side, as previously mentioned.

The generator switches, which are installed in the leads between the generators and the low-tension bus, are as a rule of the non-automatic type. As synchronous generators are capable of operating under short-circuit conditions for a limited time, it is considered better to have the operator disconnect a defective unit rather than to have all the machines in the station cut out of service in case of damage to one unit or a short-circuit in the low-tension switch structure.

In certain stations the generator switches are equipped with reverse power relays, in which case a damaged generator would be immediately disconnected from the system through the reversal of the current in its leads.

The transformer and feeder switches should be provided with automatic oil switches, the relays being so chosen that a selective action is obtained, i.e., so that a damaged section may be cut out without disturbing the rest of the system. When deciding on the proper switch and relay equipment for a power system it must be understood that this involves a complete study not only of the generating station but of the operating condition of the entire installation, including transmission lines and substations.

A 60,000-Kw. 110,000-Volt Outdoor Substation

High-Voltage Outdoor Lightning Arresters and Wall-Entrance Bushings

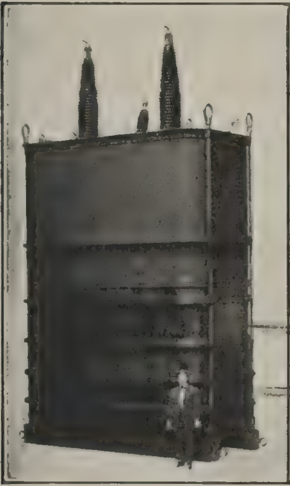
The switching equipment may for convenience be divided in two parts—the switch structure and the control board. This refers particularly to larger stations where the switches are electrically operated and located some distance from the board. For small and even moderate-sized stations it is a common practice to install hand-operated oil switches, which are mounted directly on the back of the switchboard or on a separate framework and operated by hand by means of levers located on the front of the switchboard panels.

In selecting the switches it is not sufficient that they have the proper current-carrying capacity and can withstand the operating voltage. Equally important is their rupturing capacity, i.e., their design must be such that they can safely withstand the effects of the total power which they may be called on to rupture.

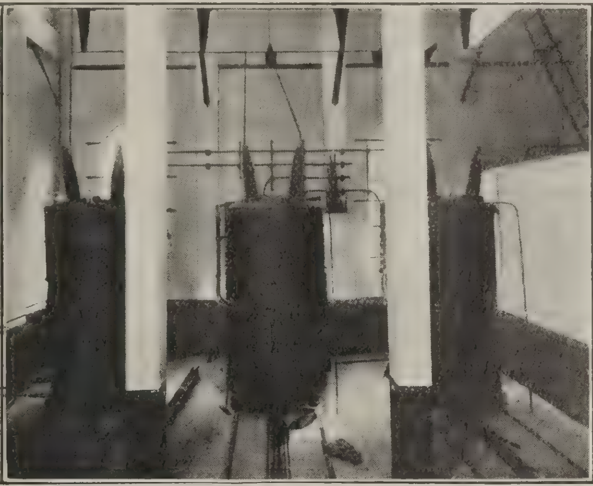
The switch and busbar structure may be either of the inclosed or open type, but is usually a combination of the two. It is generally found advisable to inclose all live parts when the voltage is below 22,000. This is due to the fact that the destructive effect of short-circuits depends on the amount of current and is thus inversely proportional to the voltage for the same amount of power. For this reason the low-tension apparatus and busbars in large power stations are generally inclosed in compartments, while their high-tension counterparts are of the open type.

The switch and busbar compartments may be built of brick or concrete, the latter material being almost exclusively used nowadays. For oil switch and busbar structures it is preferable to use brick on account of its greater strength and adaptability to the special forms of compartments and narrow barriers used for this apparatus.

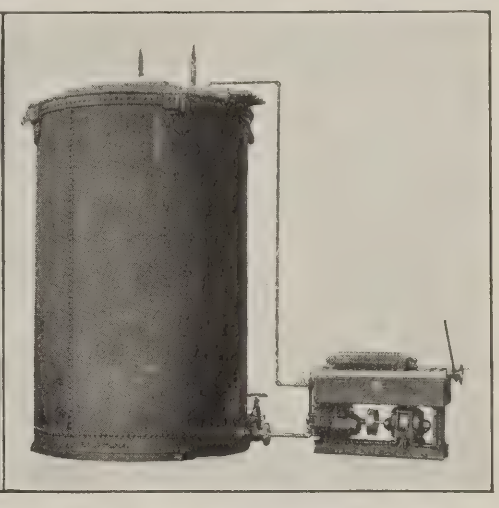
Low-tension busses are generally built up of laminations in the form of flat copper bars. This is the most economical construction since it insures a better radiation of the heat and can be tapered toward the ends where a small cross-section is sufficient. Furthermore the size can readily be increased as extensions are made to the plant. The high-tension bus, however, is almost always made of iron or copper tubing supported on post or suspension insulators.



A 4500-Kv.-a. 750,000-Volt Transformer



A Bank of Three 10,000-Kw. 110,000-Volt Transformers



An Oil Drier and Filter Drying Oil in an Operating Transformer

Every switchboard is, of course, special to a certain extent, as the conditions are seldom alike in different stations. The control board of a large station is strictly not a switchboard in the original sense of the word, as all the oil switches are located remote from it, being merely controlled therefrom. Upon the panels are mounted only the control switches and instruments. These should be arranged carefully, taking into consideration all the operating conditions. For this reason the board is divided up in panels corresponding to the machinery which it controls. The exciter and regulator panels are generally located at one end, then the generator, station, transformer and outgoing line panels in the order mentioned. This arrangement may, of course, be varied so as to more closely correspond to the arrangement of the apparatus.

Two different varieties of construction are customary, namely, the panel and the benchboard types. The panel type is mostly used in small- and medium-sized plants where the switches are located on pipework or in cells in the rear of the board, but near enough so that they can be operated by providing connecting-rods between the handles on the panels and the switches. In certain instances, this type of board is also used where the switches are electrically operated.

BENCHBOARDS PREFERRED IN LARGE STATIONS

The benchboard construction is the one generally used in large modern stations, as it provides the most compact layout, reducing the length of the board to a minimum. The instruments and meters are then mounted on the vertical panels, while the control switches, indicating lamp, receptacles, etc., are placed on the bench top.

A complete record of the operation of the various units in the station is of the greatest importance, and the instrument equipment should therefore be as complete as possible. Considerable misjudgment is, however, often exhibited in its selection, and the following recommendations may therefore prove useful:

For the exciters provide one ammeter and one voltmeter. If there is more than one exciter, a common voltmeter may be used. This should be mounted on a swinging bracket at the end of the board, and a two-point potential receptacle placed on the panels for each exciter.

Where these machines are driven by induction motors an ammeter should be provided for reading the current taken. The equipment for a synchronous motor when started from the a.c. side should include: One ammeter, one field ammeter, one polyphase indicating wattmeter; this latter may however be omitted.

For generators provide: Three ammeters, one polyphase indicating wattmeter, one voltmeter, one field ammeter, one four-point synchronizing receptacle, one eight-point voltmeter receptacle.

As all three-phase systems are more or less unbalanced, it is preferable if an ammeter is provided for each phase. In small installations one ammeter may be installed and a plug and receptacle provided so that the instrument can be connected to any one phase and the current read.

Indicating wattmeters are important, as it is not possible to determine by any other means the division of load between two alternating-current generators running in multiple. The ammeters do not differentiate between the idle current and the line current from the machines, and thus are of no use in determining the division of the load. In large stations it may also be advisable to provide a polyphase watt-hour meter for registering the amount of power which is generated.

Field ammeters are useful, but not absolutely necessary. They serve as a check on the generator in case of trouble, and are invaluable in testing therefor.

Voltmeters are, of course, used to read the voltage of the machine before it is connected in multiple with any other. They are also used to indicate the potential of the buses, and the eight-point receptacle is to connect the voltmeter to any of the phases.

The synchronizing receptacle is used to connect the generator to the buses leading to the synchronizing indicator. It is preferable to synchronize between machines and not between a machine and a bus. For this reason two plugs must be provided, one for "starting" and the other for "running," i.e., when sychronizing, the starting plug is inserted in the receptacle of the machine to be started, while the running plug is inserted in the receptacle of one of the operating machines. The synchronism indicator will then show whether the incoming machine is running too slow or too fast.

The station panel equipment should consist of one synchroscope, one power-factor indicator, one curve-drawing voltmeter.

In certain installations it may be advantageous to provide an indicating voltmeter permanently connected to the bus. A better comparison can thus be made between the bus and generator voltage when synchronizing. A curve-drawing voltmeter giving a continuous record of the bus pressure is of great value and in certain installations the importance of the service may be such that it is advisable to provide frequency and power factor indicators of the curve-drawing type.

Station feeders should be provided with: One ammeter with plug for reading current in either phase, one polyphase watt-hour meter (in large stations).

One ammeter may be provided in the low-tension circuit of each transformer bank. Outgoing lines are generally provided with three ammeters. These are usually of the series type, mounted on post insulators and located at a convenient point in the high-tension structure.

The electrical disturbances common with electric power developments may be divided into two general classes; first, those caused by excessive currents, and, second, those caused by high voltages.

Maximum Temperature Attained by Machine Determines Safe Load

The safe load which a machine can carry is determined by the maximum temperature which its insulation can withstand, and while machines as a rule are able to carry considerable overloads for a certain period, if this is greatly exceeded the insulation will rapidly deteriorate, resulting in a burn-out. For protecting apparatus against undue overloads of this kind automatic switches are provided in their circuits.

The excessive currents which are caused by short-circuits may reach high momentary values, and result in severe stresses being imposed upon the apparatus, which in turn may result in a failure of the insulation and a complete shut-down of the damaged apparatus if not the entire system. With the present tendency to concentrate large amounts of power, it is evident that the effects of a short-circuit may prove to be disastrous, and that means must be provided to limit current rushes to a safe value. On the other hand the system should be so sectionalized that the damaged part may be quickly isolated.

The most common method of reducing short-circuit currents is by introducing artificial reactance coils in the various circuits. These may be placed in the generator leads, in the low-tension transformer leads, between the busbar sections or in the outgoing feeders, the particular location being dependent upon the type of installation.

Devices for Reducing Short-Circuit Currents

Various schemes have also been devised for automatically reducing the value of the current which the generators are capable of delivering under short-circuit conditions. As almost all modern generators are controlled by automatic voltage regulators the tendency of these would be to hold up the voltage when a short-circuit occurs, but means are now often introduced which will result in a lowering of the generator voltage under such conditions.

High-voltage disturbances may, also, be divided into two classes; first, those covering actual high voltages in which the excess potential exists between phase conductors or between phase conductors and ground; and, second, localized high voltages which take place in the transformer windings, being caused by high-frequency impulses or traveling waves which are set up somewhere along the transmission lines. For guarding against the former class the aluminum cell electrolytic lightning arrester possesses ideal characteristics and is extensively employed, giving satisfactory protection.

Overhead ground wires are also used to a great extent to protect the transmission lines against static discharges, and in this connection it might be stated that a lighning arrester is not intended to protect the transmission lines but only the station apparatus, and while they could, of course, be installed and distributed along the lines, such a scheme would prove entirely impossible from a commercial viewpoint, for which reason ground wires are employed.

For protection against the second class of high-voltage disturbances, which are caused by high-frequency impulses, no satisfactory remedy has as yet been found. Extensive research work to devise such means is now being carried on and there is every indication that in the near future high-voltage disturbances can be guarded against in just as satisfactory a manner as are the disturbances caused by excessive currents.

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Plant of the Alba-Melakoff Lignite Co. in Texas

Special Correspondence

This company has a well equipped plant, with modern machinery. The employees are nearly all Mexicans, this nationality appearing to be the most plentiful in that part of the country. They seem to make very good miners, with the exception that they do not like regularity.

The coal is at present being hauled by mules, but the company expects to install cable or motor haulage in the near future. The seam is 6 ft. in thickness and is worked on the block system, a total of 400 tons per day, of a very fine grade of lignite, being taken from the mine, on a four days per week basis. This time last year the company was working full time and could not supply the demand. The cotton situation in the Southwest has hurt the lignite mining business, as it has almost all other classes of labor. The average miner receives $2.75 per day, while some of the best men make as high as $5 a day. A breast auger is used for drilling and black powder for shooting purposes.

The How and Why of the Condenser

By H. E. Beyer*

SYNOPSIS—The usual method of calculating the efficiency of a condenser is to compare the actual vacuum attained with that theoretically possible. The ratio of the vacuum and hotwell temperatures tells a different story.

It is the purpose of this paper to describe the underlying principles entering into the theory of economical condensation of steam and vapor by means of the jet condenser.

In order that the description may be more clear it might be well to preface it by the statement that a condenser is a heat transferring apparatus, being the reverse in its action of the steam boiler. The boiler generates steam; the condenser destroys it. And as transfer of heat naturally involves temperature change it may be said that the efficiency of the operation of transferring exhaust steam into hotwell water may be best ascertained by means of the thermometer.

The reason why temperatures are not more commonly used as the basis, is probably due to custom and prejudice. When Thomas Newcomen brought out his atmospheric engine in 1705 and which in reality was a steam condenser (the steam was admitted into a cylinder and then water introduced to condense it, the pressure of the atmosphere forcing the piston into the vacuum thus formed) thermometers were not available as they now are. Gages of the water or mercury column type were more accurate with the facilities of manufacture then existing, with the result that in the early days of steam engineering the practice was evolved of measuring in inches and in pounds; and because the present day science of steam engineering has been built on such measurements, this practice has been continued in condenser work.

But it would seem a useless procedure with the modern ability to manufacture thermometers which will fulfill the requirements of ordinary accuracy, that we should go to the trouble of transferring gage readings expressed in vacuum inches or in pounds absolute, correcting them for the local barometer, and then reduce them to temperatures in order to ascertain how efficiently a condenser is working when it is much more direct to take the temperatures of the inlet and outlet water and of the exhaust steam. These three readings give all the data necessary to ascertain how efficiently the condenser is working.

If for example we know that cooling water enters a condenser at 90 deg. F., that the exhaust steam has a temperature of 115 deg. F., corresponding to 27 in. of vacuum, and that the hot well water has a temperature of 113 deg. F., we know we have an efficient machine. If the waste water leaves at a temperature of 105 deg. F. we know that we have not; the amount of cooling water required with the latter condition being somewhat over 50 per cent. more than is required in the first case. So it would seem that the terminal difference actually carried between hot-well and exhaust steam temperatures should be the measure of efficiency, and the basis on which condenser guarantees should be determined.

As is evident from the above, the temperature of the hot-well water has a direct bearing on the part the steam in the condenser plays in the process of its destruction. If the rejected hot water is heated up to the temperature corresponding to that of the exhaust pipe, it shows that the steam has been deprived of all its heat, and therefore having ceased to exist can exert no pressure in the condenser. In other words, the efficiency represented would be 100 per cent.; and as most condensers in use today operate on a basis of more like 50 per cent. efficiency there must be a reason, and this reason is the air present in exhaust steam and cooling water.

Air is noncondensable, and the action of the cooling water is to disintegrate the mixture of air and steam. The more air there is in the cooling water the less its ability to properly disintegrate the steam and its air, and the less air there is in the cooling water the greater its ability to do so. So it is evident that cooling water, freed of air, will insure the highest efficiency of heat transfer occurring in the condensing process.

Most condensers put on the market and in use do not free the cooling water of air before the water mixes with the steam, and the result is a low efficiency of heat transfer. Not only must sufficient cooling water be supplied the condenser to absorb the heat of the entering steam, but an additional amount must be furnished to cool the air in the water itself, as otherwise this air would be so expanded in volume by contact with the steam, as to seriously impair the vacuum.

That is why jet condensers which depend upon a throat or water pump to carry off the mixture of hot water and air always give a low vacuum when the temperature of the cooling water is raised or the amount of water is cut down.

To relieve this condition resort is sometimes had to air pumps, but the addition of an air pump to a condenser which does not free its cooling water of air before it comes into contact with the steam gives relief mainly during the summer time when the cooling water gets hot; in winter when the water is colder as good a vacuum can generally be obtained without the pump as with it.

The efficiency of 50 per cent. in regard to heat transfer applies to condensers which come under the group classified in the art as "parallel-current," as contrasted to the type known as "counter-current." Counter-current condensers remove the air from cooling water before it comes in contact with the steam, rendering possible a much higher efficiency of heat transfer. Properly designed counter-current condensers will operate on a 2-deg. terminal difference and their efficiency of heat transfer will range from 90 per cent. to 98 per cent. Knowing this it may seem strange that the majority of condensers in use should not be of the latter type rather than the former.

Until recent years little attention has been paid to the efficiency of condensers because of the low vacuua deemed necessary. The cooling water formerly available was colder and purer than at present due to fewer steam plants in any given territory, so that with such conditions almost any old thing would do as a condenser. The large increase in the number of condensing power plants in every locality which frequently, by their re-use of river water as an instance, has changed operating conditions, so that now hot cooling water, frequently foul, and carrying much foreign material is the rule. This coupled with the higher vacuua required by modern steam practice demands a more fool-proof and efficient condenser. This demand is being met by the use of the counter-current type of condensing apparatus.

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*Condenser engineer, Cresson-Morris Co., Philadelphia, Penn.

NOTE—A paper read before the Alabama Light and Traction Association.

In a counter-current jet condenser the cooling water enters at a point above the steam entry. Low velocity of mixing is employed, the steam entering at from 200 to 400 ft. per second, as contrasted to 700 to 1000 ft. in the parallel-current type. The water is allowed to drop from a position of rest so that its velocity is due only to the pull of gravity. This ensures thorough mixing. To remove the air and noncondensible gases a dry air pump is necessarily used. This machine takes the air from a point well above the cooling water entry.

This arrangement means that the water entering the condenser is immediately freed of its air content, in proportion to the vacuum. The cooling water relieved of this air and with the slow mixing process employed can then absorb to its full ability the latent heat of the entering steam, and can also more effectively cool the hot air released from the steam and which passes up through the falling water to the point where the air pump removes it from the condenser.

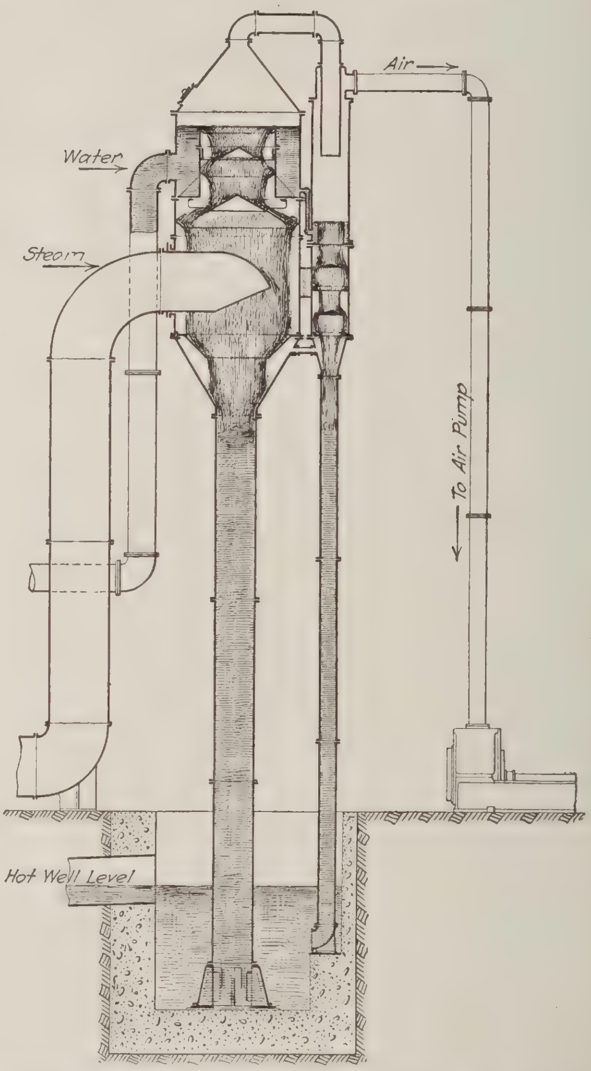
As the hot water running off is at the extreme bottom of the condenser, and the air practically cooled to the temperature of the incoming cold water, is at the extreme top, a high efficiency of heat transfer can be obtained. Further, the air passing to the air pump being cooled to the lowest possible point, it will be correspondingly dense, so that the power required to remove it from the condenser will be the minimum. High efficiency of heat transfer means a small amount of cooling water required, and the combined horsepower of the air and water pumps will be the lowest possible.

On reliable tests a counter-current barometric condenser handling the exhaust steam from a 5000-kw. turbine has required but $\frac{9}{10}$ of one per cent. of the power of the main unit when maintaining 28 in. of vacuum with 65 deg. temperature of cooling water at full load. On smaller units of course, this ratio is higher, but even with 500-kw. machines 2 per cent. should be a fair average.

While reference has been made to the slow mixing process employed in counter current condensation, it is equally essential to have the air removed from the condenser top at a slow velocity and that the hot water running off does the same. This means large air and tail pipes at top and bottom respectively; and in the case of the low level type of condenser large diameter below the steam nozzle. There should be no siphonic effect at the bottom due to velocity of water flow at that point.

Coming to the practical side of the matter, it will be found that an air pump taking air out of a counter current condenser without the medium of a suitable water separator, will constantly be troubled with water in the cylinder due to the condensation of the moisture content of the air. The air leaving the condenser is saturated and as it gets cooled on its way to the pump it drops its moisture content. This water trouble is effectively prevented by means of a simple separator which changes the direction of the air so as to shake the moisture out by the time it enters the suction pipe between condenser and pump.

In the same way, it is necessary to lead the exhaust steam into the center of the condensing space so that the cooling water forms a complete cloak or umbrella, in the center of which the steam is delivered. The steam then blows out against this water and all the water required per unit of time meets all the steam entering during the same period, so that there is no wire drawing.



Cross-Section of a Counter-Current Barometric Condenser

In addition to the feature of high efficiency, there is a most practical advantage derived from the above construction, in that the condenser will not clog up due to any rocks, wood, fish, grass or other foreign material which may enter with the cooling water. There are no springs to adjust; no contracted passages in the interior, and the condensing vessel itself needs no more attention than the exhaust pipe. The air pump can be placed at any convenient location, and in the same way the condenser can be put at any desired distance from the engine or turbine. It is also possible to have one condenser handling the exhaust from several prime movers. Last year there was installed a 15,000-hp. condenser for a large steel plant, which has 1500 ft. of exhaust piping leading to it.

Having explained the operation of the counter-current condenser and expressed the opinion that the thermometer is the proper means of recording what the condenser is doing, it may be interesting to give a comparison between this and the method generally employed by engineers This method expresses efficiency by the per cent. of ideal perfect vacuum actually obtained, and neglects the operation of heat transfer entirely. If the hot-well for instance has a temperature of 79 deg. F., the corresponding vacuum is 29 in. If the vacuum observed is 28.62 then according to this method the efficiency would be $\frac{28.62}{29} = 98.6$ per cent., and this reading would show that the condenser was doing pretty good work. An examination of the heat transfer process however shows that this is quite the reverse, and a comparison is given below, the figures being taken from actual reported tests published by the builders.

	Counter-Current	Parallel Current
Temp. cold well	66 deg.	65 deg.
Observed vacuum	28.62 in.	28.62 in.
Temp. of vacuum	89 deg.	89 deg.
Temp. hot-well	87 deg.	79 deg.
Temp. difference	2 deg.	10 deg.
Per cent. ideal vacuum realized	99.7	98.6
Latent heat per lb. steam at vacuum..	1043.69	1051.66
Lb. water actually required per lb. steam	49.7	75.1
Lb. water theoretically required per lb. steam for 100% efficiency...........	45.3	43.4
Efficiency heat transfer	91%	58%

The above comparison shows that by the method of figuring efficiency on the ideal vacuum basis that a condenser operating on a 10-deg. difference is apparently as good as one working on a 2-deg. difference; but when we come to compare the same condition on the heat transfer basis we find that the 10-deg. terminal difference condenser uses 50 per cent. more water and has an efficiency of 60 per cent. as compared to that of 96 per cent. for the counter-current with a consequent increase in the power required to operate the auxiliaries.

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Extracts from a Superintendent's Diary

I did a thing today which I have always said I would never do, and I am more than disgusted with myself for having done it; I addressed an open meeting of our miners' union and attempted to convince them that they could not justify the calling of a strike against our company at this time, no matter what the unions at the other camps in the state might recommend.

Over my desk hangs this bit of wisdom: "Never try to reason the prejudice out of a man—it is not reasoned into him, and cannot be reasoned out."

I haven't been able to get my eyes away from it since I came back from the meeting.

I realize now that my error was simply the result of allowing my enthusiasm to get the better of my judgment.

For a long time past I have been congratulating myself upon my success as a leader of men. It has seemed to me that I have been faithful to my convictions, and I have been able to impress my convictions on all who call me boss. I take my convictions seriously and have arrived at them only after much earnest deliberation. And not only have I been master of my men, but the higher officials of my company have usually come around to my way of thinking.

And now it appears that while I have been floating along in the clouds, my men have been taken in hand, secretly, by the national union officials and reminded of the great gap that exists between what they have accepted as satisfactory and what really ought to satisfy them.

It all came to the surface very quickly and in a way that could not be misunderstood, as soon as I threw down the bars at the meeting this afternoon.

"Loyalty to the company that has been loyal to you is all that we ask for" was the burden of my talk and they heard me through without an interruption. Then they began to ask questions, and such questions they were.

"Who were our directors?" "How did they make their money?" "Why did they organize our company after they had already accumulated so much money?" "Why did they not come to inspect their property in person?"

In my prepared speech I had intimated that local unions were led into all sorts of predicaments, principally, because the national organization was ruled by men living at a great distance who could not be in close touch with the local members. "How many of you know whether your national leaders are honest or are simply grafters like so many that have gone before them? Do you know enough about them to justify an opinion that they are not leading you into this course for selfish reasons?" was the way I put it.

My line of argument impressed them and they returned the compliment.

Little I knew about the personal history of our directors and everyone present soon realized that.

The effect of my embarrassment on my audience was magical; men who had never been known to question any act felt called upon to open fire and join in the general attack.

The president of the union, realizing no doubt that too much argument might react against his cause, got control of the meeting and brought it to a close.

And to think that during the past five years I have had that precept on prejudice hanging over my desk, staring straight into my eyes whenever those eyes were lifted from their work.

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A Congressman on Feudalism

Congressman David J. Lewis of Maryland recently testified before the Federal Industrial Relations Commission as follows:

> A man can no longer own a coal mine as he owns his house and garden. Suppose a friend and I were to find 10,000 acres of coal lands in West Virginia. We ought to exploit the mines we would open for the good of society. We must take the miners out there and build them houses. This gives us the relation of landlord and tenant, as well as employer and employee. Then we may have to start commissary stores. This gives us a third relation. And also we may be obliged to supply the doctor, and perhaps even the saloon for our miners.
>
> Because of relations like these, if mine employees have trouble with their employer, the result to them is disastrous. It affects all their relations to life at once, except toward their wives and children. Not only their work, but their homes and their stores are gone, and it is inevitable that trouble arises when the employer tells the men to move out.
>
> The employer is not wholly to blame, for society has told him that the mine is his just as are his garden and cottage. But such relations are impossible in this country. They are a feudalism grosser than English history has ever shown. If all the country was in the same state, we should either cease to have private property or the Republic itself would perish.

The Stoker in Coal-Mine Power Plants

By Alfred Lotz*

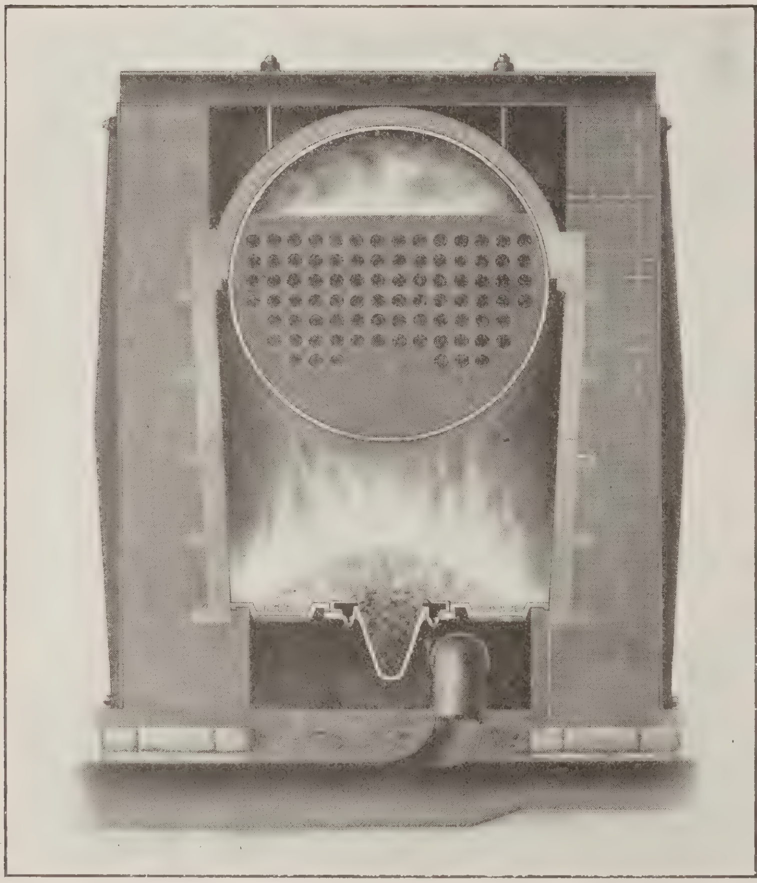
SYNOPSIS—True conservation applies alike to the production and utilization of any natural resource. By means of proper equipment the producers of coal can make use of low-grade fuel, thereby releasing to the market a salable product.

For many years past, numerous articles have appeared in the various trade journals dealing with the waste of our natural resources, the inefficiency with which the same have been handled, and calling attention to modern methods whereby various materials may be utilized with greater economy, thereby helping in a measure to conserve these natural products by using less of them per unit of output.

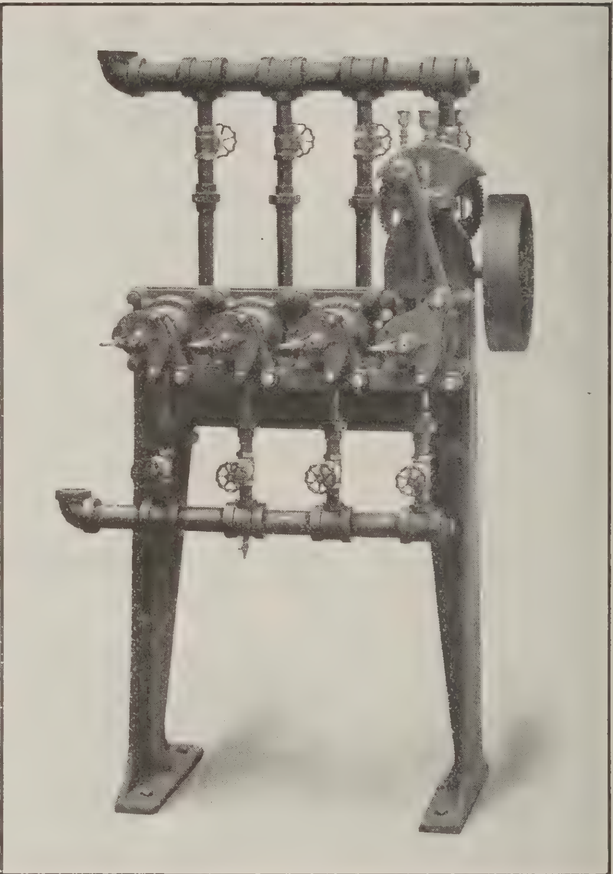
This is particularly true of coal, undoubtedly the most extensively used article of all our natural products, and until recent years probably the most wastefully handled, by large and small consumers alike, but particularly by the coal-mine operators themselves.

Of late years, however, both large and small power plant operators, who are paying out their good money for fuel, have come to the realization that they would be money ahead could they burn the coal more efficiently, cut down waste, and use less fuel per unit of output. Many have consequently resorted to mechanical stokers for this purpose.

This did not, however, apply to the coal-mine power plant except until recent years, principally because the fuel cost charged to the plant was that of mining, and as it costs just as much to mine poor coal as good coal, the latter was used in the plant instead of being sold at a profit, and the poorer grade, such as machine cuttings and slack, was dumped on the waste pile, there being no market for this material. Because of the prevailing opinion that low-grade fuel could not be utilized or that it would not pay to burn it, mines all over the country accumulated thousands upon thousands of tons of what was presumably just "waste."



Cross-Section of Furnace, Showing Retort, Tuyere Blocks, Dead Plates, Etc.



A Cole Automatic Valve Controlling the Stoker

When, however, the purchasers became more critical as to quality and price, and the competition among producers waxed keener, some of the more progressive operators began to consider the possibility of utilizing this "waste," which possessed considerable heat value, and of remodeling their power plants with this end in view.

Fluctuating Load Is Encountered

Considering the character of the waste to be burned and the highly fluctuating load of a coal-mine power plant, it soon became evident that not every stoker would meet these requirements. On account of the high percentage of noncombustible matter in cuttings, "bony" coal, etc., the air spaces of the grates of some types of natural draft stokers become clogged. This would necessitate a larger number of boilers when burning this fuel in order to get the same amount of steam, while other conditions would not be materially changed from the old hand firing practice except for the automatic feeding of the fuel.

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*Mechanical engineer, Under-Feed Stoker Co. of America, Chicago, Ill.

Another important point is that with natural draft stokers no better regulation can be obtained than with hand firing to take care of the highly fluctuating loads encountered in mining operations, and the only manner in which any approximation to a constant steam pressure is attained through hand regulation by the stoker attendant, who can change the stoker speed and manipulate the stack damper as the load fluctuates from heavy to light. This leaves the question of "steady steam" entirely to the "human equation," the same as with hand firing. All operators appreciate the fact that this is rather uncertain.

View in the Boiler Plant of the United States Coal & Coke Co., Gary, W. Va.

In the underfeed stoker using forced draft the objections cited above have been overcome. It is possible with such a stoker to utilize unmarketable coal, obtaining comparatively high efficiency and also secure an entirely automatic regulation of the fuel and air supplied to the furnace, by direct action of the steam pressure on an automatic regulating device, thereby eliminating the necessity of depending on the judgment of the fireman.

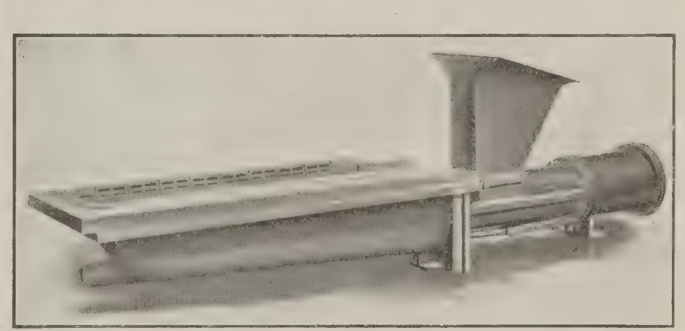
The Jones underfeed mechanical stoker has been successful in solving this very important question in coal mine power plants on account of its extremely simple construction and method of operation. It is entirely automatic in its control of the steam requirements of the plant, responding almost instantly to fluctuations in the load and being independent of the fireman in its operation. This is especially true where the fuel can be spouted to the stoker hoppers from overhead bunkers. Where there are no overhead bunkers the fuel must, of course, be shoveled into the hoppers by hand.

By referring to the illustrations it will be seen that the stoker consists of a steam-actuated piston connected to a ram which forces the coal coming down from the hopper above into a retort under the boiler. The steam cylinder, ram and hopper are located outside the boiler setting, while all else pertaining to the stoker proper is placed within the furnace.

Around the upper edge of the retort a number of air blocks or tuyeres are located. These connect to the chamber beneath the retort, which in this system is an air-tight compartment from which the air for combustion goes up through the tuyeres and mingles with the coke and gases distilled from the coal. The grate area in the furnace not taken up by the retort is completely filled with iron dead plates, which form the top of the air chamber.

An iron pusher rod with blocks or shoes, which is operated by the ram, is located in the bottom of the retort. This serves the purpose of giving an even distribution to the coal in the furnace. There are only two moving parts to the stoker proper, and these do not come in contact with the fire. No valves are employed on the stoker, the steam cylinder being connected to what is called a Cole automatic valve which gets its motion from the fan shaft by means of a belt connection.

The operation of the system is simple. The regulating valve between the steam line and engine driving the forced-draft fan is set to whatever pressure is to be carried on the boiler, and the Cole automatic valve is adjusted according to the quality of the coal to be burned.



The Stoker Proper, Showing Parts Internal and External to the Boiler Setting

Should there be little or no load on the boilers the engine, fan and Cole automatic valve will move only fast enough to keep the steam pressure at the desired point. Should the load be thrown on the boilers suddenly, the regulating valve will allow more steam to the engine, which will speed up accordingly, driving the fan at a greater speed, likewise the Cole automatic valve. This in turn operates the stoker faster, thus supplying the furnace with more coal and the proper amount of air to keep the steam pressure constant under the increased load. Should the load suddenly drop off the coal and air supply will decrease in proportion on account of the automatic slowing down of the entire system. Consequently no more coal is ever burned than is necessary.

There is no reason why coal operators should not practice the same rigid economy in their power plants that manufacturers follow in all other lines of business. If coal producers can profitably use in their boiler stations nonmarketable fuel, which would otherwise be wasted and thereby add to their merchantable output an amount equal to what they would have had to burn under ordinary conditions, obtaining a profit on the same, it stands to reason that they will be money ahead.

Unimportance of Power Questions in Jig Problems

By Geo. R. Delamater

The question may be raised as to whether capacity should not be considered in calculating the efficiency of each individual jig. It has been pointed out to me that some jigs will wash coal at the rate of 20, 30 or 40 tons per hour, while others will only handle 5, 10 or 15 tons in that time. My experience has been that jigs of high capacity are of large screen area. They may be of one compartment only, but in such cases are usually adapted only to fuels, which do not require to be crushed fine to attain the necessary breaking away of the impurities from the coal and in which the specific gravities of the impurities are much greater than that of the fuel.

They may be jigs of more than one compartment, in which case either one or two plungers are required for each compartment. The amount of water used on such jigs is practically of the same ratio to the amount of coal washed, regardless of the capacity of the jig. In fact I have always found that the amount of power required and the amount of water used are practically the same per ton of coal washed, regardless of the capacity of the jig. Again, two jigs of exactly the same design but of different sizes may operate at exactly the same cleaning efficiency. As an example, they may be the same machines throughout except that one has a width of 6 ft., while the other is 3 ft. wide. If the percentages of washed coal and their analyses are the same, the cleaning efficiencies are equal. In two machines of this kind a certain amount of the power required is consumed in overcoming the friction, etc., within the machines themselves and the larger machine probably uses little if any more power for this purpose than does the smaller one.

A considerable increase in power consumption by the larger machine will result from the increased amount of work done, and I have found that, within the rather limited extent of the variation in jig sizes to be found in actual practice, the reduction in the power consumption per ton of coal washed in the larger jigs over the smaller, is practically negligible. I, therefore, very seriously question the use of the jig-capacity figures as having any bearing on the efficiency of washing.

If the capacity figures are to be used at all, they should be reduced to the capacity per square foot of screen area of the jig, and even then, to use them in calculating efficiencies, some standard must be adopted representing 100 per cent. efficiency for one square foot. That to me seems practically impossible as all the other data obtainable for these calculations are based on float-and-sink tests. Besides this, any standard assumed for a square foot of screen area would necessarily be a variable depending on the size of the coal treated and the specific gravity of the materials constituting the raw coal.

After due consideration of these features of the problem it appears to me that the capacity of a jig settles down to a cost per ton of coal washed. The first consideration of every coal-washery owner, or intended owner, is the efficiency of cleaning the coal. If he could operate a jig at a capacity of 100 tons per hour at a cost of half a cent a ton, but at a cleaning efficiency of but 15 per cent., he would unquestionably be more interested in a jig that would clean his coal at a capacity of but 10 tons per hour at a cleaning efficiency of 95 per cent., even though the cost might be three, four, five or six times that of the other machine.

I, therefore, firmly believe that the capacity should play no part in the efficiency calculation except where there are several jigs of unequal output; then the efficiency of each jig may be multiplied by its output and the total of these products divided by the whole tonnage to find the average efficiency of the whole plant.

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*Consulting engineer, Haddon Heights, N. J.

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The Comparative Cost of Electrical Heating

By A. J. Weichardt

An interesting comparison of the cost of electrical heating versus coal heating is as follows:

One horsepower, or 33,000 ft.-lb., is equivalent to 746 watts, and 778 ft.-lb. are equal to one British thermal unit.

Expressed algebraically this is

$$\frac{746\ \textit{watts}}{\textit{minutes}} = \frac{33{,}000\ \textit{ft.-lb.}}{\textit{minutes}} \tag{1}$$

$$778\ \textit{ft.-lb.} = 1\ \textit{B.t.u.} \tag{2}$$

From (1) and (2)

$$\frac{1\ \textit{kw.}}{1\ \textit{kw.}} \times \frac{\textit{minute}}{\textit{hour}} = \frac{56.86\ \textit{B.t.u.}}{3411.6\ \textit{B.t.u.}} \tag{3}$$

Georges Creek, Pocahontas, or any good grade of bituminous coal will average from 14,000 to 14,500 B.t.u. per pound. Assuming, then, that the best grade of domestic coal has a heating value of 14,000 B.t.u., the results will be as shown in the accompanying table.

A consideration of the table shows that, with a furnace efficiency of 20 per cent., it is optional whether one pays ½c. per kw.-hr. for electrical heat or $8.20 per ton for coal.

At the more common price of 10c. per electrical unit, and using a steam boiler of 80 per cent. efficiency, one could afford to pay $656.58 for a ton of coal and come out even.

If it were possible to obtain a perfect furnace, $820.73 is the price that could be paid for a ton of coal in even competition with 10c. electrical heating.

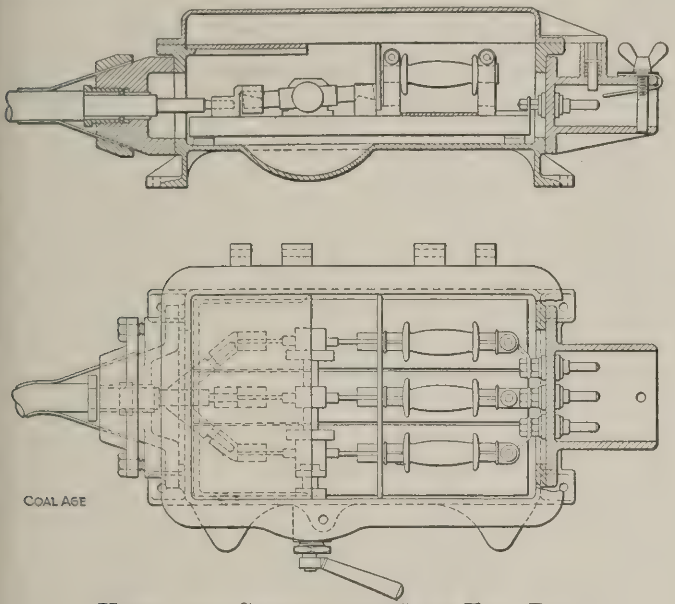
If a Kw.-hr. Cost	The Equivalent Value of Coal per Ton of 2000 lb. for the Following Furnace Efficiencies Is:									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	5%
½c.	$41.03	$36.93	$32.82	$28.72	$24.62	$20.52	$16.41	$12.31	$8.20	$4.10	$2.05
1c.	82.07	73.87	65.66	57.45	49.24	41.03	32.83	24.62	16.41	8.21	4.10
2c.	164.14	147.73	131.31	114.90	98.48	82.07	65.65	49.24	32.83	16.41	8.21
3c.	246.21	221.59	196.97	172.35	147.73	123.11	98.48	73.87	49.24	24.62	12.31
4c.	328.28	295.45	262.63	229.80	196.97	164.17	131.31	98.49	65.66	32.83	16.42
5c.	410.36	369.32	328.24	287.21	246.18	205.15	164.12	123.09	82.07	41.04	20.52
6c.	492.44	443.20	393.95	344.71	295.46	246.22	196.98	147.73	98.49	49.24	24.62
7c.	574.51	517.06	459.61	402.16	344.71	287.26	229.63	172.35	114.90	57.45	28.73
8c.	656.58	590.92	525.26	459.61	393.95	328.29	262.63	196.97	131.32	65.66	32.83
9c.	738.66	664.79	590.93	517.06	443.20	369.33	295.46	221.60	147.74	73.87	36.93
10c.	820.73	738.66	656.58	574.51	492.44	410.36	328.28	246.21	164.14	82.07	41.03

TABLE SHOWING THE RELATIVE COST OF HEATING BY ELECTRICITY AND BY THE BEST GRADES OF COAL WITH DIFFERENT FURNACE EFFICIENCIES

A Gate-End Switch Box

The accompanying illustration shows a gate-end switch box constructed by the Diamond Coal Cutter Co., of Wakefield, England, which has been standardized for 75 and 100 amp. at 550 volts, both as a single, two- and three-fold box. The drawing is practically self-explanatory.

The case is made of special high-tensile metal with side-flanged joints. These, together with the provision of cooling escapement glands, render the box explosion-proof. Interlocking devices prevent the possibility of switching on the circuit until the lid is closed or of opening the box while the current is on. Moreover, live contacts cannot be touched when the lid is open. The aluminum adaptor cannot be inserted or withdrawn when the switch is in the position and is automatically locked and a complete ground established before the current can pass.



View and Section of Gate-End Box

The fuses are contained in porcelain holders and the glands are made to suit the cables installed. The box can only be opened by the detachable handle, which is the key, and hence the switch may be claimed to be entirely fool-proof, owing to the practical impossibility of accidental misuse or shocks.

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Coal, the Big Item in Power-Plant Operation

The largest single item in the operating costs of any steam power plant is coal. In most plants the purchase of coal is a matter of careful consideration, and in the larger ones it is usually bought under specifications. Once the coal is in the bunkers, this careful consideration stops and the actual burning of the coal is very rarely given more than a passing thought, as long as the steam pressure is kept up. Of course, there are some plants where this does not apply, but in the majority it does, says Power in its Feb. 2 issue.

The men employed are paid the lowest possible living wage and are chosen more on the basis of the wages they will work for than the results they are able to produce. The man who burns the coal can easily vary the efficiency of the boiler by 10 to 15 per cent., or the heat absorbed by 15 to 20 per cent., yet he is at the bottom of the payroll.

No revolutionary advancement has been made in power plants recently, and the increased efficiency is accomplished only by taking each process separately and bringing it up to the highest standard. It would therefore seem wise, in attempting to increase the overall efficiency of a plant, to start with the item that represents the largest expenditure and work down the list.

In office-building plants the cost of coal represents some 35 to 40 per cent. of the total expense, and boiler-room labor 12 to 15 per cent. In big plants the cost of coal is 50 to 55 per cent. and the boiler-room labor 7 to 8 per cent. Take a concrete case of a certain office building in New York City that employs two firemen at $600 a year each. Their coal costs approximately $10,000 a year. If we assume that the boiler efficiency is 60 per cent., and that by paying $900 a year men could be obtained who would operate the boilers at an efficiency of 70 per cent., it would be a paying investment. The increase in wages is $600 a year. The increase in boiler efficiency amounts to a reduction in coal burned of 14.3 per cent., or $1430. The net result is $830 to the good by the change—not a matter of philanthropy.

Any plant owner can figure out for himself what a small increase in the boiler efficiency will amount to in dollars and cents, and may find it profitable. The efficiency of the boilers may be increased in several ways, but first, proper equipment must be furnished. Every boiler plant should be equipped with a draft gage, stack thermometer and means for determining CO_2. The cost of this whole equipment need not exceed $100, which would be repaid in a very short time.

Then the firemen should be taught the use of this apparatus to determine the proper method of handling the fires to secure the highest efficiency. A bonus system for savings over a certain amount would probably be productive of the best result. If the firemen are able to save the plant money by their efforts, they should logically be entitled to a part of it.

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Bureau of Mines Rescue Cars

Car No. 4

Krebs., Okla., Feb. 7 to 13.
Buck, Okla., Feb. 14 to 20.
Carbon, Okla., Feb. 21 to 27.
Adamson, Okla., Feb. 28 to Mar. 6.

Car No. 8

Berwind, W. Va., Feb. 10 to 18.
Panther, W. Va., Feb. 19 to 28.
Glen Alum, W. Va., Mar. 1 to 9.
Thacker, W. Va., Mar. 10 to 19.
Matewan, W. Va., Mar. 20 to 29.
Williamson, W. Va., Mar. 30 to Apr. 9.
Chattaroy, W. Va., Apr. 10 to 19.

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Generally speaking, electric cables are sheathed with lead for the purpose of excluding moisture and for the protection of the insulating material against mechanical or other injuries. It is sometimes necessary to harden and strengthen the lead sheath by the addition of 1, 2 or even 3 per cent. of tin. It is a question among engineers as to whether much is gained by this alloying, since the two metals do not mix uniformly, and in consequence, when much tin is employed, hard or brittle sections may develop, due to the segregation of one of the metals.

The Labor Situation

SYNOPSIS—The miners' officials finally consented to arbitrate the eastern Ohio strike. The coal companies are not disposed to concede the straight run-of-mine scale, formerly offered, believing a slack differential desirable and wholly legal. John D. Rockefeller, Jr., meets some of the officers of the United Mine Workers of America at his office. John R. Lawson and John Mitchell testify before the Industrial Relations Commission. A strike occurs in the anthracite region.

The operators' committee and the representatives of the United Mine Workers of America held a conference in Cleveland commencing Jan. 29. The meeting was called by the federal investigators and they participated in the session. On Saturday, Jan. 30, they adjourned till Feb. 2.

The operators, at once, offered to arbitrate, believing their case so just that they could not fail to receive a favorable decision from just arbitrators. The miners at first refused to submit the matter to any such test, stating that they refused to accept less than 47c. for machine-mined run-of-mine coal. The operators have withdrawn their offer of 44.61c. for that grade of coal, preferring to pay 58c. for lump and 22c. for slack, that being the equivalent of 44.61c. for run-of-mine and putting a premium on careful mining.

All Manner of Arbitration Proposals

After the miners had refused to accept the federal investigators as the sole arbiters a plan was submitted by the operators providing for five arbitrators, the operators choosing two, the miners two, and a fifth to be chosen by the other four. Another scheme included the two federal investigators, a seventh arbitrator being selected by the other six. None of these plans were acceptable to the miners.

The tentative arrangement for arbitration roughly gives the miners three representatives and the operators, the same number. Three other arbitrators are to be appointed by Federal Judges Killits of Toledo and Clarke of Cleveland. The miners refuse to let Hywel Davies or Daniel J. Keefe be members of the board.

The international officers of the miners' organization at first took no part in the negotiations, and they appeared opposed to the principle of arbitration as desired by the operators and the federal investigators. They have placed themselves under an obligation to the other operators with whom they made an agreement under which they promised not to settle with the eastern Ohio operators for less than 47c. per ton. This promise they regard as sacred, but they also pledged themselves not to concede a lump-coal scale in the Pittsburgh district and to be content with an equivalent of last year's scale in eastern Ohio but apparently they do not regard themselves bound to submit to these latter pledges. They regard them as having an inferior order of sanctity.

The Mines Are Not Working

Few mines are being worked. The Robey-Somers Coal Co. was employing about 100 men, and the tonnage was steadily increasing but on Jan. 30, the mine was closed pending the results of the federal investigation.

The Bradley mine of the United States Coal Co. is working, for the most part making the preliminary improvements necessary to prepare the mine for more extended operation. Several mines are cleaning up so that they can operate after the federal investigation is completed or the arbitral award is made, either agreeably to the decision if one is reached or "open shop" if no result is attained.

One of the eviction notices has been decided null and void on a technicality. In another case Justice Young decided for the defendant against the Robey-Somers Coal Co. where no technical error was alleged. The company declared it will proceed to evict miners who refuse to work in its mines under "open shop" rules but probably the arbitration which is now assured will delay any such action.

About 40,000 pairs of shoes have been delivered to the miners by the Union. They were purchased from a firm in Newark, N. J. It has been discovered that they do not bear the union label, and some of the miners' families though desperately in need of shoes are considering seriously whether "scab" shoes should clothe the feet of stalwart unionist miners.

Testimony of J. D. Rockefeller, Jr.

On Jan. 29, John D. Rockefeller, Jr. concluded his three-day testimony relative to his attitude toward labor, his relations toward the Colorado Fuel & Iron Co., the Colorado situation, and the Rockefeller Commission. He made a good impression but it cannot be said he helped the case for the Colorado Fuel & Iron Co. or the Colorado operators, because while he declared for certain principles of action, he was unable to show that these were being followed by the persons in control in the field. His frank admission that he did not know was, however, quite generally accepted.

The representatives of the miners, John R. Lawson, F. J. Hayes, Edward L. Doyle and Mother Jones seemed quite hopeful that John D. Rockefeller, Jr. was preparing to write to J. F. Welborn demanding that he recognize their union and make collections for it. Mother Jones' rapturous references to John D. Rockefeller, Jr. whom she declared she had once called "a burglar," appeared in all the papers. But the next day these worthies called on Mr. Rockefeller and Mother Jones had much to say about mere "lip-service to democracy." John R. Lawson appeared before the Commission and with unquestioned eloquence condemned Mr. Rockefeller, his commission and his capital. Somehow his statement failed to convince and was not received as well as Mr. Rockefeller's testimony.

The press will henceforth be more friendly, because the reporters have been admitted to the Rockefeller sanctum. No matter what he said, they have been appeased. After all in the past, absent treatment is what has been galling them, for the reporters and editorialists are too old in the profession to believe the fairy tales so cheerfully told them by the socialist press. But no good result will come out of the "rapprochement" between the agitators and Mr. Rockefeller. He will not help them and they know it.

John Mitchell's testimony was somewhat difficult to follow. He like many other people has been dreading large corporations. He stated that they reduced wages. This has never been the experience. They have repeatedly raised prices but they invariably pay higher wages than smaller corporations in the same district and provide better working conditions. It is true they could depress wages but they do not do it and since large corporations have come into being we do not have reductions in wages every time there is a lull in business as in the past. This stability is due to the action of the larger companies. As the strike in Colorado was not really about wages, it was a folly for John Mitchell to declare that the miners thought they might as well "starve idle as starve working."

Aristocracy in Laboring Men

The Dauphin County court in Pennsylvania has decided in favor of James E. Roderick's ruling that all men are eligible as mine foremen who, having had five years' experience in the mines, prove competent on examination for the place. The attempt to restrict the position to those who have dug and shot coal at the face for five years has therefore failed completely. Judge McCarrell, of the Dauphin County court, has declined to hear the 15 exceptions made to the ruling. The rule dismissing the case has been made absolute.

The attempt to make the office a place of special privilege for those who have been miners has fortunately failed. The United Mine Workers of America which has always most commendably stood for all the workingmen around the mine did ill to act on behalf of a few instead of all its members. James Matthews, president of the Ninth district by his suit against the head of the Department of Mines of Pennsylvania endeavored to establish what was an aristocracy of mining labor.

Union Buttons in Anthracite Region

On Jan. 26, the Lehigh Valley Coal Co. is alleged to have ordered the men away from its Franklin colliery who were examining the miners to see that all wore union buttons. The men left, but 600 men and boys went on strike. On Jan. 25, the executive boards of five Pennsylvania districts of the United Workers of America assembled at Harrisburg to discuss legislation relative to workmen's compensation and child labor.

The Federal court in Arkansas has ordered Andrew S. Dowd, the receiver in succession to Franklin Bache to sell the Bache-Denman Coal Co. properties. Mr. Dowd says that a deal to sell the coal lands and mines to the United Mine Workers of America has been under way for several weeks, but has not been completed.

Central-Station Power

By Wilfred Sykes*

SYNOPSIS—Many contracts for central-station power are unfair. Such agreements to be equitable should be composed of three elements: A fixed charge depending on the peak load, a flat rate per kilowatt-hour and, if power-factor is a consideration, a limit should be fixed, a high value receiving a lesser charge per unit of power while a low value should be penalized.

It is not uncommon for an electrical engineer to be asked to recommend apparatus for a mine purchasing electric energy which will enable the power costs to be reduced in some way or other. An analysis of many such cases has shown that almost invariably the power contract is defective in some respect.

Many of the contracts in force embody clauses that require the purchaser of power to use apparatus that is neither the cheapest nor the most economical that might be used. Undoubtedly much of this trouble is due to the fact that proper attention has not been given either by the purchaser, or by the central station, to the best form of agreement.

There has been a marked improvement during the last few years in contracts made by large central stations, but in general, there remains much to be desired. The purchaser is also to blame for not giving the subject proper attention. Where a man will carefully investigate the relative merits of the different makes of apparatus involving an outlay of say $1000, a power contract involving an expenditure of $10,000 to $20,000 per year will be signed without receiving much thought. Often the purchaser feels that he is not competent to understand this contract or to pass upon it, and the verbal explanations of the power salesman are accepted. Such a proceeding often leads to misunderstandings and disappointment to the purchaser.

The basis of all contracts must be that they are mutually advantageous and, consequently, just to both parties. The central station must receive an equitable return for its operating expenses, the overhead charges of the apparatus required to furnish the power, and a fair margin of profit. No contract that penalizes the purchaser for poor operating conditions due to other customers or for bad engineering of the central station is fair, but unfortunately in some territories such contracts are in force and increase the cost of power to the purchaser without any proper return.

The general basis of power charges is usually fairly well understood by large purchasers, and most operators appreciate that their costs may be roughly divided into two groups. First, those including fixed charges such as distribution, interest, and amortization, and second, the operating charges such as fuel, stores, labor, etc. In many cases such items as line maintenance, etc., might be included in the fixed charges, as they are practically independent of the load on the equipment. That some system of charging, taking this fact into consideration, is the one that will give the lowest cost to the purchaser and will also be fair to the central station is quite clear.

It is clear also that the central station can give a lower rate as the price paid for the power varies approximately as the costs, and it is therefore possible to determine more accurately what will be received from any given business. If a flat rate is made it must be set at such a value that the average load factor of the system will be profitable. Consequently, purchasers of large amounts of power cannot be given any better rate than those requiring a small amount during only a short period.

It is immaterial whether the power is generated in a central station and distributed to a number of customers, or whether each of the customers has his own generating plant, the power cost will be made up of the same items. Little power is now sold on a flat rate as it is recognized the best prices cannot be given with a charge which does not adapt itself to varying conditions. A flat rate is usually adapted for only small customers and for lighting.

Various schemes have been gotten up to give power rates which vary approximately as does the cost of power, but it is only during the last few years that anything approaching a proper basis has been devised. This has been mainly due to the fact that there has been no apparatus available to accurately determine what the charge for power should be, although it has been recognized for a long time that a proper basis of charging is one that involves a fixed amount depending upon the demand on the central station, and a variable charge depending upon the number of kilowatt-hours consumed.

The only way in which the amount of power-station equipment that is required for each customer can be determined is by keeping some record of that customer's load conditions. There is considerable difference of opinion as to what is a fair basis for determining the amount of apparatus needed for certain customers. It is generally conceded that an integrated peak, or in other words, the average load for a certain period, say 5 minutes, is the proper basis. The period varies widely, some stations taking the average peak for one minute, others 5 minutes, 15 minutes, or 30 minutes.

Still another arrangement is to take the average of say 6 of the highest 5-minute peaks during the month. One-minute peaks are hardly fair to the purchaser as a peak of such short duration does not fix the capacity of the apparatus that must be used. If, however, the rate is such that the amount of equipment that is considered reserved for the customer is, say, two-thirds of that indicated by the peak, or some other percentage that is approximately correct and the rate is made accordingly, then there is no objection to a peak of this duration being used as a basis for charging.

If a 5-minute peak is taken, the capacity of the apparatus reserved, of course, is nearer to the value indicated during this interval. In general, however, a 5-minute or longer period works out more satisfactorily for everyone concerned than does a shorter one. Instantaneous peaks are the basis of charges in some cases, but are generally unsatisfactory due to the difficulty of measuring them,

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*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn.

and also of making proper allowances for abnormal peaks, for which the customer is not responsible.

It is the load that must be carried for, say, 15 minutes, or half an hour, that really determines the capacity of the generating plant, and therefore the proper basis for charging is one that takes this point into consideration. In other words, the average, or integrated, peak load for a reasonable period must be used. The period taken is, generally, 15 minutes to half an hour; the larger power stations adopting a longer period, as the variety of their load enables them to take a more liberal attitude towards the customer than is possible with a smaller plant.

To determine, to some extent, the effect of the length of the integrated peak upon the basis of charging, a number of investigations have been made, and the results of one case are shown below.

Taking the 15-min. peak as a basis, the 5-min. and 10-min. peaks are given as a percentage:

15-min. peak	100 per cent.
10-min. peak	104 per cent.
5-min. peak	106½ per cent.

It is usually not possible to arrange the fixed charge that a large customer pays so that it will cover the total fixed charges of the station that would be represented by the capacity measured on, say, a 15-min. integrated peak, as the charge would be so high that it would be difficult to secure business.

It is usually easy, however, to obtain a fixed charge that would be equal to the corresponding figure if the customer installed his own station, which he could do, generally, at a lower cost per kilowatt capacity than the central plant, as he would have considerably shorter lines, and the standard of equipment probably would not be so high.

The additional flat rate per kilowatt-hour is a much more flexible charge, and the average customer is usually prepared to stand for a flat rate that represents a fair profit, whereas the fixed charge must be reduced below what is really an equitable figure. Much of this difficulty is due to the fact that customers have, as a rule, little idea as to the proportion of fixed and variable charges in their power accounts, and therefore have not been educated to see these charges in their proper relation.

In the case of a large system, supplying power to both large and small consumers, the question naturally arises, should the large user pay the same rate as the smaller one? In general, it is reasonable for the large customer to expect a lower rate, as he looks on the matter from the standpoint of what he could do with his own generating plant, and this is a condition that must be met by the central station.

One point that is receiving more attention from central stations is the effect of power-factor on their lines and equipment. Power-factor determines the percentage of apparatus installed that can be usefully employed for delivering energy and the station has the right to expect that the customer shall maintain a reasonable operating power-factor.

Some central stations are attempting to meet this condition by regulations designed to control the type of apparatus used by the customer, but there are limits to this arrangement that reduce the value of the scheme. It is customary to require synchronous motor-generator sets to be used for direct-current work, and, as much of the power required by mines is for haulage, coal cutters, etc., fairly good results can be obtained by this simple expedient. But there are a great many cases where induction-motor load predominates, and a more definite scheme is required.

The only definite way in which this factor can be controlled is to fix a minimum power-factor below which an additional amount will be charged per kilowatt-hour. In some circumstances a bonus might be given if better power-factor is maintained. To obtain a better power-factor requires the expenditure of more energy in converting apparatus. This should be paid for by the station if it obtains any advantage therefrom. It is not fair, however, for any station to require a power purchaser to install apparatus which is more expensive in first cost, and less efficient in operation without some benefit in rate being given. A number of stations have attempted to control the apparatus installed by their customers in order to correct past errors, without giving the purchaser the benefit of a lower rate. Often such contracts appear attractive to the uninitiated.

A case recently came to the writer's attention where a central station with a long transmission line had induced one of the customers to install a synchronous motor-generator set having an extreme kv.-a. capacity in proportion to its kw. capacity, and which was to be used for correcting poor line conditions. As an inducement the power company offered to supply an attendant for the substation, and the arrangement was accepted by the customer without investigation. The net result was that the customer paid several times the amount of the attendant's wages for extra power.

In view of the above it will be seen that the following should be the basis for power contracts:

(A) A fixed charge, depending upon the integrated peak load for a reasonable period, so that it will represent, approximately, the equipment required to carry the consumer's load.

(B) In addition to the above, a flat rate per kilowatt-hour, based on operating costs, taking into consideration the amount of power used, and allowing a graduated discount so as to give large consumers a lower rate.

(C) If power-factor is a consideration, a reasonable limit should be set, lower power-factors being penalized by increasing the rate per kilowatt-hour, and a reduction in rate granted if high power-factor is obtained.

I believe that if this plan were generally followed, it would be possible to meet all the conditions arising in mining work, and to fix rates that can be given to all consumers that will represent profitable business.

In conclusion, it must be pointed out that to secure a proper load the central station should adopt a generous policy towards its customers, and when there is doubt as to the effect of operating conditions upon the station's costs, it should be prepared to accept the risk, rather than attempt to place a burden upon the consumer which may not be justified by results. The central station has the advantage of a diversity of loads, and a part of this benefit should be given to the consumer.

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While tape and braided rubber wire and cables are used for indoor and submarine service with entire satisfaction without lead sheathing, experience has demonstrated the advisability of inclosing the cable in a sheath wherever it is used in conduits for underground work, or where it will be exposed to acids, gases, extreme temperature changes or other destructive agencies.

The Mine Foreman

"If every mine foreman were given a Carnegie medal for every act of heroism he performed, this plan would keep a factory busy turning the medals out," said Col. R. A. Phillips, of the Delaware, Lackawanna & Western R.R. Co.

There is a group of over 2500 men in the anthracite region of Pennsylvania who always look you straight in the eye. Big, burly chaps, they are, for the most part, and they range in age from 30 years to the term of life. They are the mine foremen and assistant mine foremen, each one of whom bears the responsibility for not only many thousands of dollars' worth of property, but for hundreds of lives.

The anthracite industry has been responsible for the development of this group of splendid men, but it would be a fairer way to put it that they have been largely responsible for the development of the anthracite industry. Occasionally a man who is unfit attains the position of mine foreman, but he does not keep it long.

The mine foreman must listen to the complaints of men of many nations; he must pore over mine maps at night to see where those needed extra cars of coal are to come from; he must control his men, and keep them from going into danger, and be the first to face a peril himself. He must be a leader of men.

The mine foreman must have the confidence of his employees and the confidence of his men. He must be a diplomat, a financier, an executive, a student, a disciplinarian and a philanthropist. On him depends to a large extent the success or the failure of an operation. By the general public, he is unhonored and unsung, but he is doing his job and doing it mighty well.

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Electric Shotfiring in Bituminous Mines

By M. D. Cooper*

The employment of especially qualified men to fire shots in gaseous workings is intended to reduce accidents due to carelessness or ignorance on the part of the miners. It is self-evident that a person whose sole duty it is to fire shots after examining the place and determining that all the surrounding conditions are safe is much less liable to cause an accident than one whose main duty is to load coal, and from whom, therefore, the firing of an occasional shot is of secondary importance.

The Bituminous Mine Law of Pennsylvania requires that "in such portions of a mine where explosive gas is being generated in quantities sufficient to be detected by an approved safety lamp, in which locked safety lamps are used, the mine foreman shall employ a sufficient number of competent persons who are able to speak the English language, to act as shotfirers, whose duty shall be to charge, tamp and fire all holes properly placed by the miners and to refuse to charge any holes not properly placed." The same law further provides that all such holes shall be fired by an electric apparatus, and no person other than the shotfirers shall connect up the wires or operate said apparatus.

The advantages of electric firing make for greater safety than where fuse or squibs are employed. No open light is required where electric current is used, and the danger of misfires is considerably lessened. Again, the burning through of fuse, with its consequent dangers, is avoided by the use of electric detonators. Moreover, the shotfirer may locate himself in a safe place before firing the charge.

For the purpose of firing shots electrically, a small hand generator or blasting machine may be used, or in place of this, a box containing two dry cells may be satisfactorily employed where it is necessary to fire but one shot at a time. Blasting machines of various types may be purchased from the manufacturers of explosives. On the other hand, a safe battery box may be home-made.

Details of a Simple Shotfiring Box

A convenient, cheap and easily constructed shotfiring box is shown in Fig. 1. This apparatus consists of two ordinary dry cells, a small steel spring, a contact plate, two binding posts, and a box made of ½-in. boards, to which a shoulder strap may be attached. To operate the apparatus, the battery wires are first connected to the wires of the detonator, and then to the binding posts of the battery box. After this a wooden plug, of sufficient length and of the proper diameter to make a snug fit in the hole provided for the plug in the top of the box, is pressed down to bend the spring into contact with the contact plate. In this manner the circuit is closed and the shot fired.

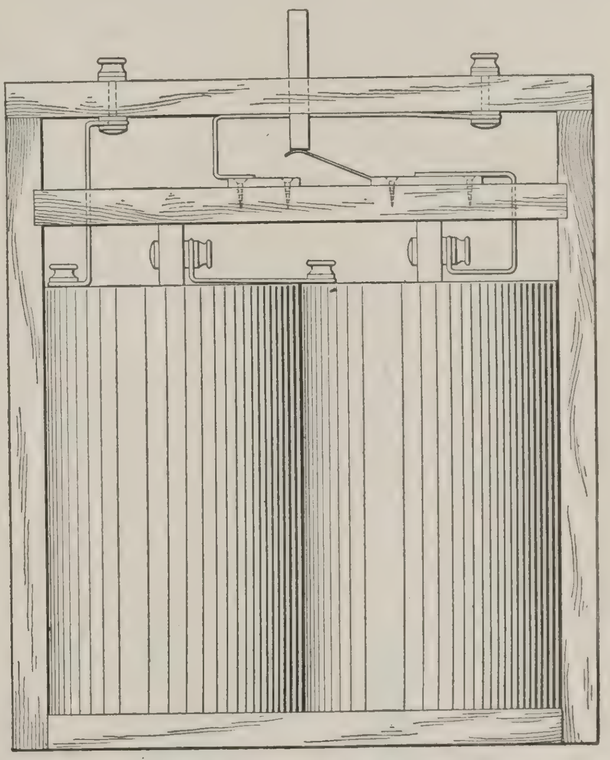

Fig. 1. Shotfirer's Battery Box with Front Cover Removed

With this apparatus, it is found that a shotfirer can set off an average of 50 shots in eight hours under normal conditions of working, where the distances between shots are not excessive. The life of the batteries varies, but in general a pair ought to last 150 days, which is equivalent to 7500 shots. The wires used to connect the battery to the detonator wires are made up of two separately insulated wires, No. 14 B. & S. gage, covered by an outer insulation binding both wires together. Its life depends entirely upon the manner in which it is used.

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*Mining engineer, Ellsworth, Penn.

If, after firing, the shotfirer drags the wire toward him while coiling it, it may be rendered unfit for service in about two or three weeks. However, if he walks toward the place where the shot was fired while taking up the wire, thus avoiding unnecessary wear, it will be found that it will be safe for use, in some cases, for a year. After the insulation becomes worn, so that any part of the wire except at the ends is exposed, the insulation must be repaired, or the wire discarded on account of the danger of a difference of potential between the bottom and the rails on which the wire may rest.

A lighter apparatus than that described above may be made by substituting for the two standard dry cells a single battery of three units, such as that used in a small cylindrical flash lamp. This arrangement, however, is somewhat more expensive.

In order to have some definite record of the work of shotfirers, and to provide a means of increasing the efficiency of their work and equipment, each shotfirer ought to fill out and hand to the mine foreman a daily report on a blank similar to that illustrated below:

SHOTFIRER'S REPORT

................, 19...

Mine No. ......
Section No. ......
1. Before charging each shothole, did you examine the place for all dangers?..
2. Total number of shots fired ....
3. Shots I refused to fire:
Location Reason
1. ....
2. ....
4. Blownout shots:
Location Reason
1. ....
2. ....
5. Misfires:
Location Reason
1. ....
2. ....
6. After firing, did you return and examine each place where a shot was fired?....................................
7. Remarks ....
....
....
Shotfirer.

When It Pinches

Written Expressly for COAL AGE
By BERTON BRALEY

WHEN the breaker's running steady
And the trade's O. K.
We've got our grievance ready
All along the way,
We do our daily mining
With an ugly frown,
But—we sure do miss the money
When the mine
shuts
down!

IT'S not a picnic mining
'Way below the soil,
Where the sun is never shining
On your hard day's toil,
But it buys you food and clothing
And the wife's new gown,
And—you aren't so keen on loafing
When the mine
shuts
down!

THE *pitboss makes us weary and the foreman, too.*

WHEN the hoist is jerking cages
And the payroll's strong,
We blow a lot of wages
Just for wine and song,
We treat the other fellows
And we do things brown,
But—we sort of wish we hadn't
When the mine
shuts
down!

WHEN *the mine shuts down.*

OH, the pitboss makes us weary
And the foreman, too,
And we're always sort of leary
Of the things they do,
We talk about them nasty
All around the town,
But—we find we're *longing* for 'em.
When the mine
shuts
down!

THERE are grievances in season
Which are just and fair,
But we ought to keep in reason
While the job is there,
For when trouble's really busy
Why, she does things brown,
And you're pretty sure to meet her
When the mine
shuts
down!

Editorials

Not To Inform but To Confuse

The New York *World* gives the following apocryphal account of the termination of the Colorado strike:

> Nothing in all of the testimony of John D. Rockefeller, Jr., was more illuminating than his description of the manner in which the great Colorado strike came to an end.
>
> The employees were invited to elect delegates to meet the executive officers of the employing company in Denver, and did so. At this conference the spirit manifested on both sides was "most satisfactory," and it is Mr. Rockefeller's hope and belief that from this meeting will develop some permanent machinery which will insure to employees quick and easy access to the executive officers with reference to any grievances, real or assumed.
>
> If there had been such access a year or two ago, it is probable that there would have been no strike.
>
> How easily these things can be done when there is a real disposition to do them!

Our readers will recall that Mr. Rockefeller stated, as we printed last week, that the strike ended on Dec. 10, 1914, that the call for a joint conference between the employees and the company was not made till Jan. 5 of this year, and that the meeting was not held till Jan. 19. In this conference few if any of the strikers took part. Only those employed by the Colorado Fuel & Iron Co. were represented, and that corporation had reinstated but few of the striking men as their mines were already almost completely supplied.

Moreover the Colorado Fuel & Iron Co.'s men do not by any manner of means comprise all the striking miners of Colorado. The surrender of the union was not to that company alone but to several others and covered at least one important district where the "Fuel Company" does not even have a mine.

Would it be too exacting if we were to ask the editorialist of the *World* to read the columns of his own paper, and thus avoid adding to the confusion of thought already prevailing relative to the Colorado situation?

* * *

A Congressman on Feudalism

Congressman David J. Lewis recently made some interesting statements before the Federal Industrial Relations Commission. We have quoted them on another page. He showed how naturally the coal operator became landlord, merchant, doctor, and even saloon-keeper for the miners under his employ. He then said that this was unfortunate because when the employee fell out with the operator, he was at war at the same time with the man who not only paid him wages, but housed him, sold him food and clothing, provided him with medicine and even with beer. The employee by the fact that he had quarreled with one man, became an outcast without a friend.

Now Congressman Lewis' statement has only a small relation to the truth. In a big city, say Minneapolis, where the happy people are not cursed with mine operators nor injured by their feudalistic tendencies, when a man is discharged by his employer, he is evicted by his landlord, refused food and clothing by his storekeeper and he cannot get his "growler" filled by the saloon-keeper. He can, however, usually get care at the dispensary. But this is a small mercy and so the plight of the jobless is terrible. On the other hand, in the feudal mines of eastern Ohio, the men have lived in the companies' houses for ten months without paying rent, and only now, at last, are the men about to be evicted.

Public opinion is much wrought up about the proposal to dispossess these men. The feudal barons of eastern Ohio are subjected to most severe criticism for doing after a year what the average landlord would do in a month with but little criticism and almost no resistance.

We do not know just what credits the company commissaries in Ohio may have given during the strike. Perhaps they refused entirely to give any supplies to the men without immediate money payment, but we do know that in many places commissary stores have on occasions financed strikers against their companies by letting the employees of the corporation have goods on credit.

In the 1894 strike one company, after it had given all the credit which it felt justified in extending, actually let the miners take the commissary mules and wagon to make house-to-house trips for contributions. The store manager, while he could not advance any more goods, did not want to see the women and children go hungry. So he furnished the wagon. It would hardly be done today, for the farmers are no longer sympathetic, knowing that the miners who are striking make more than the farmers even when crops are good; so sending out a wagon to the neighboring farmhouses would not be of any avail.

To show that in the matter of medical attention the companies' rule is not altogether undesirable from the point of the miner, we will relate a recent incident. We strolled into a superintendent's office and noted that a little box of money was brought to him which he passed out to miners, who occasionally appeared at the window and presented slips.

On inquiry we learned that there had been a strike lasting a month; the company doctor continued his ministrations as before, and the clerk when he made up the first payroll after the strike was over, deducted from each man the pay due the doctor for his services during the strike period.

But another strike was threatened by the union if the money was not returned. The employees had been idle, and though the doctor had been working, they contended that he should be contented to lose his pay just as they had theirs and should be willing to donate his medicines into the bargain. The company had been obliged to deprive the doctor of his dues in order to pacify the union.

These evidences of the benignity of feudalism are all we will now offer. We will not say anything about the saloon. We fear to do so because we are prone to believe that if an operator were wicked enough to run a saloon he would be base enough to break his beer pump if his miners went on strike. However, we only know of two cases where saloons were run by company officials, and we know that in those instances the company was not a party to the business and had no ownership in the building.

Despite all we have said, however, in defense of the industry, we agree with Congressman Lewis that if the United States were all feudalized like some mining towns, it would be an unfortunate and an un-American situation. Justified and endurable or not, the operators should endeavor to correct that condition, for it is well that men should control their own actions and mold at pleasure their own lives.

Nevertheless his conclusions need not be taken too seriously. He is merely pointing out that a local condition if made universal would be unbearable. Some individuals own property; it would be unendurable if one man owned it all. But that is not sufficient to condemn private ownership.

But if Congressman Lewis really believes the water of feudalism may become a deluge, let us assure him that like the oceanic area its limits increase and decrease so as to make little change from year to year. It is true that recently the companies have increased feudalism in Kentucky by collecting for extra school terms, in the anthracite region by levying a contribution for the priests and in many sections by holding back pay for the hospital. It is also true that large sums of money are held back by those feudal barons and paid over to the union and in many places this is done whether the employees really desire it or not.

But against these lapses into feudalism, we may instance the increase in private home ownership from one end of the country to another, especially in the Middle West and the gradual decline of the company store. Where the latter exists, it is greatly improved and usually the best store and most reasonable the neighborhood affords.

In conclusion, let us remark that Congressman Lewis acknowledges that feudalism has an element of inevitability. Might we not also ask him to grant that in its care of the workingman it has even more the quality of benignity? In fact, its extension of late years has been perhaps wholly in that direction.

As evidence that feudalism as denounced may be benign, let us call attention to the fact that Henry Ford is declared to be feudal in his relations with the employees in his celebrated automobile factory. In fact, the feudal attitude always was truly protective and the creed of the uncompromising anti-feudalist is "the immortal rhetoric of Cain." We are harried back and forth between the contemners of the saying, "Am I my brother's keeper?" and the propagandists who demand "Who made thee a prince and a ruler over us?" Thus, the capitalist runs the gauntlet and it is a poor fool who cannot plant an effective blow on his head.

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Domestic Coal Consumers Economizing

Retail yards in the factory towns all over the country complain that the domestic consumption is much less than in former years. Many householders allow their fires to go out over night and only burn coal during the day time for cooking and heating purposes. Other families have been disbanded and are living with relatives, and the net result in every case is that there is one less household consuming coal. These are some of the reasons why the retailers still have an accumulation of coal left over from shipments of last summer and fall, and explains their failure to place orders appropriate to the season.

The Dream of Conservation

This is an age of dreams and dreamers, but modern man dreams upon his feet with both eyes open. And, unlike the mental visions of the past, the thought-image of today not infrequently materializes into reality, crystallizes into wood and steel, brick and reinforced concrete, into better physical or moral conditions, into labor-saving devices or cheaper necessities; in short, into those things which in one way or another make life more worth while.

The conservation of natural resources has been a dream. Its realization has begun. True conservation is, however, composed of two elements, one of which affects production, while the other affects utilization. Wherein lies either the equity or logic of forcing a coal operator under pain of fine or other punishment to extract the last ton of coal from a given measure, allowing the consumer meanwhile to waste as much of the heat content of the fuel produced as suits his fancy?

Some of the mining methods and practices in vogue in this country have been, and are still, highly reprehensible and should by no means be condoned. The percentage of extraction attained in many mining districts may be woefully, aye criminally low, but the profligacy of even the average consumer in his utilization of the heat contained in this fuel vastly exceeds the waste of the producer.

Nor are the means entirely lacking whereby to secure a greater return in heat absorbed for the fuel-capital invested, as is shown by Mr. Van Brunt, of the Combustion Engineering Co. of New York, in our current foreword. He points out that the proper equipment installed under mine boilers allows the utilization of fuel, which but a short time ago was considered purely and solely as an unavoidable waste.

And if equipment, scientifically designed and constructed, will turn a loss into a gain, if it will enable the consumption and utilization as power of a waste product, which otherwise must needs be disposed of at an expense, a long step has been taken toward true conservation.

The conservation of our vast natural stores of fuel has for some time been a favorite theme among dreamers with political proclivities. These have secured, or procured, legislative and congressional enactments concerning coal lands in the public domain, which have masked as beneficent, but which have nevertheless failed utterly to either materially enrich the public coffer or reduce the price of fuel.

It has remained for the practical dreamer—the one who puts his vision into wood, steel, copper, brick, or concrete—to develop just such devices as that mentioned in our foreword, and to conserve, not the coal in the ground, but to render available a higher percentage of the heat which it contains.

The progress of the world demands the efforts of both kinds of dreamers. True conservation—which is only another word for thoroughness—will be attained so far as the fuel industry is concerned when the percentage of extraction from the earth and the heat absorption from the coal are each a maximum. The dream of the conservationist may eventually be realized—we are on the right road. But when it finally meets fulfillment, it will be found to be composed of two parts equally important—conservation in production, and conservation in utilization.

Success

In our Jan. 2 issue we announced a special "Success" number of Coal Age as a coming feature that would doubtless be of unusual interest. Since publishing this preliminary notice, a number of excellent articles, well adapted for such an issue, have been received, and as a consequence we are more than ever certain that our readers will all help to make this particular number of Coal Age the biggest and best issue so far published.

Arrangements have been made, therefore, to print the special "Success" number of Coal Age on Apr. 3, and we invite the active participation of all our readers. Every article prepared for this particular issue must bear closely on the subject success, although it may deal with a man, a machine or a method.

One article already received tells of a man who came to this country a poor emigrant boy, and the writer of the article (an acquaintance of the fellow) recites the story of this man's struggles to climb to his present position as mine superintendent. Perhaps you know a similar case; if so, write it up and send it to us.

At the mine where your interests lie perhaps there is a fireboss, or foreman, or other official, who, in proportion to his opportunities, has made a greater success than the president of the company that employs him. Maybe the man you have in mind has had no chance to secure a schooling, and, notwithstanding this severe handicap, perhaps he has afforded his children an education, and in addition has paid for the home he lives in. That's a story worth printing.

Then there's the case of a mine where failure has been turned to success by the adoption or application of a new method of working, or by the installation of certain types of new machinery, or maybe some new efficiency plan has saved the day. Nothing could be more interesting.

In order that all who desire to do so may prepare something for this special number, we have decided to limit each contributor to one article. If you don't want to send us something yourself, tell us what you would like to see written up in this special issue, and we will try to follow out your suggestion. Remember that your name doesn't have to appear with the article you write.

Just think! is there anything so close to our hearts as that magic word "success"? Is there anything easier to talk about? Is there anything more interesting to read about?

Pick your subject and start your article today. Get it in our hands as soon as possible, so we can set it up in type and return it to you for correction and revision.

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Letter No. 1 Wins in the Contest--Who Gets the Promotion?

After a competition that was interesting in the extreme, the readers of Coal Age by a large popular vote selected Letter No. 1 written by J. E. Butler, general manager of The Stearns Coal Co., Stearns, Ky., as the winning answer to the cartoon—Who Gets the Promotion?

There was an enthusiastic response to our invitation for a popular vote, readers in all coal states sending in their choice by letters and postals. In one instance, a single large company operating a number of mines submitted 18 votes. There is every evidence that the question was discussed in detail in all fields. Quite a few people stated their choice of the three men up for promotion, but did not select one of the nine letters; these answers, of course, could not be counted.

The second most popular letter was No. 9, written by M. D. Cooper, a mining engineer of Ellsworth, Penn. Mr. Cooper ran Mr. Butler a close race, and early in the voting was slightly in the lead.

Letter No. 3 by Leo Mayer and Letter No. 6 by A. W. Calloway were always in the running, and each polled a large final vote. In fact, each one of the nine letters published had its friends and received many votes, showing how difficult it would have been for a few judges to reach a popular decision in the matter. It also occurred that a number of readers stated as their opinion that certain letters not printed among the nine were more meritorious than any of those up for vote. These same readers, however, in their actual voting confined themselves to one of the nine letters.

A careful analysis of the votes received indicates clearly that prejudice, or rather personal opinion as to which man should be promoted, played an important part in influencing each man's choice. If a reader believed that the older man of long service should be promoted, he voted for one of the letters advancing the same view. If he was in favor of promoting the "popular" man, he generally chose for the winning letter one holding views similar to his own. For this reason the final result means a little more than that Mr. Butler wrote the most convincing letter. It means also that Mr. Butler was running on the popular ticket, for there is no doubt that the young "popular" man was the choice of the majority.

A great many letters have been received from Coal Age readers, complimenting the paper on having advanced such an important, and at the same time, such a happy question for general discussion. An official of one of the largest Southern coal consolidations says that the effect of this cartoon discussion will be felt for a long time in many camps. Men who have been honest and industrious have been brought to realize that there are some traits of character worth cultivating besides industry, loyalty and persistence. They know now that a great many people figure a pleasant countenance and a sociable manner as assets of great importance in a business sense. Therefore, if the discussion has brought more smiles to the faces of many ambitious mining men, the work has been worth while.

It should not be difficult now for those who are seeking promotion to set before themselves an ideal and endeavor to pattern their lives therefrom. Ever so many letters have suggested that from this discussion we evolve an imaginary being who would fill the bill in every particular. One of our readers in a lighter vein says: "The cartoon problem would have been much simplified by the addition of a fourth applicant, who was 'some kin by marriage to the boss' wife.' Then specify in addition that the kin, the wife and the boss are all Irish, and the job is a cinch for the relation."

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 26—It is indeed gratifying to see the great interest that has been manifested in this discussion. If you will allow me the space, I want to emphasize a few of the points already submitted. One of these is in respect to systematic timbering in mining.

It will be remembered that, about two years ago, the qusetion of systematic timbering at the working face was thoroughly discussed in Coal Age (Vol. 3, p. 286, *et seq.*). If I remember rightly, it was generally agreed in that discussion that a maximum distance between posts set at the working face should be maintained, generally. At that time, it was urged by Mine Foreman William Crooks that legislation was greatly needed to regulate the question of timbering in coal mines (Vol. 3, p. 698). I gladly indorse that suggestion and maintain that a large number of mine accidents occur from falls of roof at the working face, which would be prevented if state mining laws required the adoption of some regular system of timbering the coal face in every mine. I believe such a law would be of great assistance to all mine managers, foremen and their assistants.

I desire, also, to indorse Mr. Crook's remarks, Coal Age, Nov. 21, p. 839, in respect to the time that should elapse between the inspection of working places by the fireboss and the miners starting work for the next shift. I agree with Mr. Crooks that no more than *two hours* should elapse between the time of making such inspection and the time when men are permitted to go into the mine. This is an important matter that should be plainly treated in all mining laws.

Considering the constant recurrence of mine disasters and the number of mines that have been visited by two or more explosions, the suggestion is worthy of the most careful consideration that state mining laws should compel the introduction of safety lamps in every mine where it is known that quantities of firedamp are generated. By this I mean the exclusive use of safety lamps should be made compulsory, by law, in all mines in which gas is generated in such quantities as to necessitate the frequent marking out of certain places because of the presence of sufficient gas to make the place unsafe for work.

The mining law should further require that every person employed underground, in such mines, should be taught the use and care of safety lamps. The same requirements should be made of shotfirers who are frequently compelled to carry safety lamps in the performance of their duties. I have known instances where men employed as shotfirers and obliged to carry safety lamps knew little more about the use of the lamp than how to light the same. Under such conditions, it is no wonder that mine explosions occur.

Before closing, I want to refer briefly to the question of the *selection of mine inspectors*. It seems to me that a better method of choosing men for this office should be generally adopted. I would ask, What is the use of men fitting themselves by careful study and hard work to fill such positions when appointments to this office are given out merely for political reasons and in return for the political services of men who are ill-prepared for the work of inspecting mines? There can be no question but that every effort should be made, and *must* be made, to secure the men best fitted by knowledge and experience for this responsible position. The question has well been asked, "Does the present method of selecting men for this office accomplish this end?"

There are many points, besides, that could well be discussed, in the consideration of our mining laws and needed legislation, and I hope these points will be brought out by others who will enter this discussion.

A. Coats,
Mine Foreman.

Kimberly, Ala.

Letter No. 27—I am pleased to see the great interest that is being manifested in this discussion. I read with some surprise the criticism of my last letter, by Mine Inspector Rose, of Tennessee (Coal Age, Jan. 2, p. 25), who seems to refute the idea I expressed that the present method of appointing mine inspectors, in some states, is unsatisfactory. Mr. Rose's letter contains two points that I will answer.

1. He asks, "Is it not true that most men holding positions of trust and honor have secured those positions through influence?" Mr. Rose charges that I "do not suggest a better method for the selection of mine inspectors," in answer to which I will narrate, briefly, a few observations I have made, during the past few years, when my spare time has been taken up in teaching the principles of mining and preparing men for state mining examinations. I will say that many of these men have been successful in passing the examination, and are now holding positions of trust and honor. I might add that they did not "secure these positions through influence"; but obtained them by reason of their practical and technical training.

Permit me to ask, What kind of men are selected generally by large coal corporations, for positions on their official staff? Are men selected for these positions because of any "influence" brought to bear; or because of the ability of the candidates to deliver the goods? I venture the assertion that any shrewd mine manager will desire to know something of the candidate's capability before making him mine superintendent or foreman of his mines. It is *ability* and not *influence* that counts as a commercial asset. As an instance supporting this assertion, I recall a man who, nine years ago, was one of the rank and file in Alabama. Today, he is general superintendent of a large coal company. His rise was phenomenal; but it came as the result of his *ability to get results.*

Permit me to ask Mr. Ross, Why does the U. S. government hold civil-service examinations? Is it not to test the knowledge of applicants for the positions to be filled? Such an examination is necessary to produce qualified men. It is stated in Bulletin No. 1 of the University of Illinois that "One of the most important and prominent topics under consideration by the industrial and educational world, at the present time, is what is known as Industrial Education; that is, such education and training as will produce more skilled workmen and better foremen and bosses." I fully indorse this statement.

In reference to the appointment of state mine inspectors, Mr. Rose says:

> I fully believe that the appointment of mine inspectors by the governor is the best method that can be adopted in the interest of safety for the miner.

I trust Mr. Rose will bear with me for my failure to see any logic in a statement of this kind. Suppose, for a moment, the governor of a coal-producing state is, we will say a cotton manufacturer and knows little or nothing of the coal-mining industry. In this event, he must rely, naturally, on the advice of friends and is easily susceptible to the political influence of those who have supported his campaign for office.

In response to Mr. Rose's charge that I did not suggest a better method of selection, I would say, Make the appointment of state mine inspectors, by law, dependent upon and determined by a competitive examination. The candidate whose technical examination shows the *highest percentage* and who has had the necessary *practical experience* in the mining of coal should be recommended for appointment by the examining board, the members of which should all be mining men of experience and have sufficient technical knowledge to enable them to pass intelligently on the questions required to be answered by candidates. To my mind, this is a practical suggestion, and points out, I believe, the only sane way to safeguard mine employees. In forming my conclusions, I have tried to cultivate an unbiased opinion in respect to what I believe would go a long way toward placing the mining industry in a less dangerous class of occupation. I do not wish to appear as the man, who, looking through a dark glass, saw everything dark. I want to view things in a practical and helpful light.

WM. CROOKS.

Ensley, Ala.

Letter No. 28—One of the most important considerations, in the discussion of mining laws and needed mining legislation, is the question of the selection of state mine inspectors. I believe that it is quite generally agreed that the mine-inspection department, of all others, should be under civil-service control. This plan seems to have been followed in most coal-producing states. Viewed from the standpoint of the mine workers' organization, however, the system has the disadvantage that it places the mine-inspection service almost beyond the control of any outside influence, either political or otherwise.

The mine-inspection service in Illinois had been, for many years, practically free from the untoward influence of politics; and, as a result, the work had been brought to a high degree of efficiency. Inspection, under civil service, in this state, meant just exactly what it said. The mine inspectors were obliged to report to the Civil-Service Commission, for each month, before the seventh day of the following month. Under the rules adopted by the commission, "A false statement in an efficiency report was sufficient ground for discharge from the service." This note was printed at the bottom of each inspection-report blank, and every mine inspector understood its significance.

When the Democrats came into power, in the change of administration in the state, they naturally wanted all the offices they could control. To assist them in their efforts to secure these, they had the advantage of an obliging attorney-general. It transpired that, under the Republican administration, the civil-service law was signed after the mining law; and the attorney-general had ruled that this fact would place the mine inspectors under the civil service. But, to offset this, a further ruling was made to the effect that "All persons who are appointed by the governor and are under bonds are not under civil-service control."

It is needless to comment on the fact that, as a result of the first examination held by the new board of examiners, 19 out of 34 candidates who took the examination passed successfully. This result was in marked contrast with a previous examination held under civil service, where only 6 out of 29 candidates passed the examination. The standard of excellence of the new board is suggested by the claim, made by a prominent member of the board in discussing one of the questions given in the examination, that "The size of a hoisting engine depends on the drum."

I do not make this statement in the spirit of retaliation, but to show that, in politics, it is difficult to secure the appointment of capable men, either to serve on the examining board or in the inspection of mines. On the other hand, many office seekers and wire-pullers obtain the appointment to these important and responsible positions, as a reward for their political activities.

At the present time, a strong effort is being made in Illinois to make the office of state mine inspector an *elective* instead of an *appointive* office. This effort emanates from the state mine workers' organization. At its convention, held in Peoria, last March, a resolution was passed recommending that all state mine inspectors should be elected by popular vote. It is understood that a bill will be introduced into the state legislature now in session, providing for such an enactment. There is, however, no doubt but that a strong fight will be required to pass such a law, as the attempt will meet with determined opposition.

Of the two evils, I would much prefer to see the mine-inspection department under the baneful influence of politics, than to see that office made elective. Under politics, a mine inspector may be an honest man; but, under the elective system, honest mine inspection is practically out of the question. In order to hold his office, the inspector must overlook many flagrant violations of the mining law, on the part of the miners, and condone many shortcomings of the operators. It needs no argument to convince one that inspection, under such conditions, would be a farce, jeopardizing both the safety of human life and the security of property.

A FORMER MINE INSPECTOR.

——————, Ill.

Letter No. 29—The manner of selection of state mine inspectors appears to me to be one of the most important questions affecting the coal-mining industry, at the present time. This is eminently the case, in Illinois, where an attempt is about to be made to force a bill through the present legislature, providing that mine inspectors shall be elected at the regular state elections instead of being appointed by the governor, as formerly, or by the Civil Service Commission.

There is, perhaps, no question demanding greater attention, in respect to needed legislation than the question of efficient mine inspection. It is unnecessary to remark that mine inspectors should be in possession of the foremost mining knowledge, both practical and theoretical. A mine inspector should be a broad-minded man, capable of handling any problem that may be presented, with a clear head and without prejudice. He must be a man of courage and fearless in the discharge of the duties pertaining to his office. His character should be beyond reproach.

In order to secure men of this type and standing, I am convinced that the first requirement is an *examination,* both practical and theoretical, to ascertain the capabilities of the candidate. It is of the utmost importance that the examining board should be composed of thoroughly capable and representative men. The board should comprise, naturally, two operators, two miners and a mining engineer who is a graduate of a college and understands fully the theory, principles and practice of coal mining. The operators on the board should each be a superintendent or manager of some coal company engaged in the mining of coal. They should each possess a theoretical and practical knowledge of the principles of coal mining. The miners on the board should be men of practical experience in the mining of coal, and should possess certificates of competency obtained by them in a previous examination. A board so constituted is capable of giving a fair and thorough examination and determining with equal justice the capabilities of candidates who present themselves for examination.

When we consider that the mine inspector must meet continually with men who are the most capable representatives of both the operators and the miners, it is easy to see that an inspector must be, himself, a capable official in order to handle the various questions that arise, logically and with sound reason and common sense. There is no question but that coal mining, in this and other states, is growing in importance every day. The coal industry is advancing by strides. More capital is being expended, larger plants are being erected and extensive mines developed. The output expected from these mines far exceeds what would have been thought of a few years ago.

In the face of these conditions, it is absurdly ridiculous to consider any proposition that bids fair to lower the efficiency of the mine-inspection service. No argument is required to convince a reasonable, unprejudiced mind that such inspection service should be completely divorced from politics. The proposition to make the office elective has nothing to recommend its adoption to one who is at all familiar with the responsibilities of the position and its requirements.

Let one consider, for a moment, and ask himself the question, How can an inspector discharge the arduous duties of his office when, by so doing, would mean to forfeit his reëlection to the office? Is it not more than can be expected of human nature, for one to take an independent stand in opposition to the forces and elements to which he must look for support in future elections? As a consequence of this condition, would not the mine inspector become simply an office seeker—a good fellow with the operators and a diplomatist with mine workers, having always uppermost in his mind the chances of his reëlection to office? Can anyone say but that this would be the natural result and outcome of making the office of mine inspector an elective office?

The man must be blind indeed who cannot see that the adoption of the elective system, in the selection of men to serve as mine inspectors, would practically eliminate the question of *fitness* or *capability.* The success of the candidate for office would depend, first, on the number of votes he could command, in respect to his nomination; and, second, on the success of his party at the polls. The question may well be asked, *Why should the lives of men working in the mines and the security of valuable property be made to depend on such uncertain and changing conditions as are assured in politics?* A careful study and familiarity with the situation make the conclusion almost inevitable that neither the *miners* nor the *operators,* as a class, should be permitted to influence or in any way control the selection of a state mine inspector; because the interests of both of the parties named will be and are seriously affected by the conscientious discharge of the duties that devolve upon the inspector.

At the annual meeting of the Mine Inspectors' Institute, U. S. A., held at Birmingham, Ala., June, 1913, the inspectors present engaged in a very interesting discussion of this subject. It was generally shown by the experiences given that the elective system, in respect to mine-inspection service, seriously impaired the efficiency of the work. It was shown that not only was much time lost through the necessity of electioneering on the part of the inspector, but that he was seriously handicapped in the matter of enforcing the mining law. It was stated that the influence of the United Mine Workers' Organization was particularly harmful, under the elective system, since any failure of the mine inspector to comply with a request coming from an official of that organization was at once heralded throughout his district and the matter taken up by the several locals in a way that promised that the said inspector would fail of reëlection, a succeeding term. It was further shown that, under such a system, the inspector is constantly used as a tool to adjust matters that are wholly outside of his province. Reference was made to the work that Coal Age had already done to combat this law, and the hope was expressed that this work would be continued.

In closing, I want to indorse what has already been said in reference to the length of tenure of office, in the case of state mine inspectors. I want to say that the longer the inspector is in office, the more capable, efficient and valuable he becomes as a state official. Any change in the inspector means a handicap to the service in that district, as it requires time for a new inspector, no matter how capable he may be, to understand and become familiar with the working conditions of the mines in his charge. He must learn anew the attitude of the operators and miners in that district.

Again, it is plainly evident that, having acquired this knowledge of affairs and conditions, the method of treatment by a new inspector will differ materially from that of his predecessor in office; and this fact threatens an increased expense and annoyance to the operator and jeopardizes the harmonious relations existing between employer and employed, which the old inspector has been able, by his long and intimate relation, to establish. For these and other reasons, I believe that an inspector should be appointed for good behavior and removable only for cause, to be established through regular judicial action before a proper tribunal.

MINE INSPECTOR.

——————, Penn.

Drying Washed Coal

Letter No. 3—Referring to the question of John Hammond in regard to the drying of washed coal, I would suggest, as the best means available for his purpose, at the present time, the use of centrifugal coal driers, which are something new on the market and for which I have heard of claims being made that the moisture in coal can be reduced to, approximately, 3 per cent. I believe, however, that such statements have been frequently misunderstood, as I think it is more generally admitted that the best that can be expected of these machines is a reduction of the moisture to about 3 per cent. *above the ordinary moisture content of the raw coal before washing.*

I have been doing considerable experimenting with one of these machines and, under certain conditions, have succeeded in reducing the moisture to about 4.5 per cent., which is the lowest obtained to date. I believe, however, that it is too early to predict the possibilities of these machines of the various makes; and I do not believe that definite information can be given, until they have been tested under commercially operating conditions, for several months. I believe, however, that there are good possibilities in them.

In regard to the probable increased cost of drying the coal by these machines: I think it is, also, too early to predict just what the final cost will be; and would not care to be quoted in that regard at this time.

Outside of centrifugal driers, the only other methods of drying the washed coal are through the storage of the coal in suitable bins. The extent, however, to which the moisture can be reduced depends largely on the size of the bins, as compared with the plant capacity; or, in other words, the length of time the coal can be permitted to drain before being drawn from the bin. Such systems are quite common and the results of their use are undoubtedly known to this correspondent, and I assume no further discussion of that point is required.

I shall be glad to give additional information in regard to centrifugal driers at such time as the work has been carried to a point where such data will be of definite value.

G. R. DELAMATER,
Consulting Engineer.

Harrisburg, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Size of Discharge Portal—The required diameter (d) of the discharge portal of a centrifugal pump, as stated previously, depends on both the gallons (G) of water pumped and the head (h) against which the pump discharges. This is calculated by the formula

$$d = 0.56\sqrt{\frac{G}{\sqrt{h}}};\ \text{or}\ \sqrt{\frac{G}{\sqrt{10\,h}}}$$

It is evident, therefore, that the area of the discharge portal of the pump is always less than that of the column pipe, the diameter of which is calculated for the given discharge (G) and a velocity of 400 ft. per min., as in other types of pumps, according to the formula previously given,

$$d_c = 0.25\sqrt{G}$$

Diameter Ratio for Different Heads—Comparing the two formulas last given, it is clear that the ratio of the diameter of the column pipe to the diameter of the discharge portal of a centrifugal pump is independent of the quantity of water pumped, and varies as the fourth root of the discharge head. This diameter ratio is given by the formula

$$\frac{d_c}{d} = \frac{0.25}{0.56}\sqrt[4]{h} = \text{say}\ \frac{4}{9}\sqrt[4]{h}$$

In other words, the suitable diameter of column pipe for a double-suction, volute pump is found by multiplying the diameter of discharge in inches (number of pump), by four-ninths of the fourth root of the head in feet. For example, a No. 10 pump of this type, discharging under a head of 150 ft. will require a 16-in. column pipe to reduce the velocity of the flow to, approximately, 400 ft. per min., in the pipe.

Capacity of Double-Suction, Volute Pumps—Calling the number of this type of pump N, the rated capacity of the pump, for a maximum efficiency and a given head (h) in feet, is given approximately by the formula

$$G = N^2\sqrt{10\,h}$$

Limitations in Practice—Naturally, the adaptation of centrifugal pumps, like centrifugal fans, is limited to certain conditions, in respect to the quantity of water to be handled and the head. For the same pump, within certain limits determined by a falling off in efficiency, the discharge varies as the square root of the head.

For example, a small No. 2, double-suction, volute pump capable of throwing, under a 50-ft. head,

$$G = N^2\sqrt{10\,h} = 2^2\sqrt{10 \times 50} = \text{say 90 gal. per min.}$$

is not an efficient pump to use under a head of 100 ft. or more. In other words, pumps of this class have their limits of capacity, owing to the rapid decrease of efficiency as the head is increased. The formulas given for estimating the size and capacity of these pumps relate to the maximum efficiency of the pump.

The Coal Age Pocket Book

Table Adapted to Pumping In Mines—The following table has been specially prepared to meet the conditions common to coal mining. Owing to the rapid corrosion of the pipes by the acid mine water, the usual tables giving the loss of head due to friction for the flow of water in pipes do not apply, except when the pipes are new. When using such tables it is safe to add from 20 to 25 per cent. to the values given.

The table given below is estimated for a coefficient of friction f = 0.01, instead of 0.0075 or 0.008, as is often done. The heads due to friction in the suction and column pipes are based on velocities of 200 ft. and 400 ft., respectively, and estimated for a 10-ft. suction and a 100-ft. column pipe or discharge head. This makes the total static head or lift 110 ft.

TABLE SHOWING SIZES OF SUCTION AND COLUMN PIPES, FRICTION VELOCITY AND TOTAL HEADS AND TOTAL PRESSURES, FOR DIFFERENT CAPACITIES

Water Pumped or Capacity (G.p.M.)	Friction Head, 10-Ft. Suction ($f = 0.01$) (Ft.)	Friction Head, 100-Ft. Dischg. ($f = 0.01$) (Ft.)	Diameter of Suction Pipe v_s = 200 F.p.M. (In.)	Diameter of Column Pipe v_c = 400 F.p.M (In.)	Velocity Head in Suction Pipe (200 F.p.M.) (Ft.)	Velocity Head in Column Pipe (400 F.p.M.) (Ft.)	Static Head or Total Lift (Ft.)	Total Effective Head (Ft.)	Pressure Against Which Pump Operates L.p.s.i.
50	0.336	18.85	2.47	1.75	0.17	0.69	110.0	130.0	56.4
100	0.238	13.33	3.50	2.50	....	....	.....	124.4	54.0
200	0.168	9.43	4.95	3.54	....	....	.....	120.5	52.3
300	0.137	7.70	6.06	4.33	....	....	.....	118.7	51.5
400	0.119	6.67	7.00	5.00	....	....	.....	117.6	51.0
500	0.106	5.96	7.83	5.59	....	....	.....	116.9	50.7
600	0.097	5.44	8.57	6.12	....	....	.....	116.4	50.5
700	0.090	5.04	9.26	6.61	....	....	.....	116.0	50.3
800	0.084	4.71	9.90	7.07	....	....	.....	115.7	50.2
900	0.079	4.44	10.50	7.50	....	....	.....	115.4	50.1
1000	0.075	4.22	11.07	7.90	....	....	.....	115.1	50.0
1200	0.069	3.85	12.12	8.66	....	....	.....	114.8	49.9
1400	0.063	3.56	13.10	9.35	....	....	.....	114.5	49.8
1600	0.059	3.33	14.00	10.00	....	....	.....	114.3	49.7
1800	0.056	3.14	14.85	10.61	....	....	.....	114.1	49.6
2000	0.053	2.98	15.65	11.18	....	....	.....	113.9	49.5
2500	0.048	2.67	17.50	12.50	....	....	.....	113.6	49.3
3000	0.043	2.43	19.17	13.69	....	....	.....	113.3	49.2
4000	0.038	2.11	22.14	15.81	....	....	.....	113.0	49.1
5000	0.034	1.89	24.75	17.68	....	....	.....	112.8	49.0

The table gives the diameters of the suction and column pipes for the velocities named above and for different quantities discharged varying from 50 to 5000 gal. per min.

The friction head for other lengths of vertical suction and column pipes are easily found from the values given in the table. The length of inclined pipes must be found by dividing the vertical head by the sine of the angle of the slope or inclination. The table gives the exact diameter of pipe required instead of the nominal size.

Inquiries of General Interest

Pump Troubles

I want to ask, What would cause a duplex pump to overreach; or, in other words, what is the possible cause of this pump making a stroke of 15 in. on one side and 21 in. on the other side, when each side of the pump should have a stroke of 18 in.? The pump is of the Worthington type and, I may say, the water-end is in perfect condition. Our machinist in charge says that the steam valves are right. Except for the unequal stroke of the pistons, the pump is doing excellent work.

I also want to ask how much pressure the springs controlling the water valves of the pump should have. The pump is discharging against a pressure of 90 lb. per sq.in., through an 8-in. column pipe. The dimensions of the steam- and water-ends are as follows: Steam-end—high-pressure cylinder, 14 in. diameter; low-pressure cylinder, 20 in. diameter. Water-end—plunger, 11½ in. diameter. The length of stroke is 18 in. There are four suction valves and four discharge valves. What size of spring-brass wire should be used on these valves, assuming the diameter of the springs is 5 in.?

I would also like to know what danger there is, if any, in operating a pump in the condition I have stated.

MINE FOREMAN.

Coral, Penn.

There is nothing unusual or peculiar in the action of a duplex pump, as described by correspondent. It is well known that there is nothing to determine the exact length of the stroke of a pump, which may be a little longer or shorter than the specified normal stroke. The stroke is brought to rest by the admission of live steam in that end of the steam cylinder when the valve closes the exhaust port and opens the steam port. The movement of the two pistons of a duplex pump is not correspondingly uniform; and the length of the stroke of each piston is, therefore, independent. The relative distance through which each piston moves, in a single stroke, will depend not only on the movement of its valve, which is actuated by the opposite piston; but, likewise, on the stiffness of the moving parts and resistance of the valves on the respective sides of the pump.

We are advised, further, that it is possible that the cross-exhaust valve, in this particular pump, is not free to open between the cylinders, this being a compound, duplex pump. We would suggest that the machinist look carefully to the valves, again, on each side of the pump and reëxamine their setting, as this is most frequently the chief cause of such a difficulty.

The inquiry does not state anything in regard to the conditions of suction, in this case. It frequently happens that, on a very long or a very high suction, the springs controlling the suction valves must be extra light, in order to allow for the increased suction head.

The information desired in regard to the proper tension of the springs and size of brass wire required can be best obtained by corresponding directly with the manufacturers of this pump, who will be pleased to give such information and further advice as is necessary. In writing for such information, it is always required to give the number of the pump. While the observed irregularity in the action of this pump may be due to other causes, which can be detected only by a close and careful inspection, such as faulty pipe connections or bad packing, it is more than probable the trouble is in the valves.

⁂

Available Oxygen

Will you kindly explain how it is that when we are taught that oxygen is the mainstay of combustion, and anything burnt in pure oxygen is consumed with extreme rapidity, the effect of carbon dioxide, which contains more oxygen than carbon monoxide, is to *extinguish* flame while carbon monoxide *assists* the combustion.

We are taught that carbon dioxide contains two atoms of oxygen and one of carbon, while carbon monoxide contains only one atom of oxygen and one of carbon. It would seem that the gas containing the greater percentage of oxygen would naturally be the better supporter of combustion; but, on the contrary, in this case, the gas containing the less oxygen assists combustion, while that containing more oxygen has an opposite effect.

STUDENT.

Dubois, Penn.

In order for oxygen to support the combustion of matter, it must be available or free. The oxygen contained in both of these gases mentioned by correspondent is combined with carbon and is not available or free to support combustion.

The fact that carbon monoxide acts to assist combustion, while carbon dioxide has the opposite effect and reduces the combustion of matter, is due to the respective properties of these gases. Neither of the gases is a supporter of combustion of carbon or carbonaceous material. Carbon monoxide, however, is a *combustible* gas, while carbon dioxide is an *incombustible* gas. The former will therefore burn in an atmosphere of oxygen and produce, as a result, carbon dioxide. It is the heat of this combustion of the gas that assists the combustion of carbonaceous matter when this gas is present.

On the other hand, as stated, carbon dioxide being *incombustible* will not burn even in the presence of free oxygen. Therefore, when carbon dioxide is present in the atmosphere, it serves to dilute the oxygen present, making the percentage of available oxygen in the atmosphere less and thereby reducing the activity of the combustion. Not only this, but the incombustible gas when present absorbs the heat of the combustion taking place, which again reduces the rapidity of the combustion. It must be remembered that the activity and rapidity of combustion depend on the relative affinity of the elements of the combustibles for those of the supporter of combustion and the percentage of available oxygen present in the atmosphere.

Examination Questions

Alberta, Canada, Examination for First-Class Certificates, Held June 23-25, 1914

VENTILATION—(*Selected Questions*)

Ques.—What is meant by the term "occluded gases"? Name the occluded gases found in coal mines. What other gases are met with in coal mines and how do they originate? State briefly the characteristics of each gas.

Ans.—The occluded gases of coal mines are those naturally contained (occluded) in the pores of the coal or other strata. In many cases, these gases have escaped from the pores of the coal and rock and are held confined in pockets or other void spaces in the strata. The occluded gases of coal mines are: Methane or marsh gas (CH_4), olefiant gas or ethene (C_2H_4), carbon dioxide (CO_2), nitrogen (N), oxygen (O) and, in a few instances, ethane (C_2H_6). The other gases found in coal mines are: Carbon monoxide (CO) and hydrogen sulphide (H_2S). Neither of these two gases is found occluded in coal formations. Carbon monoxide is a product of the explosion of gunpowder and some nitroglycerin compounds, or of the slow combustion of carbon in a limited supply of air. Hydrogen sulphide is a product of the decomposition of pyrites, in the presence of moisture, the pyrites being frequently associated with coal formations.

The principal characteristics of the gases mentioned are briefly as follows: All the gases are colorless and without odor, except hydrogen sulphide, which has a strong, pungent odor resembling that of rotten eggs. Methane, carbon monoxide and hydrogen sulphide form explosive mixtures with air. Although carbon monoxide and hydrogen sulphide are generally considered the only poisonous gases, both being deadly in their effect on the human system, carbon dioxide has a distinctly toxic effect, producing headache, nausea, pains in the back and limbs and death by suffocation. Nitrogen is an inert gas, serving to dilute the oxygen of the air and other gases, but playing no other part in general chemical reactions. Oxygen is the great supporter of life and combustion. Olefiant gas, when present in firedamp mixtures, lowers the point of ignition and increases the explosive condition.

Ques.—If the total quantity of air circulating in a mine is 120,000 cu.ft. per min., with a water gage of 3.5 in., find the indicated horsepower of the fan engine, taking the combined efficiency of fan and engine as 70 per cent.

Ans.—The pressure corresponding to a water gage of 3.5 in. is $3.5 \times 5.2 = 18.2$ lb. per sq.ft. Then taking the combined efficiency of fan and engine as 70 per cent., the indicated horsepower of the fan engine is

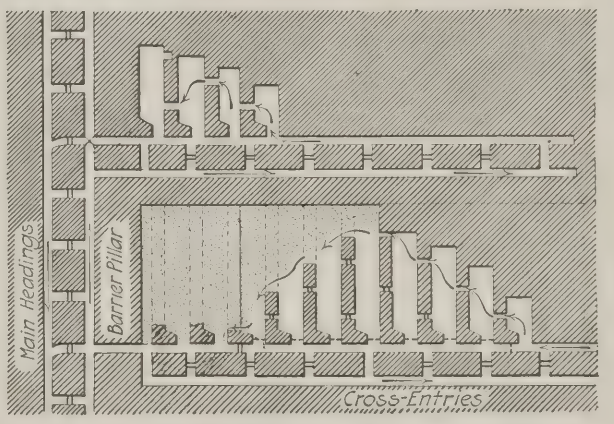
$$H = \frac{120,000 \times 18.2}{0.70 \times 33,000} = 94.5\ hp.$$

Ques.—A seam of coal lying at an inclination of 35 degrees is worked on the room-and-pillar system, the rooms being driven up the pitch. The distance between each set of levels is 400 ft. Several pillars in the lower panel have been extracted and the strata overlying the coal seam give off CH_4 freely. Rooms are still being driven to the rise of this gob and also on the inby side of it. Show by means of a sketch how you would ventilate this part of the mine.

Ans.—The question states that rooms are still being driven "on the inby side" of the section in which the pillars have been drawn. The plan is therefore the advancing system of working. Under the conditions named, it would have been better to have adopted a panel system of working, and worked each panel on the retreating plan. By that means, all of the coal, including that mined from the pillars, could have been hauled out on the intake air without difficulty.

Under the conditions named in the question, it is important to ventilate the levels by separate air splits, carrying the air in to the head of each level and returning it through the rooms in such a manner as to sweep the face of each place, as shown by the arrows in the accompanying figure.

The current, after sweeping the edge of the falls in the pillar workings, will be laden with gas and is conducted at once into the main return airway and passes out of the mine. To avoid hauling any coal on this air, a crosscut should be opened on the cross-entries at a point inby of the pillar section and a switch laid there to take the coal out on the intake air. It will be necessary to put a door on this crosscut and to backswitch the pillar coal to this door to avoid the gas.



Ques.—The ventilating fan at a mine is exhausting, but is made reversible. Explain under what emergency arising underground would the reversal of the ventilating current be of benefit.

Ans.—In the development of a large mine, it frequently happens that the main roads and airways must traverse a large section of old workings that have been abandoned long since and sealed off. In many instances heavy falls have broken the cover to the surface. Since, in the exhaust system, the mine is ventilated under a pressure below that of the atmosphere, the outside air is forced down through the breaks and the gases accumulated in the old workings are driven out into the mine. The reversing of the fan will obviate this difficulty.

Coal and Coke News

Harrisburg, Penn.

The following is a copy of the letter being sent out by the burgesses of the various municipalities in the anthracite region to the saloon keepers of these municipalities:

> Owing to my position as burgess of this municipality, and the fact that the chief industry within the limits of my jurisdiction is the mining and preparation of anthracite coal, which you are aware, cannot be accomplished without considerable risk to the lives and welfare of those employed in this dangerous vocation, I have been requested to send each of you a letter, asking, if you will join in a voluntary movement not to open your respective places of business for the sale of liquor until the hour of 7 a.m. and close the same not later than 11 p.m. The chief reason for making this request is that the various coal mining companies operating in this vicinity are making an earnest effort to reduce the number of serious and fatal accidents which occur at frequent intervals in their mines.
>
> During the year 1914 a large number of serious and fatal accidents occurred in the mines located in this borough. These accidents result in untold suffering of the victims and in addition, in many instances, are the cause of distress and want among the large number of widows and orphans created in each mining village by the untimely death of the father and wage-earner, thus depriving many families of their only visible means of support. You will no doubt agree that when an accident which causes the death of a father or son occurs, not only the family deprived of a wage-earner suffers, but it is a decided loss to our community at large.
>
> It has come under the observation of officials in charge of our mines that many men who have been injured or killed have been frequent patrons of the saloon until a late hour at night and on their way to work in the morning. Mining accident statistics, which are compiled from year to year prove that many of these unfortunate occurrences transpire during the morning hours. Six hundred and twenty-four persons were killed and several thousand injured, in the anthracite mines during 1913. I do not intend to infer that all these accidents were caused by the use of alcohol, but the men in charge claim to have several specific cases to which they can refer whose victims were in the saloon late the night before, and again on their way to work. This is not a prohibition movement, but one of common-sense regulation.
>
> Will you do your part to help it along by keeping your place of business closed between the hours designated?

Many Bills Are Introduced

Members of the legislative committee of the United Mine Workers of the anthracite and bituminous districts expect to urge the legislature to provide for an assistant mine inspector in every district. An assistant inspector, they contend, will double the frequency of inspections and this plan was preferred over that of asking for the creation of 10 additional inspectors.

It is the plan of the mine workers to draw up a bill making the salary of these assistant inspectors $2000, and it is said this bill will be ready for presentation to the Legislature in about two weeks. The lobby to be maintained by the mine workers will devote considerable of its time to the Compensation Act.

During the week two bills were introduced into the legislature, one in the Senate and one in the House, either of which will, if passed, do away with case beer and "family trade" in Pennsylvania. It is explained that the bills' primary object is to prevent the wholesalers, brewers, etc., from sending beer into the mining towns where there are no licensed saloons. The penalty provides for a fine of $100 and the loss of license for five years.

Mr. Garner introduced three bills during the week, one providing that all mine foremen, assistant mine foremen or firebosses, in making examinations of the mines before the men enter their working places in the morning, shall be accompanied by at least one miner. It contended that these foremen are compelled to travel many miles in dangerous and gaseous places and are the only men in the mines for hours at a time, and that many have been overcome by deadly gases or injured while thus making these examinations and have died before any workmen arrived. The bill says that but little cost would be placed on the operators to detail an experienced miner to accompany the foremen on the examinations of the mines.

The second bill provides for the employment of an assistant hoisting engineer for one hour in the morning and one hour in the evening, while men are being lowered and hoisted into the mines. Mr. Garner states that accidents have been caused by the sudden illness or injury to hoisting engineers and in one case an engineer was intoxicated while on duty and no other person was in the engine house to stop the engine and the cage was drawn to the head of the frame and six miners were killed. The bill carries a penalty of $100 for each day of violation.

The third bill of the trio, all of which pertain to anthracite mines, is for the purpose of overcoming the decision of the Dauphin County Court, which sustained the Attorney General in his decision that any one working in anthracite mines was a miner. This bill provides that before any one shall receive a certificate of qualification as a mine foreman or assistant mine foreman, he must have given satisfactory evidence to the board of examiners of at least five years' practical experience as a miner "in the actual work of cutting coal at a face."

PENNSYLVANIA

Anthracite

Mayfield—When the boiler of a mine locomotive burst, while pulling a trip of coal cars on Jan. 27, Mrs. Mary Wazerchak and daughter, aged 14 years, who were riding on the trip, and the engineer as well, were quite seriously burned. The locomotive was the property of the Moosic Mountain Coal Co., and was hauling its last strip of coal cars from Jessup to the breaker at Marshwood.

Scranton—The Delaware, Lackawanna & Western R.R. Co. is having prepared various designs of steel cages which will be submitted to a board of the Lackawanna's mine superintendents within a short time, and one of the designs will surely be adopted. Just what it will cost to install the new style carriage in all the company's mines has not been stated, but it is thought it will be in the neighborhood of $50,000. The argument that mine gases would have a corrosive effect on the steel and tend to weaken the carriage is not given much consideration. It is stated that steel carriages have been in use for five years in some mines and that the improved style has more than paid for the additional cost.

Rappahanock—Over 1000 men and boys were given employment on Jan. 25, by the Lehigh Valley Coal Co. at the new concrete and steel breaker located here, which has been erected on the site of the old Packer No. 5 breaker. Work was started on the breaker about a year ago. The building is absolutely fireproof the floors being of concrete and lighting accomplished by electricity. It is the only breaker in the Hazleton region in which cars are loaded by means of a belt. Both empty and loaded cars will be weighed on the one scale in the new breaker.

Rohrsburg—While digging a skunk out of a hole on his farm, in Columbia County, on Jan. 25, Bert Everett discovered the outcropping of a vein of coal. He started to uncover the measure and from all indications it is over 12 ft. in thickness.

Bituminous

Pittsburgh—On Thursday, Feb. 11, a representative of the Inter-State Commerce Commission will hear testimony of railroads and shippers, pro and con, as to the justice and merits of the so-called "spotting car tariff" sought to be imposed by the carriers in furtherance of previously expressed suggestions of the commission and suspended by that tribunal pending inquiry regarding it. In this connection the commission has caused it to be understood that the burden of proof of the necessity for the charge proposed, rests upon the railroads, and, also that only the testimony of shippers specifically mentioned in the suspended tariff will be heard.

Boswell—The mines of the Randolph Coal Co. are to have their capacity increased by the installation of a complete electrical equipment. With the aid of the new equipment it is expected that the daily output will be sufficient to enable the company to meet the competition of many larger mines.

Iselin—Following an attempt to dynamite the big company store building of the Buffalo, Rochester & Pittsburgh Coal Co., the mines have been shut down. Two attempts were made to dynamite the miners' hall at that place and the home of an official of the coal company before the latest outrage which damaged the big store building considerably.

Ebensburg—Three men were killed and six injured when a rope broke on a loaded trip of coal cars at Delaney, Jan. 28, permitting the cars to run down the slope into an empty train, upon which men were riding.

Mine Inspector Monteith, of the 15th Bituminous District, comprising the northern part of Cambria County and the Greenwich mines in Indiana County, believes that the 1914 production will be about 5,000,000 tons, or 1,000,000 tons less than that for 1913.

Uniontown—Orders were recently issued by the H. C. Frick Coke Co. to fire immediately 1000 coke ovens which have been idle for a year or more. These ovens are scattered throughout the entire Connellsville district, about 20 plants being affected.

Receivers were recently appointed for two more business men of Fayette County, William M. Thompson, brother of J. V. Thompson, and Jasper Augustine, a business associate of the latter. Both men owned coal lands and placed their assets far in excess of their liabilities.

Washington—C. J. Kelley and William Gregory, mine foremen at the No. 2 mine of the Meadowlands Coal Co., recently entered pleas of guilty to violating the mining laws. They had neglected to protect, as required by law, trolley wires at a parting in the mine, since this parting was to be abandoned shortly. They were each fined $40 and costs.

WEST VIRGINIA

Bluefield—It is reported that the sale of the Big Vein Pocahontas Coal Co. has been confirmed by the court. This operation was sold on Dec. 31 at auction and bought in by the bondholders for $356,000. It had been working under receivership for about four years, and it is reported made considerable money during that time.

Huntington—It is said that the Ohio Guyan Valley Coal Co. has arranged to take over the holdings of the Rocky Creek Coal Co. at Chapmansville. This firm is one of the Ohio operators that is seeking coal in the West Virginia field.

VIRGINIA

Pocahontas—The first National Bank of Pocahontas, owner of 14 bonds, of $1000 each, and Andrew C. Snyder, of Baltimore, owner of 12 bonds of the Big Vein Pocahontas Coal Co., recently filed a bill for an injunction in circuit court No. 3, against Thomas C. Boswell, Michael Sheehan, Merville H. Carter, John C. Krug, and Frederick H. Hack, constituting the bondholders' committee, the Big Vein Pocahontas Co., and the Colonial Trust Co., and Elmore D. Jeffrey. The bill alleges that the bondholders' committee undertook to disregard the rights and obligations of one of the members, and held meetings without his knowledge or consultation with him. The bill asked for an injunction to prevent the purchase of the coal lands involved.

ALABAMA

Birmingham—Twenty-eight out of the class of 33 men taking the semi-annual examination for positions of first and second class foremen and fire bosses passed. A. C. Ramcey of Littleton received the highest mark—97—in the first class.

KENTUCKY

Graham—The W. G. Duncan Coal Co. has built and equipped a "moonlight" schoolhouse in which a night school will be conducted. This is a part of the state-wide campaign to wipe out adult illiteracy in Kentucky.

Uniontown—It is reported here that the Deep Water Coal Co. which has extensive plans for taking over a large coal area in this part of the state has asked for a two months' extension of options which the promoters held on large coal holdings. It was reported recently that the deal had been closed but confirmation is lacking.

Whitesburg—J. H. Hopkins and associates of Virginia have taken a lease on the E. M. Webb coal land tract near Sergent on the Lexington & Eastern R.R. It is announced that they will begin immediately on an operation which is to have a daily output of from 800 to 1000 tons.

Harlan—A group of former Alabama operators who some time ago entered this field and leased the Harlan Home Mining Co.'s operation from A. B. and D. B. Cornett and reorganized the company as the Republic Coal Co., have recently undertaken a second development. They have taken an 800-acre lease on land owned by John H. Smith and Judge W. F. Hall and will build one mile of railroad and begin operating in the spring. This group of operators is headed by E. O. Guthrie.

OHIO

Bellaire—The Purseglove-Maher Coal Co., which recently made arrangements for opening a new mine in Logan County, W. Va., has shipped its horses to the new operation, at which a large amount of work has already been done. A new railroad track is to be constructed to the mine, and it is said that the operation will be ready for work within a few weeks.

Nelsonville—The Robbins Coal Co. which has a normal output of 600 tons daily has closed down its mines indefinitely, because of lack of business.

Rendville—The shutting down of the mines of the Sunday Creek Co. in the Hocking Valley is the cause of much suffering and destitution among the miners of that section. Recently the chairman of the board of education visited Columbus and appealed for donations of food, clothing and money to relieve the suffering. Many of the mines have been closed down entirely and others are being operated with a small force of men.

ILLINOIS

Duquoin—The mining property of the Benton District Coal Co. at Hanaford which recently went into the hands of a receiver, has been sold for $60,000. This deal was completed by Herman Rea of Christopher, receiver of the property.

Edwardsville—The hoisting apparatus at the mine of the East Side Coal Co. broke recently when the cage, with four miners upon it, was 130 ft. from the bottom. After dropping a few feet, the safety clutches stopped the fall. This is the second case in about three weeks of the same kind of an accident happening to mines in this county.

Benton—Engineers for the Illinois Central R.R. are completing a survey of the proposed new line from Hanaford, east of Benton, to West Frankfort, to the Franklin County coal fields. The proposed branch will be 7 miles long and, it is understood, will be the beginning of a new line of the Illinois Central extending from Hanaford southeast through the Franklin County coal field, and through the eastern section of Williamson County, down into the Saline field in and around the Harrisburg district. It is understood that the extension into the Saline County field will not be completed at this time, but it will only be a matter of a few years until the eastern field is open, and the Illinois Central is preparing to get its track in through this virgin coal field.

ARKANSAS

Bates—The Bates Coal Mines have been leased for five years by local coal miners who will renew active operations. These mines have, in the past, been operated at a loss but the miners believe they can make a profit.

Fort Smith—The deal for the purchase of the Bache-Denman Coal Co.'s Hartford Valley holdings by the United Mine Workers of America, has not been consummated. It is believed however that this deal will be closed within a short time.

FOREIGN NEWS

St. Johns, Newfoundland—An expedition to discover coal in the Hudson Bay district which may be utilized in connection with the proposed opening of the Hudson Bay Ry. is understood to be the mission of the schooner "Laddie" equipped here. This expedition is being financed by the Canadian railway operators, Mackenzie & Mann. One of the most essential factors to the successful carrying out of the Hudson Bay project will be the securing of an adequate coal supply for both steamers and trains. When the road reaches the seaboard and terminals are constructed at Fort Nelson, provision will be made for the storage of large quantities of coal both from western Canada and Cape Breton but if a supply could be secured at any point comparatively accessible for ships plying on the Hudson Bay route it would have an immense advantage.

PERSONALS

W. C. Franz has been made president of the Lake Superior Coal Co. and also the Canton Coal Co. a subsidiary.

B. F. Nigh, secretary of the Michigan-Ohio-Indiana Coal Association is busy getting up the annual year book of the organization which will be issued about the middle of April.

Kingdon Gould of New York, president of the Consolidated Coal Co. of St. Louis, and the Western Coal & Mining Co., has returned from an extended trip of examination at the various coal properties of this company in the Middle Western States.

Earl F. Scott, with offices at 702 Candler Bldg., Atlanta, Ga., has been appointed representative for the State of Georgia by the Terry Steam Turbine Co., of Hartford, Conn. H. A. Rapelye, in charge of the Pittsburgh office, is now located at 1624 Oliver Building.

George A. Harper, who was connected with the Buffalo office of Coxe Bros. & Co. when it went out of the western business and since mainly in the employ of the Lehigh Valley Coal Sales office, has been made representative of the latter company in western Michigan, with office in Grand Rapids.

P. A. Coen, general sales manager of the Sunday Creek Co. has announced the appointment of M. J. Gallagher as city sales agent in the place of E. A. Cole & Co., which formerly acted in that capacity. Mr. Gallagher has been a traveling salesman for the company for a number of years.

G. L. Douglas, assistant general sales agent, in charge of the St. Louis office for the Consolidated Coal Co. of St. Louis and the Western Coal & Mining Co., with mines scattered throughout Illinois, Missouri, Arkansas, and Kansas, has resigned to take a similar position with the Devoy & Kuhn Coal & Coke Co., St. Louis.

Arthur C. Vicary, formerly of Lorain, Ohio, has recently assumed the duties of sales manager of the steam shovel department of the Ball Engine Co., of Erie, Penn. Mr. Vicary has been engaged in the design and sale of steam shovels for years, and is widely known to steam shovel users, particularly in the eastern section of this country.

W. D. Monsarrat, formerly head of the operating department of the Sunday Creek Co. has established an engineering office in the Hardman Building at Columbus, Ohio. Mr. Monsarrat will devote his time to outside construction work such as shaft sinking, slope driving, etc., in which he has had considerable experience. He is prepared to submit bids on such work either in the United States or Canada.

E. S. White, for the past few years Southwestern representative for the Hart-Williams Coal Co. of Chicago, has been appointed general freight and passenger agent, to succeed W. H. Ogborn, of the Illinois Southern Ry. Co., with headquarters in St. Louis. Previous to his connection with the Hart-Williams Coal Co., Mr. White was assistant to one of the officials of the Missouri Pacific-Iron Mountain System.

R. E. Eggebrecht, for the past three years sales manager of the Devoy & Kuhn Coal & Coke Co. in St. Louis, will shortly assume a similar position with the Southern Coal, Coke & Mining Co. of St. Louis. Previous to his connection with Devoy & Kuhn Coal & Coke Co., Mr. Eggebrecht was connected with the Standard Collieries Co., with mines at Marion and Johnston City, Illinois, as vice-president. Previous to that he was A. G. F. A. of the Missouri Pacific-Iron Mountain System, in charge of coal traffic.

J. W. Hardy, for many years connected with various western railroads, and especially the Frisco, as a locomotive fuel expert, and for the past two years fuel engineer for the Southern Coal, Coke & Mining Co. of St. Louis, will sever his connections with that company shortly, to take the southern sales office for the West Kentucky Coal Co. at New Orleans. This office is created for the purpose of taking care of Southern trade of the West Kentucky properties, and the growing river business, and to expedite the handling of this company's product in an export way, on account of the opening of the Panama Canal. He will be succeeded as fuel engineer for the St. Louis company by J. E. Richmond, for some time past connected with this company.

OBITUARY

Col. S. M. Dalzell, general manager of the Spring Valley Coal Co., with mines at Spring Valley, Seatonville and Dalzell, Ill., died on Wednesday morning, Jan. 25, at his residence, 430 Grand Boulevard, Chicago. He had been suffering from physical infirmities for a long time, and his death although regretted by his many friends was not unexpected. Mr. Dalzell was long and favorably known in the coal trade of Illinois, and from Dec. 23, 1897, to Dec. 21, 1900, was president of the Illinois Coal Operators' Association, the duties of which office he performed with signal ability and success. He was born at Hartstown, Penn., Dec. 3, 1850, and up to recent years had always been one of the important factors in handling labor questions from the operators' standpoint.

RECENT COAL AND COKE PATENTS

Coal Recording Device. A. W. Dodge, Two Harbors, Minn. 1,121,234. Dec. 15, 1914. Filed Apr. 21, 1913. Serial No. 762,589.

Smoke Eliminator. C. Cable, Elkhart, Ind. 1,120,129. Dec. 8, 1914. Filed Mar. 24, 1914. Serial No. 826,969.

Boiler. L. D. Lovekin, Philadelphia, Penn.. 1,119,025. Dec. 1, 1914. Filed June 25, 1913. Serial No. 775,662.

Smoke Consumer. E. C. Heimlich, Detroit, Mich. 1,120,484. Dec. 8, 1914. Filed Apr. 1, 1914. Serial No. 828,665.

Furnace Structure. H. L. Meyer, St. Paul, Minn. 1,121,569. Dec. 15, 1914. Filed Feb. 21, 1913. Serial No. 749,797.

Gas Producer. P. G. Schmidt, Olympia, Wash. 1,116,131, Nov. 3, 1914. Filed Mar. 26, 1913. Serial No. 757,020.

Coal Breaker. M. H. McTurk, Philadelphia, Penn. 1,121,931. Dec. 22, 1914. Filed May 31, 1912. Serial No. 700,688.

Coal Pocket. G. D. Curtis, New York, N. Y. 1,121,328. Dec. 15, 1914. Filed Jan. 16, 1909. Serial No. 472,723.

Mine Safety Lamp. F. Farber, Dortmund, Germany. 1,116,048, Nov. 3, 1914. Filed Dec. 2, 1913. Serial No. 804,274.

Coal Cutting Machine. M. Mysliwicz, Wehrum, Penn. 1,116,907, Nov. 10, 1914. Filed Mar. 6, 1913. Serial No. 752,350.

Smoke Recorder. H. C. Alger, Chicago Heights, Ill. 1,122,229. Dec. 22, 1914. Filed Apr. 6, 1914. Serial No. 829,958.

Method of Mining Coal. E. C. Morgan, Columbus, Ohio. 1,116,355, Nov. 3, 1914. Filed Aug. 4, 1905. Serial No. 272,637.

Dumping Grate for Furnaces. E. Gibson, Jersey City, N. J. 1,116,409, Nov. 10, 1914. Filed Jan. 21, 1914. Serial No. 813,391.

Coal Picking Apparatus. F. H. Emery, Scranton, Penn. 1,119,586. Dec. 1, 1914. Filed Apr. 7, 1914. Serial No. 830,152.

Coal Washing Machine. W. W. Cooper, Fortyfort, Penn. 1,121,715. Dec. 22, 1914. Filed Sept. 8, 1914. Serial No. 860,655.

Chain Grate—P. L. Crowe and A. Frankenheim, New York, N. Y. 1,115,904, Nov. 3, 1914. Filed Mar. 9, 1914. Serial No. 823,388.

Coke Oven Door. J. A. McCreary, Connellsville, Penn. 1,121,385. Dec. 15, 1914. Filed Dec. 12, 1913. Serial No. 806,308.

Boiler Grate. D. K. Briggs and T. N. Smith, Portsmouth, Va. 1,121,791. Dec. 22, 1914. Filed May 23, 1913. Serial No. 769,529.

Furnace. R. F. Almirall and C. G. Armstrong, New York, N. Y. 1,120,993. Dec. 15, 1914. Filed June 4, 1910. Serial No. 564,952.

Sectional Shaking and Dumping Grate. C. T. Coe, Albany, N. Y. 1,121,001. Dec. 15, 1914. Filed Jan. 30, 1909. Serial No. 475,091.

Locomotive Fire Box. J. Black and J. Frama, Glasgow, Scotland. 1,119,490. Dec. 1, 1914. Filed Mar. 7, 1914. Serial No. 823,190.

Means to Prevent Gas Explosions in Coal Mines. H. Hall, Wylam, Ala. 1,119,427. Dec. 1, 1914. Filed Feb. 2, 1914. Serial No. 816,121.

Mining Machine. C. E. Davis, assignor to Goodman Mfg. Co., Chicago, Ill. 1,121,002. Dec. 15, 1914. Filed Oct. 6, 1910. Serial No. 585,550.

Charging Device for Gas Producers. J. A. Herrick, Newark, N. J. 1,119,280. Dec. 1, 1914. Filed Apr. 15, 1913. Serial No. 761,179.

Securing Device for Miner's Drills. J. W. Shallenberger, Canal Fulton, Ohio. 1,115,594, Nov. 3, 1914. Filed Sept. 26, 1913. Serial No. 791,919.

Process of Producing Gas from Bituminous Fuel. O. C. Berry, Glendale, Ohio. 1,117,217, Nov. 3, 1914. Filed May 6, 1908. Serial No. 431,177.

Apparatus for Treating Smoke and Fumes. J. Mercer, New Brighton, England. 1,121,746. Dec. 22, 1914. Filed May 20, 1912. Serial No. 698,474.

Clinker Grinder and Discharger for Furnaces. O. C. Woolson, New York, N. Y. 1,121,888. Dec. 22, 1914. Filed Jan. 30, 1914. Serial No. 815,351.

Mining Machine. F. L. Sessions, assignor to Jeffrey Mfg. Co., Columbus, Ohio. 1,122,034. Dec. 22, 1914. Filed Jan. 7, 1903. Serial No. 138,158.

Apparatus for Quenching Coke. H. Koppers, assignor to H. Koppers Co., Chicago, Ill. 1,121,376. Dec. 15, 1914. Filed Feb. 1, 1913. Serial No. 746,098.

Automatic Stoker. D. T. Williams, assignor to Standard Stoker Co., Wilmington, Del. 1,118,985. Dec. 1, 1914. Filed Apr. 18, 1914. Serial No. 832,730.

Locomotive Boiler Furnace. C. B. Moore, assignor to American Arch Co., New York, N. Y. 1,115,955, Nov. 3, 1914. Filed Dec. 18, 1911. Serial No. 666,353.

Grate. A. B. Coates, assignor to Economy Forced Draft Slack Burner Co., Ellsworth, Kan. 1,119,808. Dec. 8, 1914. Filed June 17, 1913. Serial No. 774,226.

Stoker. H. B. Holt, assignor to Rosedale Foundry and Machine Co., Pittsburgh, Penn. 1,122,203. Dec. 22, 1914. Filed Dec. 8, 1913. Serial No. 805,318.

Tubular Recuperator for Retort Coke Ovens. C. H. Hughes, assignor to Semet-Solvay Co., Solvay, N. Y. 1,120,147. Dec. 8, 1914. Filed Jan. 7, 1910. Serial No. 536,807.

Steam Boiler Construction. J. W. MacDonald and D. W. Robb, assignors to International Engineering Works, Montreal, Can. 1,120,071. Dec. 8, 1914. Filed Dec. 21, 1913. Serial No. 804,221.

TRADE CATALOGS

Waterbury Co., 80 South St., New York. Catalog. "Fiber-clad Wire Rope." Illustrated, 24 pp., 3½x6 in.

Pelton Water Wheel Co., 90 West St., New York. Bulletin No. 8. "Water wheels." Illustrated, 64 pp., 6x9 in.

CONSTRUCTION NEWS

Kirksville, Mo.—The Kirksville Commercial Club has a proposition well under way to extend the Big Creek R.R. to coal and clay deposits near here, and plans are made to open up these deposits in the spring.

Chicago, Ill.—It has been announced that the large tract of land which the Susquehanna Coal Co. purchased some time ago on the Calumet River at 114th St., will be improved with docks and coal handling equipment at a cost of approximately $300,000. A 1600-ft. wharf will be built while the yards will have a daily capacity of 8000 tons.

Birmingham, Ala.—Tentative plans have been agreed upon to extend a railroad from Birmingham to the Warrior River so that transportation may be secured. There will also be developments near the river, of considerable importance. All appearances seem to indicate that there will be improvements in the Warrior field of considerable magnitude within a short time.

Columbus, Ohio—At the annual stockholders meeting of the John M. Taylor Coal Co. of Columbus the announcement was made that the Taylor-Williams Coal Co., the retail department, will soon start the erection of a modern plant on Cleveland avenue, opposite the U. S. Barracks. This is made necessary by the rapid increase in the business. The plans provide for storage bins, yards, barns and an elevated track.

NEW INCORPORATIONS

Temple, Texas—The Bastrop Lignite Coal Co. has been incorporated with a capital of $75,000 to develop coal properties.

Cleveland, Ohio—Papers have been filed with the secretary of state reducing the capital of the Goshen Coal Co. from $1,000,000 to $5000.

Wellston, Ohio—The Blue Jay Coal Co. has filed amended articles of incorporation increasing its capitalization from $10,000 to $15,000, to finance more extended operations.

Oklahoma City, Okla.—The Ross-Caldwell Coal Mining Co. has been organized at Lehigh with a capital of $6000. The incorporators are A. K. Ross, Ray Caldwell, and Tom Mitchman, all of Lehigh.

Roanoke, Va.—The Eastern Kentucky Block Coal & Fuel Co. has been incorporated with a minimum capital of $10,000 and a maximum of $80,000, to engage in coal mining. The officers are W. O. Brothers, president, H. V. Brothers, secretary, both of Honaker, Va.

Crumpler, W. Va.—The United Pocahontas Coal Co. which is to have its chief works in the North Fork district of McDowell County, has been organized with a capitalization of $500,000. The incorporators are A. B. Rice, Hall Kilpatrick, J. L. Ashworth, A. A. Bosh, and C. B. Hoyt.

Quebec, Canada—The British Columbia Skeena Coal Co., Ltd., has been incorporated, capitalized at $1,000,000, with head office in Quebec by Senator P. A. Choquette, Hon. N. Garneau, J. G. Scott and J. T. Ross, to conduct general mining operations and take over the assets of the British Columbia Anthracite Syndicate.

Chattanooga, Tenn.—The Craney Creek Coal Co., owning land in Kentucky and chartered in that state, has applied for a Tennessee charter, listing its capital at $100,000. The company is allied with the Continental Coal Co., a local concern, and its incorporators are C. C. Moore, J. D. Carlin, O. P. Darwin, John E. Patton, W. E. Wilkerson.

Charleston, W. Va.—The Ivy Branch Coal Co., of Charleston, has been granted incorporation papers. The company will have its chief works in the Washington district of Lincoln County, and is capitalized at $50,000. The incorporators are A. E. Moore, John W. Moore, Angus MacDonald, Leo F. Moore, Hubert S. Moore, all of Charleston.

INDUSTRIAL NEWS

Louisville, Ky.—Announcement is made that the Kentucky, Land, Lumber & Mineral Co. is to dissolve, and claims against the firm, as well as debts owing it, are called for.

Birmingham, Ala.—Announcement has been received here that under the new ruling by the terminal companies, cargo and bunker coal will be held free for 10 days at New Orleans. This is interesting to coal men here who sell large quantities of bunker coal at New Orleans.

Cleveland, Ohio—Federal Judge Clark recently appointed receivers for the East Grafton Coal & Coke Co. and the Triona Coal & Coke Co., West Virginia corporations with offices in Cleveland. Lack of capital is blamed for the financial embarrassment of these firms.

Olcott, W. Va.—The Black Band Fuel Co. has purchased the property formerly owned by the Olcott Coal & Iron Co. operating mines at Olcott, W. Va. All matters pertaining to the Olcott property should hereafter be addressed to the Black Band Fuel Co., 1 Broadway, New York.

New York, N. Y.—The withdrawal of steamers used in the coal trade between Chesapeake Bay ports and New York for use in the trans Atlantic trade has created a demand for sail tonnage, and incidentally brought about increases in the freight rate amounting to about 25 per cent. The average time taken by sailing vessels from Norfolk to Boston is about three weeks so that it will require six schooners of 3000 tons capacity each to make up for the loss of one 6000-ton steam collier.

South Bethlehem, Penn.—An event in industrial affairs of this vicinity was the charging on Jan. 26, of 106 newly built coke ovens at the Lehigh coke plant it being the first battery of four comprising 424 ovens which are being built. Already half of the 424 ovens have been erected, but only 106 have been fired. These new coke ovens are taking the place of the old four-battery systems which were built by the Didler-March Co., a German concern and which proved a distinct failure.

Washington, D. C.—The Grand Rapids, Michigan, Association of Commerce recently complained to the Interstate Commerce Commission about the unfair rates of the Ann Arbor and other railroads on soft coal from mines in Pennsylvania, West Virginia and Ohio, to Grand Rapids, alleging that rates to Detroit and Toledo were proportionately lower than the shorter haul warranted, and asked that new rates be established from the coal fields to Michigan points as those used at present are prejudicial.

Washington, D. C.—By a recently announced decision the Interstate Commerce Commission notified the Illinois Central and other railroads that their proposed increased rates on coke in carload lots from St. Louis, Chicago, Milwaukee, and other points to destinations in Minnesota other than Duluth, in Wisconsin, Iowa, and South Dakota, are justified. The proposed increased rates on the same commodity from the same points of origin to Duluth, Minnesota, however, were held to be unreasonable to the extent that they exceed $2.15 per ton. The present rate to Duluth is $2, and the proposed rate is $2.25. The changes take effect on Feb. 28.

Cincinnati, Ohio—Petitions have been filed in the United States district court by receivers Harmon and Smith, of the Cincinnati, Hamilton & Dayton R.R., asking for the appointment of receivers to operate the Cincinnati, Indianapolis & Western Ry. Co. The petitions were filed in foreclosure proceedings instituted by bondholders represented by the Central Trust Co. and the Equitable Trust Co. of New York, against the company mentioned. The receivers of the C. H. & D. have been operating the other road, which is a connection of the former, under an agreement between the two companies, and report that its operation has been unprofitable, resulting in a deficit, and that it is now necessary to spend $140,000 for repairs to a bridge over the Wabash, and $400,000 at Indianapolis.

Coal Trade Reviews

General Review

Severe weather relieves the pressure on anthracite and working schedules are increased. Uncertainties developing in bituminous. Spectacular advance in ocean freights causing general uneasiness. The trend of conditions on new contracts generally satisfactory.

The inclement weather of this week was a potent stimulus to the anthracite market, which was beginning to show distinct indications of a break. The domestic grades are all in easy supply, the demand centering entirely on the steam sizes, the high grade of buckwheats being the leaders. Mining operations have been increased somewhat this week, and a continuance of the severe weather will result in the anthracite trade rounding out the coal year in much better form than has recently been anticipated.

Though bituminous apparently continues as heavy as ever, there are uncertainties developing which may cause a readjustment in the situation. The storms and heavy weather have not only stimulated consumption, but have delayed the movement, and consumers are showing slightly more interest in the market.

The spectacular advance in Coastwise freights has ceased for the time being, though there has been no relapse back to normal levels, and all the indications point to a still further increase; this is one of the most interesting phases of the general situation at the present time, since it means that the market for the Hampton Roads coal may soon be restricted to relatively narrow limits, causing a radical readjustment in the customary channels of trade. The accumulations at the Tidewater piers continue relatively large, and substantial cuts are doubtless being made where coal is on demurrage.

Preliminary negotiations on new contracts are being reported in the Pittsburgh district, and it is generally believed among well informed observers that prices will be on the same basis as last year. On current business the situation is slightly stronger; the manufacturing demand has toned up appreciably, particularly at the steel mills and the railroads are using a larger tonnage. Complications are rising on Canadian business over the question of exchange.

The heavy snows and low temperatures through Ohio have forced the buyers into the market again, though many of them expected to be able to hold out over the balance of the season. Orders are not large as a rule, but there is a decidedly healthy tone, and prices are relatively firm with the possible exception of the steam grades. A judicious curtailment of production, however, will be necessary to put the market on a firm basis.

The recent sluggishness in the Middle Western market has given way slightly under the influence of the exceedingly cold weather, though the large accumulations have not yet been much affected, and the mines are still working under curtailed schedules. The high grade fuels are relatively firm, but there is a general weakness in other directions which it is doubtful if even a long stretch of severe weather would materially affect.

ATLANTIC SEABOARD

BOSTON

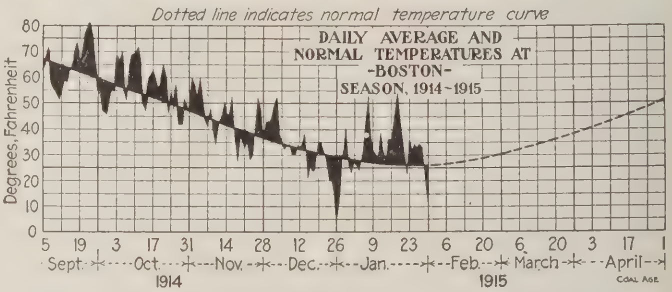
Further advance in water freights discounted; prices being made only by agencies that control transportation. Georges Creek and Pennsylvania grades show firmness for season delivery. Anthracite trade not improved.

Bituminous—There is less alarm on the part of shippers than a week ago. The interests that own their own transportation are actively in pursuit of business and are understood to offer contracts at 12@15c. up from last year either alongside or on cars. The other shippers appear to be marking time until water freights have settled into something like a reasonable season basis. High ocean freights still prevail, but it develops that there is a certain amount of steam tonnage that will not be available for over-sea business.

At Hampton Roads there are still ample supplies of Pocahontas and New River, with a very quiet demand; f.o.b. prices show practically no change. The slow movement of barges and sailing vessels has affected the volume of shipments Coastwise, and inquiry for export is only spasmodic and transient. Pocahontas and New River shippers for the most part are rather discouraged.

The contract basis, on cars Mystic Wharf, Boston, for inland delivery, is understood to be $3.90. This is 12c. up from the price at which similar contracts were closed last year and will very likely bring all-rail coals into closer competition. Spot prices on cars are firmer in consequence of the higher water rates, but there is no special activity.

The Georges Creek shippers are apparently very conservative about making delivered prices. They have done so only in a few cases, and so far have not made a rate of less than 90c. from Baltimore and Boston. Anthracite-carrying barges are still being freely chartered to enable the Georges Creek people to catch up with their orders. Prices on this grade are very firm.



Pennsylvania operators are more hopeful than for several months. This attitude is reflected in the prices named for future delivery. There is some prospect of better demand for the more favorably regarded grades and sales agents are carefully going over the ground. Meanwhile, spot prices continue on about the same level.

Water Freights seem to be marking time at $1, Hampton Roads to Boston, 2500 tons upward. The higher rates seem to have drawn out a number of bottoms that were not in evidence a week ago, and some of the brokers are busy trying to get orders; $1 to Boston has also been named as a season rate on certain types of steamers as well as schooners, but it is not believed that any tonnage has actually been closed at that rate. The Reading barge rate on bituminous from Philadelphia was advanced from 75 to 80c. to Boston points, effective Feb. 1.

Anthracite is expected to profit from the colder weather of the past week. Among the shippers all sizes are in plentiful supply.

Prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.65@2.75
Boston†	....	....	....	3.83@3.95
Providence†	....	....	....	3.73@3.78

* F.o.b. †On cars.

NEW YORK

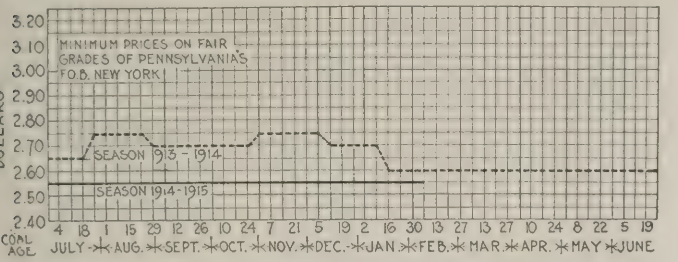
Bituminous continues quiet, with no definite indications for any improvement in sight. Interest centering on new contracts. Anthracite operations somewhat better and colder weather stimulates the movement.

Bituminous—Cold, stormy weather, accompanied by heavy fogs has interrupted the movement to some extent and caused a spasmodic demand in certain quarters, but the general situation continues monotonously the same. The operators are still holding coal rather close at the mines, but in spite of this, an occasional lot comes down on consignment and not infrequently results in a forced sale on demurrage. The bunkering trade livened up somewhat during the past week. Mine operations seem to be on about the same basis as for the past several weeks. The outlook for the current month is regarded as moderately favorable.

Negotiations have hardly yet started on contracts, although some few of the less important ones have been signed up.

Prices on these range at the same levels as last year, and it is generally felt in well informed quarters that these will be the ruling figures on new contracts, particularly as regards the higher grade standard fuels. In a comparatively short time contracting will be actively under way; the cold weather, together with the near approach of the customary contracting period, is beginning to stimulate interest among buyers and inject a little life into the situation as it is.

Prices continue unchanged. One small sale of good grade of Pennsylvania coal was noted during the week at our top quotations, $2.80, and we continue previous quotations on the same basis, as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.



Anthracite—Conservative hard-coal dealers are not missing any of the opportunities presented by the recent cold snaps to unload their coal, although occasionally one is found who is keeping a substantial surplus in hopes of a more active market later. That the situation is somewhat better, however, is indicated by the increased working schedule at the mines, which was notably larger this week. As a general thing the business may be regarded as good with companies having the more favored grades of coal, which are moving off briskly. In some instances it is noted that the large companies are even picking up some of their stocks.

Of the prepared sizes, nut is in the most active demand, although the situation is generally easy on all grades. The heavy call for stove coal of some time ago has completely disappeared. The good grades of buckwheat are in active demand in all directions and are the strongest feature of the market, with the other steam sizes continuing fairly active.

Far-sighted observers are already beginning to contemplate the possibilities of a long suspension next April, and preparations for such a contingency are receiving consideration. Should business conditions continue as bad as at present, it is obvious that the producers will make a determined stand against the customary advance demanded by the unions, which will result in a bitter, and very probably a long-drawn-out struggle.

The market is quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	5.05@5.35	5.30	5.00@5.30
Chestnut	5.60	5.30@5.60	5.55	5.25@5.55
Pea	3.55	3.40@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.75@2.25
Barley	1.80	1.70@1.80	1.75	1.55@1.75

BUFFALO

Bituminous continues as discouraging as ever. Railroad buying light. Recession in prices on contracts. Anthracite business fair but congestions are now occasionally noted.

Bituminous—Trade is very dull; it promises now and then to improve and shippers will be encouraged by a good day or two and then it settles back apparently on the bottom again. But it is still noted that shippers continue hopeful. The mines are experiencing great difficulty in finding an outlet for the coal that should be mined, if only to keep the men from going hungry. It is difficult to find business enough to keep the mines running half time and operators are pushing the jobbers hard to sell coal. Consignment coal is a particularly bad feature of the situation and consumers are beginning to rely on this to meet their current requirements.

The Canadian trade is especially heavy on account of the dispute over the discount demanded by the banks on Canadian paper, as buyers and sellers make every effort to avoid this extra cost. It was said at the outset that this discount was not likely to last, but it has not disappeared yet and it may continue indefinitely, especially if the slow pay in Canada has anything to do with imposing it.

Railroads are not buying any more coal than formerly and this is having a decidedly depressing effect on the situation. The contract situation is not encouraging; consumers are showing little interest as they expect to get figures 10c. or so lower than last year while operators and jobbers are more than pleased when they can close at old prices. At the same time there is scarcely anyone connected with the trade who does not believe that coal will go up before fall.

There is no change in the price of bituminous. Some shippers have urged a reduction in the accepted circular but others stoutly oppose it, saying that they are getting these prices. Figures therefore remain at $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley coal sells for about 25c. less than Pittsburgh.

Anthracite—The very cold weather of late has improved the demand, though it is not yet satisfactory to the shipper who expects to sell as much coal as usual. There are some efforts to urge sales on the part of certain companies by advertising in local papers. Reports from Western sales centers are encouraging and it does not appear that coal is accumulating here, though shippers of independent anthracite say that at certain Eastern junction points there is more congestion than is good for the trade. The local Buffalo market is rather quiet, though weather conditions are of the best.

There is a better demand for chestnut than any other sizes, stove being decidedly quiet, with egg doing better than it was in the fall. The small sizes are finding bituminous competition sharp enough to hurt them materially.

The loading of anthracite into Lake vessels for winter storage continues slowly. There is now more than 100,000 tons afloat.

TORONTO, CAN.

Bituminous dull, but anthracite is showing some activity.

There has been a good, steady demand for anthracite for domestic purposes, weather conditions being favorable for a brisk trade. While the market for bituminous lump is rather quiet, screenings are much in requisition, with short supplies on hand and little coming forward.

Quotations are as follows, with an upward tendency for screenings: Retail, anthracite, egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale, f.o.b. cars, three-quarter lump, $3.78; screenings, $2.79.

PHILADELPHIA

No improvement in anthracite. Discouraging features still continue. Bituminous shows little or no change.

While conditions were fair for the consumption of the fuel during the past week there is apparently no great need for coal and the same lassitude of the past six weeks still prevails. There is practically no size in any great demand, with the possible exception of buckwheat, which, under restricted mining, is short of the market requirements. Continuous soliciting is required to move even the curtailed output now in effect and it is understood that surplus coal is available, both at Tidewater and along the line. Dealers are well fixed in the matter of supplies, and from the present outlook, the trade is likely to continue sluggish for the balance of the winter season.

While reports of concessions are heard, ranging from 10 to 40c. per ton, prices on the whole are being maintained at circular. Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75@4.85
Stove	5.00	4.90@5.00
Chestnut	5.25	5.00

Bituminous—There is no change in the soft-coal situation. Spot demand is light, and prices range about the same as last week. It is understood that contract requirements have been slightly increased, but in the main, nothing important has developed in this branch of the trade.

BALTIMORE

Poor showing in December export trade, but movement is improving. Dull market conditions for both hard and soft coals. An excellent bunker business the only local redeeming feature.

Export figures show that December was the worst month in the foreign movement during 1914. A total of but 50,712 tons was recorded. A considerable improvement is indicated by the number of vessels loaded for January, however, with good prospects for current month. The January total will probably run in excess of 70,000 tons.

The market is dull in both the hard- and soft-coal trades. From West Virginia comes the statement through local headquarters that gas coal and slack are both in poor demand. Steam coals from West Virginia and Pennsylvania were also in slow call. There is very little market for low grade coals and prices are generally low.

The past two weeks have seen little change in quotations to the trade at the mines. While there is considerable variation under press of individual necessity, quotations are about as follows:

West Virginia—Kittanning, $1.20; Freeport, 80@85c.; Fairmont, gas three-quarter, 85c.; run-of-mine, 80c.; slack; 60@65 cents.

Pennsylvania—South Fork best, $1.40; Cambria County, $1.25 with ordinary grades 95 cents; Somerset best, $1.25, fair grades $1.10@1.15.

Maryland—Ordinary steam coals, 80 to 85c.; Georges Creek regular production, $1.60 with select grades, $1.70 and some special lump grades at $1.90.

HAMPTON ROADS

Tidewater situation showing some little improvement. Prices about circular. Dumpings for month of January more than December.

Dumpings over Tidewater piers were hardly normal last week but still in excess of the previous week. There have been several export cargoes for Havana, Santiago, Cristobal, Pernambuco, and Italian ports. The coastwise movement has as usual been heaviest to Boston, Providence and Portland with other cargoes to the smaller New England ports. The placing of several of the large coastwise steamers in the foreign trade has caused a better demand for schooners and barges; a number of the former which have been tied up are again in the trade. As noted some weeks ago schooners are replacing steamers on some of the South American shipments, another of these vessels having been loaded here during the week for Pernambuco, Brazil.

Whether general conditions will be so dull that no great shortage of transportation will be felt along the coast, and whether there will be further advances in ocean freights, remains to be seen. However, so long as one or two agencies can name prices delivered at Boston only 15c. up from last year, and other agencies are required to pay 30c. up for what bottoms are available, it is easy to see it will be slow business for the houses that are in the latter position.

It is difficult to ascertain exactly what prices are being quoted at tide just at this time and although there is still somewhat of an accumulation on the railroad yards it is not believed any great cut is being made. It is just possible some suppliers with excess coal on demurrage are making some slight concession but under present conditions the opinion seems to be that price cutting would not increase the demand to any extent.

With the amount of vessel tonnage in port and that due it is believed the total dumpings for January will be around the million-ton mark. To the morning of Jan. 30, the Virginian Ry. had dumped 236,514 tons and the Chesapeake & Ohio Ry. 214,163 tons; the Norfolk & Western Ry. figures were not obtainable.

Recent steamer clearances have been noted as follows:

Vessel	Destination	Vessel	Destination
Corcovado[1]	Rio de Janeiro, Brazil	Galveston[1]	Santiago
Liguria[2]	Elba, Italy	Oilfield[2]	Canal Zone
Tyskland[2]	Havana, Cuba	*Edw. E. Briry[2]	Bernambuco, Brazil
Beltier[1]	Unknown	Vesuvio[1]	Unknown

[1] Loaded at Newport News. [2] Loaded at Norfolk. * Schooner.

OCEAN FREIGHTS

Market steadies down though rates are still generally higher. Sailing vessels most advantageous to Rio but these rates are also advancing rapidly. High point not reached yet.

There was a pause in the freight market during the last week and rates to Mediterranean and South American ports could have been shaded slightly. This does not apply to outward coal to Cuban and West Indian ports. These rates held firm, owing to the still further advance in sugar freights from Cuba.

A steamer was chartered to load coal at Baltimore for the River Plate at $8.88 at which figure a number of others were offered. A large steamer was also chartered for coals, from a United States port to Italy, on time charter, shippers agreeing to re-delivery United Kingdom, which makes the outward freight rate uncertain, but it is estimated at about $10.80 which rate can be shaded.

A number of additional sailing vessels were chartered, from Virginia to Rio, at $5.35, charterers paying all foreign port charges. At present it would seem preferable to ship Rio coal by sail rather than by steam, as the rates are very much lower. Sail rates on the coast, however, are advancing, and this will no doubt have an effect on offshore rates.

A steamer was chartered, from Baltimore to Guantanamo at $2.75, and another from Norfolk to Bermuda, at $3.75, and if the war continues for any length of time, rates will undoubtedly reach new high levels.

The market is hardly quotable, but approximate steamer prices on coal may be taken as follows:

To	Rate	To	Rate
Havana	**$2.75**	Guantanamo	**$3.25**
Cardenas or Sagua	3.25@3.50	Demerara	**5.50**
Cienfuegos	**3.25**	Bermuda	3.75@4.25
Port of Spain, Trinidad	3.25@3.50	Vera Cruz	3.25@3.50
St. Lucia	3.00@3.50	Tampico	3.25@3.50
St. Thomas	3.00@3.25	Rio	**9.60**
Barbados	3.25@3.50	Montevideo, Buenos Aires or La Plata	**9.60**
Kingston	**3.25**	Mediterranean	**9.60**
Curacao	**3.00**	Valparaiso	7.20@8.40
Santiago	**3.25**		

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Adriatico	Italian	Baltimore	Genoa	3362	
Storfond	Norwegian	Philadelphia	Havana	2256	
Florence M. Penley		Norfolk	Rio Janeiro	927	$5.35
Hope Sherwood		Norfolk	Bermuda	522	2.50
Malcolm Baxter, Jr.		Norfolk	Boston	1479	1.00
Jacob M. Haskell		Atlantic Range	Guantanamo	1362	
Margaret Thomas		Atlantic Range	Guantanamo	1161	
Wm. E. Burnham		Atlantic Range	Guantanamo	642	
John D. Colwell		Philadelphia	Santa Isabel, P. R.	946	
Ada F. Brown		Norfolk	Rio Janeiro	1294	5.35
D. H. Rivers		Baltimore	San Juan, P.R.	963	
Lucinda Sutton		Philadelphia	Martinique	1331	
St. Gothard	British	Baltimore	W. C. Italy	1790	

Note—Steamers are indicated by **bold face** type, all others being schooners

OHIO VALLEY

PITTSBURGH

Six-year Lake coal contract closed, also one cargo for export. Regular demand slightly improved. Prediction of $1.15 for Lake coal to large shippers. Operations at 55 to 60% of capacity.

A prominent coal and coke interest has just closed a contract with one of the leading Lake shippers for about 200,000 tons of Lake coal annually for a period of six years. The price terms of the contract are not divulged, but it is understood that it is a differential above the prevailing mining rate and that the margin is a close one, in keeping with the rather depressed state of the coal industry.

The first coal export order reported in this district for some time has just been closed, involving one cargo for a foreign port, not specified, of about 6500 tons. This was for a good grade of Youghiogheny gas coal, and quality is understood to have played a large part in determining the destination of the order.

Negotiations have hardly begun yet on coal for the coming Lake shipping season, but there has been some comparing of notes, and in a well posted quarter the prediction is hazarded that the prevailing price will be about $1.15 to the large shippers for ¾-in. Pittsburgh coal. This is 20c. below the prevailing price two years ago. One year ago there was nothing like a standard price, the inquiries being far below normal and developing sharp competition in every instance.

The weather has been only moderately favorable to the development of a good retail demand in the past week, but manufacturing demand has undergone a further increase, and most of the steel mills are now working at a decidedly better rate than a month ago, consuming from 25 to 50% more coal now than in December. Railroad demand has looked up a trifle. Mining operations in the Pittsburgh district have responded to the slightly better total demand, and the mines are working at between 55 and 60% of capacity, on an average.

Prices are a trifle steadier than a week or two ago, and remain quotable about as follows: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

TOLEDO

Cold weather gives added impetus to Toledo coal trade. Prices remain unchanged.

Severe cold weather has had the effect of putting some life into the domestic situation and if it continues there will be plenty of business to keep all the local dealers busy. The steam market is not showing any great activity as many of the Toledo manufacturing plants are running light. Prices have not changed so far as the list is concerned but are not very closely held and are largely regulated by how bad the seller desires to let go and how urgent the demand of the buyer. Railroads have not found any difficulty thus far in moving supplies promptly.

COLUMBUS

Colder weather has stimulated the domestic trade slightly. Dealers are buying for immediate delivery and cancellations are less frequent. Steam trade is still dull.

The continued cold weather had resulted in a better tone to the domestic trade; buying on the part of dealers is better and orders are generally larger as their stocks are light and they must come into the market now in order to be prepared to take care of their retail business.

Retail trade has been fairly steady in both the cities and rural districts. Consumers have been compelled to replenish their supplies since the winter has been rather rigorous. Orders are usually small except in the case of public institutions and office buildings. Retail prices are ruling firm at the same level. There is still a preference being shown for Pocahontas and West Virginia varieties but Hocking lump is moving well.

Steam business continues dull and there are no immediate signs of improvement. Much attention is being given to the renewing of contracts, a large number of which expire about Apr. 1. A considerable amount of the steam tonnage at present is being purchased in the open market. One of the best features is the better demand for railroad fuel. Surpluses which railroads had collected are being gradually depleted.

Production has not been increased to any extent during the past week. The Hocking Valley is producing about 60% of normal and the same figures are reported from Cambridge, Crooksville, Jackson and other small districts. In the Pomeroy Bend district the output is about 80% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.60	.....
Inch and a quarter	1.45	1.50	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.70	0.75	0.65
Coarse slack	0.60	0.65	0.55

CINCINNATI

The cold weather has stimulated all departments of the trade. Orders plentiful, though averaging small. Outlook much improved, and prices stiffening up.

Both domestic and steam consumers have been forced into the market in greater numbers than has been the case for some time. Almost continuous snow last week, with fairly low temperatures, has compelled the liberal use of fuel, and those who hoped to get through to spring without buying in any quantity are being forced into the market again. Industrial conditions also seem better.

Complaint is heard from some quarters that the volume of business is still much below what it ought to be, but the trade may shortly expect normal conditions, if the favorable weather continues. Judicious curtailment of production has been necessary this season and a more general observance of this will help the present situation.

CLEVELAND

Weather more favorable to the coal business, but the supply has been fully equal to the demand. No change in prices. Floods cause some uneasiness.

The weather has been cold and had a bracing effect on the local market. The retail trade was brisk and did more business than for several weeks. Last Sunday a rain storm, that lasted over Monday, began and by night the rivers and streams were almost at flood stage. Monday some of the railroads called upon local consignees to give orders for quick placing of cars because of the danger of a flood. Toward night the ice jam that was causing the trouble gave way without damage.

Receipts over Sunday were not very large, but the continued presence of consignment fuel held the market for coarse coals down. Fine coal sold at $1.65 to $1.70, and jobbers were not called upon to help move a surplus.

Reports from the Upper Lake docks indicate there will be very little early Lake coal to go forward. Duluth-Superior has close to 7,000,000 tons of coal on dock and agents there estimate the docks will carry close to 4,000,000 tons at the opening of navigation.

The market is now quotable as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.60	......	......	......	......
Lump, 6 in.	......	......	$2.35	......	......
Lump, 1½ in.	......	......	2.20	$1.95	......
Lump, 1¼ in.	......	$2.35	......	......	......
Lump, ¾ in.	......	2.25	2.10	1.90	$2.05
Egg	3.60	......	......	......	......
Egg, 6 in.	......	......	2.00	......	......
Mine run	2.60	2.15	1.90	1.85	1.95
Slack	......	1.80	1.75	1.70	1.75

COKE

CONNELLSVILLE

No more coke company failures expected. Coke quiet, but not on account of Thompson failure. Production and shipments somewhat increased.

Present prospects are that there will be no more receiverships for coke companies growing out of the Thompson failure. The only coke receivership thus far is that of Tower Hill, already reported. The failure has not noticeably affected the coke market and is hardly likely to do so. While Mr. Thompson seems to have made no progress in straightening out his affairs, it looks as if there would be fewer changes in ownership than expected, because a number of the recent transactions regarded as loans turn out, with the present alignment of things, to have been sales, so that a considerable part of what has been regarded as Thompson coal acreage is really now in the possession of strong bankers. The steel industry has improved very materially, the Carnegie Steel Co., for instance, operating 32 blast furnaces against 22 three weeks ago, but among the merchant furnaces, the chief buyers of merchant coke, there is no increase in operations. Prompt furnace coke is $1.55 to $1.60 for standard grades, with some brands offered at less, and a good brand could be bought for delivery to Apr. 1 at $1.60. Foundry coke for prompt shipment is offered down to $2, with a strict guarantee of analysis, but some well known brands are still held at $2.40 or $2.50. Contract foundry coke is hardly quotable, but ranges somewhere inside these limits.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 23 at 214,210 tons, an increase of 7360 tons, and shipments at 212,017 tons, an increase of 7619 tons.

Buffalo—The demand for all grades of coke is light and there is no apparent prospect of improvement at present. There is prediction of something better soon, but that can hardly happen till there is new life to the iron trade. With foodstuffs very active and cotton doing well, it is generally believed that manufactures are are soon to follow. Quotations remain at what is regarded bottom figures, $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Toronto, Can.—Coke dealers have been reminded of the existence of a city bylaw to the effect that coke must be sold by measure and not by weight, which has hitherto been regarded as a dead letter. One dealer was prosecuted under this law, but released with a caution, and future offenders are to be heavily fined.

Chicago—Domestic sizes have not been in sufficient quantities to meet the demand, and prices are strong. Furnace and foundry trade shows very little activity, and there is more of this coke on hand than the market will absorb.

Prices are as follows: Byproduct, $4.60@4.95; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.60@4.75; gas coke, $4@4.25.

THE STEEL INDUSTRY

January operations show a moderate, but encouraging, increase. The feeling generally better. Railroad buying steadily improving.

Since the steel companies were responsible for practically all of it, the January increase in pig-iron production gives a measure of the gain in steel works output. Our statistics show a total make of 1,601,421 tons of pig iron last month, against 1,515,752 tons in December, a gain of 85,669 tons or 2763 tons a day. The steel works furnaces made 1,115,944 tons in January, against 1,034,802 tons in December, a gain of 81,000 tons or about 8%.

The total number of furnaces in blast Feb. 1 was 160, against 146 on Jan. 1, the Steel Corporation contributing 10 to the increase and the independent steel companies 4. The capacity of all furnaces in blast Feb. 1 was 56,270 tons a day against 48,848 tons a day one month previous. The Steel Corporation is to put three additional furnaces in blast this week—one Lorain and two Shoenberger.

Operations in the Steel Corporation's plants are now on the basis of nearly 55% of ingot capacity. Its statement of unfilled orders as of Jan. 31 is expected to show an increase of 150,000 to 200,000 tons.

The feeling in the steel trade this week is better, and the larger companies look for a further moderate increase in output in the next six weeks.

The increased ability of the railroads to get money and its further accumulation are factors in the situation of which more is heard. Rail buying is still far from normal, but each week adds to the total.—"The Iron Age."

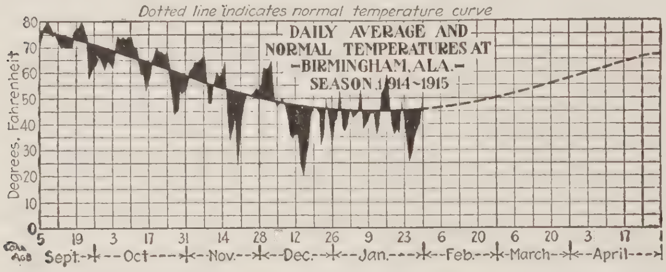
SOUTHERN

LOUISVILLE

Colder weather stimulates the market slightly but the trade is still weak.

Cold weather has resulted in a mild sort of stimulation for the domestic coal market though there has not yet been any improvement in prices or demand due to the fact that the stocks in retailers' hands are heavy. The steam coal market has shown a steady improvement with the betterment of general industrial conditions and there is said to be no steam coal on demurrage in the central part of the country.

Prices continue about as heretofore with block coal ranging up to $1.75 for the best Eastern grades, egg sizes around $1.15 to $1.25 and nut and slack 60 to 70c. for the best grades and 30 to 50c. for the lower grades, all f.o.b. mines.



MIDDLE WESTERN

INDIANAPOLIS

Continued cold weather fails to help the market because of the heavy buying in January. Falling off in orders. Domestic grades moving well. Prices generally unchanged.

The operating end of the Indiana coal industry is suffering a reaction. Consumers stocked up some time ago with the result that their recent buying has been small. The mines are on shorter schedule again, the smaller ones not making much better than three days a week and the larger ones a day more. All the mines made good time during January and most of them from about the middle of December when the real winter weather began. The railroads were then large buyers and many of the principal factories but the stocks accumulated then have not yet been entirely exhausted.

The retail department is the one bright spot, but even in this the dealers have observed an appreciable reduction in the volume of business, apparently due to a rigid economy in fuel bills among the poorer people as a result of the restricted industrial conditions. Prices at the mines are unchanged, though retail prices have been advanced three times from the summer level. Screenings are slightly easier at 75 cents.

CHICAGO

Weather conditions more favorable. Recovery in prices noted in spots. Screenings steady. Better anthracite demand.

Lower temperatures at the close of the week have made a slightly stronger undertone. The sluggishness of last week has been less pronounced, although the cold weather has not yet had much effect on the accumulation of large stocks.

Franklin and Williamson County screenings have been quoted as low as 60c., and there is a wide range of quotations prevalent on the coarser sizes. Harrisburg coals show more firmness than any other Illinois grades. The suspension of certain cement plants in the Northwest has resulted in a considerable quantity of southern Illinois screenings being thrown on the market and consequently prices have weakened.

Springfield screenings have been bettered somewhat, and the demand for domestic sizes has improved.

A wide variation of prices obtains for eastern Kentucky coals, and there is hardly a quotable price on any size.

Hocking grades have been very slow, but nevertheless shippers have held firmly to circular prices on mine shipments. Track shipments have been sold from 10c. to 15c. below list prices.

The anthracite demand which has been slowing up improved during the latter part of the week. A few cars have been accruing demurrage awaiting disposition. The supply of all sizes is ample, but prices are well maintained considering conditions.

Competition in the smokeless coal market has been keen, and while mine-run is holding steady under adverse conditions, lump and egg prices are variable. There seems to be plenty of lump but not much egg on hand and the demand for the latter is brisk.

Prevailing prices are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.50@1.75	$1.50	$1.40@1.75	$1.40@1.60	$1.50@1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	1.15	1.25	1.15@1.25	1.15@1.25
2½-in. lump.	....	....	1.35@1.60	....	....
1¼-in. lump.	....	..	1.35@1.50	....	....
Mine-run...	1.15@1.25	1.[illegible]	1.10	1.10	....
Egg........	1.50@1.75	....	1.35	1.35@1.50	....
No.1washed	....	....	....	....	1.60
No.2washed	....	....	....	....	1.60
6x3-in. egg.	....	1.40@1.50	....	....	1.40@1.60
Nut.......	....	1.35	....	1.15@1.25	1.25@1.35
No. 1 nut..	1.60@1.75	....	....	....	....
No. 2 nut..	1.50@1.60	....	....	....	....
Screenings..	0.60@0.70	0.60@0.70	0.60@0.70	0.60@0.70	0.50@0.70

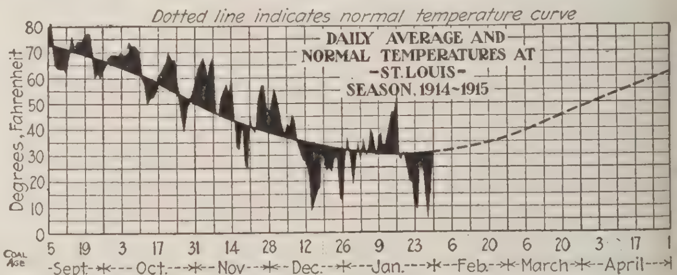
	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.60@1.75	$1.75@2.25	....	....	....
1¼-in. lump.	....	1.50@2.00	....	....	$1.35@1.50
Lump & egg	...	....	$1.75@2.25	$1.75@2.00	....
Mine-run...	1.15@1.20	....	1.25@1.40	1.10@1.25	1.15@1.25
Egg.......	1.50@1.75	1.25@1.75	....	....	....
No. 1 nut..	1.40@1.60	....	....	....	....
No. 2 nut..	1.30@1.60	....	....	....	....
Screenings..	0.60@0.75	....	....	....	....

Greene County 5-in. lump, $1.50@1.75; 3-in. lump, $1.40; 5-in. egg, $1.25@1.35; 3-in. egg, $1.25@1.30; mine-run, $1.10; screenings, 60 to 70c.

ST. LOUIS

Plentiful stocks available and cold weather has failed to relieve the pressure, though better grade coals are firmer in some cases. Retail demand active but orders are small.

Though the mercury has been hovering around the zero mark, there is a striking contrast with what the market ought to be and what it really is. During the past few weeks all of the retail yards stocked up well on coal so that they were well prepared for the cold snap. As a result, there is extremely cold weather here with practically no demand for coal, and the situation is in such shape that the dealers can dictate the price at which they will buy. Continued cold weather, however, may change this situation in the next day or two, and prices will likely advance.



Some exceptionally good coals from the Williamson and Franklin County fields are selling as low as $1.25 and $1.30, while some of the other fuels from the same field are as high as $1.60 to $1.70. The operators with the higher priced coals, however, are pretty well sold up and are in a position where they can ask a fancy price, knowing that they will have but very little coal to offer on the market. The same conditions apply to the steam sizes, with the exception of washed No. 1, which is in good demand and likely to continue so. There is very little activity in the steam market, and nothing at this time to indicate that it will get any better.

In the Standard field conditions are such that few operators are realizing more than the cost of production on their coal though more cold weather will affect the Standard lump market shortly. The steam sizes are weak with every indication that they will continue so.

The local retail demand is fairly good, but retailers report that there are no large orders. The anthracite demand is light, and the same applies to smokeless. The prevailing market is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump........	....	$2.00	$1.25	....	....
3-in. lump........	....	....	1.40	....	....
6-in. lump........	$1.35@1.65	....	1.50	$1.15@1.25	$1.25
3x6 egg..........	1.25@1.55	....	....	1.00@1.10	....
No. 1 nut........	1.15@1.30	....	....	0.90@0.95	....
Screenings........	0.65@0.70	....	....	0.40@0.45	0.50
Mine-run..........	1.05@1.10	1.50	....	0.80@0.85	....
No. 1 washed nut.	1.65@1.75	2.00	1.60	....	....
No. 2 washed nut.	1.30@1.40	....	....	....	....
No. 3 washed nut.	1.15@1.20	....	....	....	....
No. 4 washed nut.	1.10@1.15	....	....	....	....
No. 5 washed nut.	0.40@0 50	....	....	....	....

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 62—New York, N. Y.—The bids on this contract (p. 189), which provides for furnishing and delivering coal, were as follows:

SCHEDULE NO. 1, for 650 gross tons bituminous coal to the Far Rockaway disposal plant, Borough of Queens: George D. Harris & Co., $2788.50; John B. Reimer, $2925; William A. Duncan, $3048.50; A. J. & J. J. McCollum, $3217.50.

SCHEDULE NO. 2, for 280 gross tons pea coal to the Newton disposal plant, Borough of Queens: Burns Bros., $1624; John B. Reimer, $1484; J. E. Backus & Sons, $1316; Elmhurst Coal Co., $1330; Jurgen-Rathjen Co., $1307.60; A. J. & J. J. McCollum, $1489.60; Charles Hirschburger, $1372.

SCHEDULE NO. 3, for 1040 gross tons anthracite coal to the County and Borough Buildings in the Borough of Queens:

Amount	Burns Bros.	John B. Reimer	Jurgen-Rathjen Co.	A. J. & J. J. McCollum
600 tons broken[1].....	$5.99	....	$5.93	$5.89
200 tons stove[1].......	6.57	....	6.68	6.37
100 tons stove[2].......	7.10	....	6.93	7.00
140 tons stove[3].......	7.60	7.15	6.93	7.25
Totals	$6682	$1001	$6557.20	$6523

[1]Delivery at Long Island City. [2]Delivery at Flushing. [3]Delivery at Jamaica.

SCHEDULE NO. 4, for (1) 100 tons semibituminous to the Crematories of the Bureau of Street Cleaning at Far Rockaway: George D. Harris & Co., $4.29; John B. Reimer, $4.40; William A. Duncan, $4.75; (2) for 180 tons semibituminous to the Far Rockaway Aqueduct: George D. Harris & Co., $4.24; John B. Reimer, $4.50; William A. Duncan, $4.75. Total on both sections, George D. Harris & Co., $1192.20; John B. Reimer, $1250; William A. Duncan, $1330. Address Mr. Buckley, Borough Hall, Jackson and Fifth St., Long Island City, New York.

Contract No. 67—Schenectady, N. Y.—The local city government will be in the market for about 4730 tons of anthracite stove and egg coal, about the first of next month. The contract is usually closed at about $6.50 per ton. Address, Board of Contract and Supply, Franklin St., Schenectady, New York.

Contract No. 70—Baltimore, Md.—The Fidelity & Deposit Co. purchases about 2000 tons of standard mine-run soft coal annually which is usually bought a carload at a time. Address, Morris R. Pierson, purchasing agent, Baltimore, Maryland.

Contract No. 71—Monroe, Mich.—The Municipal Electric Light Plant at this place, will be in the market for 2600 tons of Smithers Creek coal some time during March. Deliveries are to extend over the next year, and the customary contracting price is $2.60 per ton. Address, Charles R. Osgood, superintendent, Municipal Electric Light Plant Co., Monroe, Michigan.

Contract No. 72—Baltimore, Md.—The H. McCormick & Co. contracts for about 100 tons of soft coal per month. The supply is usually ordered in carload lots when required. Address, H. P. McCormick, McCormick Block, Baltimore, Maryland.

Contract No. 73—Washington, D. C.—Sealed proposals will be received until 11 a.m., Feb. 15, for furnishing and delivering bituminous coal, either at Washington, D. C., or at Alexandria, Va., for the steamer on duty at Fort Washington, Md. Address, J. B. Houston, Depot Quartermaster, Washington, D. C.

Contract No. 74—Bellefontaine, Ohio—The lowest bid received for furnishing a six-months' supply of coal for the local water works was from the W. H. Warner Co., at $1.75 per ton f.o.b. Bellefontaine. The Sunday Creek Coal Co. at present, has the contract, and offer to renew the same of $1.85 per ton. Address Director of Public Service, Bellefontaine, Ohio.

Contract No. 75—Ottawa—The Canadian Department of Public Works calls for tenders addressed to R. C. Desrochers, Secretary, to be received up to March 1st for supply of best quality steam coal to be delivered in quantities, and at places specified. Address, R. C. Desrochers, Secy., Department of Public Works, Ottawa, Canada.

Contract No. 76—Baltimore, Md.—The Emmerson Hotel Co. purchases about 300 tons of standard mine-run coal per month in the spot market. At present there is no existing contract, and bids for furnishing these requirements on a contract might be considered. Address, Wm. H. Parker, purchasing agent, Emerson Hotel Co., Calvert and Baltimore Sts., Baltimore, Maryland.

Contract No. 77—Rochester, Ind.—The Rochester Electric Light, Heat & Power Co. at this point will be in the market for 7000 tons of Indiana mine-run coal on Mar. 1. The contract is to run over one year and it is usually closed at $2.10 per ton. Address, Rochester Electric Light, Heat & Power Co., Rochester, Indiana.

Contract No. 78—Detroit, Minn.—The Municipal Electric Light Plant will be in the market for 1800 tons of Youghiogheny dock-run coal on Mar. 1. This coal laid down at Detroit usually costs $5 per ton and deliveries are to be made over the next year. Address, E. J. Bestick, City Clerk, Detroit, Michigan.

Contract No. 79—Boston, Mass.—The following are the bids received by the United States Navy, for furnishing 5000 tons of navy steaming coal, to be delivered at the Navy Yard, Boston:

5000 TONS—Edward M. Alden Co., New River Georges Creek coal, $3.73, Ralphton Quemahoning, $3.65; Davrow-Mann Co., New River coal, $3.57; Archibald McNeil & Sons Co., Navy New River coal, $3.68; Pocahontas Fuel Co., Pocahontas coal, $3.80; White Oak Coal Co., New River coal, $3.60.

6000 TONS—Bader Coal Co., Pocahontas mine-run, $3.45; Davrow-Mann Co., New River coal, $3.57; J. H. Weaver & Co., Colver coal, $3.40.

3305 TONS—Chesapeake & Ohio Coal Co., half navy standard, one-half trade, $3.62.

5500 TONS—Northern Coal Co., New River coal, $3.55; (bid modified by telegram, $3.60).

5600 TONS—Maryland Coal & Coke Co., standard New River coal, $3.45.

Address, Samuel McGowan, paymaster-general of the Navy, Washington, D. C.

Contract No. 80—Bismarck, N. D.—Bids will be received by the Board of Public Works until 8 p.m., Feb. 8, for supplying about 300 tons of best lump lignite coal to the public schools during the ensuing year. The coal will be subject to state analysis. For further information address R. Penwarden, Clk. of the board, Bismarck, North Dakota.

Contract No. 81—Philadelphia, Penn.—Sealed proposals will be received until noon, Feb. 17, for furnishing and delivering about 29,000 tons of bituminous coal to the floating plant employed in the Philadelphia Engineer District of the United States Government during the period beginning Mar. 1, 1915, and ending June 30, 1916. Address, Col. Geo. A. Zinn, 815 Witherspoon Building, Philadelphia, Pennsylvania.

Contract No. 82—Winnipeg, Man., Can.—Tenders will be received by the Commissioners of the District up to noon, Feb. 22, for furnishing the supply of steam coal required during the year 1915 The quantity is estimated at from 6000 to 12,000 tons. Address S. H. Reynolds, Chairman of Commissioners, 901 Boyd Building, Winnipeg.

Contract No. 83—Baltimore, Md.—The Chamber of Commerce Building purchases an annual supply of from 475 to 500 tons of superior grades Georges Creek coal. The contract calls for the delivery of about one car per month during the summer season, and one and one-half cars during the winter. Address, John T. Davies, purchasing agent, room 214, Chamber of Commerce Bldg., Baltimore, Maryland, for further information.

CONTRACTS LET

Contract No. 8—Portland, Ore.—Bids on this contract (Vol. 6, p. 814) which provide for furnishing 5000 tons of coal, for use on the Dalles-Celilo Canal, were as follows, all prices f.o.b. mine: Roslyn Fuel Co. (13,650 B.t.u.) $2.70; Gunn-Quealy Coal Co. (13,000 B.t.u.) $1.62; Wyoming Coal Co. (13,500 B.t.u.) 87½c.; Wellington, Coma Agency (12,050 B.t.u.) $3.50; Kemmerer Coal Co. (13,900 B.t.u.) $1.79; A. L. Stephens (13,000 B..u.) $3; A. L. Stephens (12,800 B.t.u.) $2.50. The awards were as follows: Roslyn Fuel Co. for 500 tons, and A. L. Stephens for 1500 tons. Owing to the more rapid completion of the canal than anticipated the requirements do not exceed 2000 tons. Address Major Jay J. Morrow, Corps of Engineers, U. S. A., U. S. Engineer Office, 802 Couch Bldg., Portland, Oregon.

Contract No. 61—Erie, Penn.—This contract (p. 189), which provides for furnishing the best Pittsburgh ¾-in. lump coal to the local garbage disposal plant, has been let to the Burnwell Coal Co., at $2.30 f.o.b. the Garbage Plant Siding, Belle Valley, Penn. Address, Frank E. Pellow, Supt. of Parks and Public Property, Erie, Pennsylvania.

Contract No. 63—Lorain, Ohio—This contract (p. 189), which provides for furnishing 3500 tons of coal for the water department, has been awarded to the West Virginia & Ohio Coal & Coke Co., Cleveland, Ohio, at $1.87 per ton f.o.b. Lorain for Goshen mine run and $1.55 for slack coal. Address, L. B. Johnston, Clerk, Board of Public Service, Lorain, Ohio.

Contract No. 66—Guantanamo Bay, Cuba—The bids on this contract (p. 231), which provide for furnishing and delivering, or either, or both, 5000 tons of coal to the United States Government at Guantanamo Bay, Cuba, were: Wm. C. Atwater & Co. (Pocahontas coal), $6.80; Berwind-White Coal Mining Co., 4600 tons at $5.90, and 1100 tons at $5.25; Caster-Curren & Bullitt (Pocahontas coal), $6.80; H. N. Hartwell & Sons (smokeless fuel), $6.74; Maryland Coal & Coke Co., 2300 tons at $5.80; Smokeless Fuel Co., $6.84; Willard Bros., 684 tons at $6; Pocahontas Fuel Co., 5000 tons at $6.95, and the same (by sailing vessel), $5.60. The awards were: W. A. Blake & Co., transportation on 1000 tons, $2500; Crowell & Thurlow, transportation on 1900 tons at $5700; Berwind-White Coal Mining Co., for furnishing and transporting 1100 tons at $5775.

CONTRACT NOTES

The United States Naval Department have asked for bids for the transportation of one to six cargoes of coal amounting to 5000 to 8000 tons each, from Atlantic Coast points to San Diego, Calif. and, or to, Tiburon, Calif. The carriers must be ready to load at any time upon demand between Feb. 20 and Apr. 20.

The United States Naval Department has asked for bids for the transportation of one cargo of coal of 5000 to 8000 tons from the Atlantic Seaboard to San Diego, Calif., or to Tiburon, Calif. Loading is to be made at any time on request between Feb. 15 and Mar. 15.

PRODUCTION AND TRANSPORTATION STATISTICS

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for September and the preceding two months of the years 1913 and 1914:

	July		August		September	
State	1913	1914	1913	1914	1913	1914
Missouri...	198,723	177,093	178,949	201,992	250,763	233,195
Kansas.....	465,761	513,312	451,968	453,675	474,237	569,114
Arkansas...	163,185	117,016	178,904	157,803	201,782	160,233
Oklahoma ..	272,124	234,638	289,949	244,103	297,213	254,973
Totals...	1,099,793	1,042,069	1,099,770	1,057,573	1,223,995	1,217,515

LAKE MOVEMENT

The following is a summary of the fuel shipments by the Lakes for the past 10 years:

Year	Pittsburgh	Ohio	Virginia	Total Bit.	Anthracite
1905.......	7,443,883	2,062,692	2,109,262	11,615,837	2,785,362
1906.......	9,237,272	2,560,906	2,743,732	14,591,910	2,681,808
1907.......	10,549,995	4,074,296	3,420,941	18,037,232	3,449,695
1908.......	8,700,000	3,600,000	3,450,000	15,750,000	3,538,098
1909.......	8,687,395	3,002,815	3,874,570	15,564,690	3,052,706
1910.......	11,911,900	4,297,300	6,629,500	22,838,700	3,639,368
1911.......	10,611,941	4,019,544	7,151,200	21,782,685	3,917,419
1912.......	11,300,000	4,676,000	7,360,000	23,335,000	4,204,741
1913.......	13,415,473	6,176,624	8,736,586	28,328,683	5,033,696
1914.......	11,195,000	1,363,000	9,106,000	22,996,000	4,285,228

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during December and the past four months in short tons:

	September	October	November	December
Pocahontas Field........	1,390,531	1,021,699	837,577	798,182
Tug River District......	295,332	270,651	253,975	227,944
Thacker District........	295,776	264,528	235,080	227,938
Kenova District.........	110,158	112,455	90,772	90,030
Clinch Valley District....	158,393	84,530	237,831	135,362
Other N. & W. Territory	4,781	4,860	3,849	1,686
Total N. & W. Fields..	2,254,971	1,758,723	1,659,084	1,481,142
Williamson & Pond Creek R.R..................	85,053	70,338	62,505	62,271
All other railroads......	169,892	168,778	131,269	97,752
Grand total...........	2,509,916	1,997,839	1,852,858	1,641,165

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during November and the first eleven months of the last two years, in short tons:

	November		11 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]......	171,714	126,769	1,398,652	1,245,323
Chesapeake & Ohio[1].....	1,225	1,209	15,864	15,646
Erie[2].................	732,726	696,812	8,016,552	8,487,000
Pennsylvania[1] [3]........	987,487	1,017,942	9,699,210	10,223,221
Virginian[2] [1]............	50	142	959	484
Total 5 roads.........	1,893,202	1,842,874	19,131,237	19,971,674
Bituminous				
Baltimore & Ohio[1]......	3,080,093	2,452,786	33,732,240	30,186,640
Buffalo, Roch. & P.[1] [2]...	869,023	640,508	8,907,011	7,376,316
Buffalo & Susq.[1] [2]......	138,315	97,105	1,645,656	1,068,453
Chesapeake & Ohio[1].....	1,528,761	1,555,489	15,716,866	19,162,434
Erie[3]................	20,437	3,998	340,201	71,897
Hunt. & Br'd T. Mt.[1] [2]..	107,016	80,351	1,242,310	939,439
New York Central[3]......	755,397	673,131	8,414,117	7,363,050
Norfolk & Western[1] [2]...	2,026,798	1,852,858	22,056,646	23,830,804
Pennsylvania[1] [3]........	4,509,375	3,667,385	47,171,538	44,013,552
Pitts. & Lake Erie[1] [2]....	1,101,622	638,704	11,914,029	10,078,546
Pitts. Shaw. & North[1] [2].	227,820	220,583	2,535,163	2,125,073
Virginian[1] [2]...........	421,971	281,499	4,190,394	3,678,295
Western Maryland......	246,793	251,588	3,073,864	2,810,817
Total 13 roads........	15,033,421	12,415,985	160,940,035	152,705,316
Coke				
Baltimore & Ohio[1]......	343,387	185,466	4,340,798	2,969,787
Buffalo, Roch. & P[1] [2]...	27,509	30,253	472,671	269,443
Buffalo & Susq.[1] [2]......	22,621	48,812	278,124	398,485
Chesapeake & Ohio[1].....	28,535	11,304	328,456	287,425
New York Central[3]......	....	....	36,207	....
Norfolk & Western[1] [2]...	117,807	74,468	1,413,079	945,536
Pennsylvania[1] [3]........	999,500	602,573	13,011,863	8,926,580
Pitts. & Lake Erie[1] [2]....	488,674	281,481	6,239,226	4,542,133
Pitts. Shaw. & North[1] [2].	....	....	9,383	....
Western Maryland......	4,430	2,503	68,543	56,988
Total 10 roads........	2,032,463	1,236,860	26,198,350	18,396,377

Total Coal and Coke 13 Roads	1913	1914
January..........	19,314,523	18,157,998
February.........	17,594,079	15,446,830
March............	17,672,305	20,233,213
April............	16,882,326	15,497,444
May..............	19,015,721	16,523,385
June.............	18,610,757	16,984,476
July.............	18,736,979	17,589,427
August...........	19,757,104	18,740,453
September........	19,080,318	18,601,926
October..........	20,646,425	17,802,496
November........	18,959,086	15,495,719
Total, 11 months	206,269,623	191,073,367

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 359,229 short tons of bituminous coal during October, 1914, and 3,324,703 short tons during the ten months ending Oct. 31, 1914.

FOREIGN MARKETS

GREAT BRITAIN

Severe shortage developing because of the scarcity of men. High ocean freights have caused a slowing up in exports.

Jan. 22—Firmer conditions are in evidence as a result of an improved demand. The tonnage position is much better and sellers are looking forward to an active trade for some time. Quotations are approximately as follows:

Best Welsh steam.......	$5.04	Best Monmouthshires....	$4.26@4.32
Best seconds...........	4.56@4.68	Seconds................	4.20@4.32
Seconds................	4.32@4.44	Best Cardiff smalls.....	3.24@3.36
Best dry coals..........	4.44@4.56	Cargo smalls...........	2.52@2.82

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—The demand for tonnage is not so great and chartering is slow. Tonnage, however, is still scarce. Rates are approximately as follows:

Gibraltar.........	$5.40	Naples..........	$6.96	Las Palmas......	$6.00
Malta............	5.76	Venice, Ancona...	9.00	St. Vincent.......	6.24
Marseille....	5.79	Alexandria.......	7.44	Rio Janeiro......	7.08
Algiers..........	5.52	Port Said........	7.44	Monte Video.....	6.24
Genoa...........	6.96			River Plate......	6.48

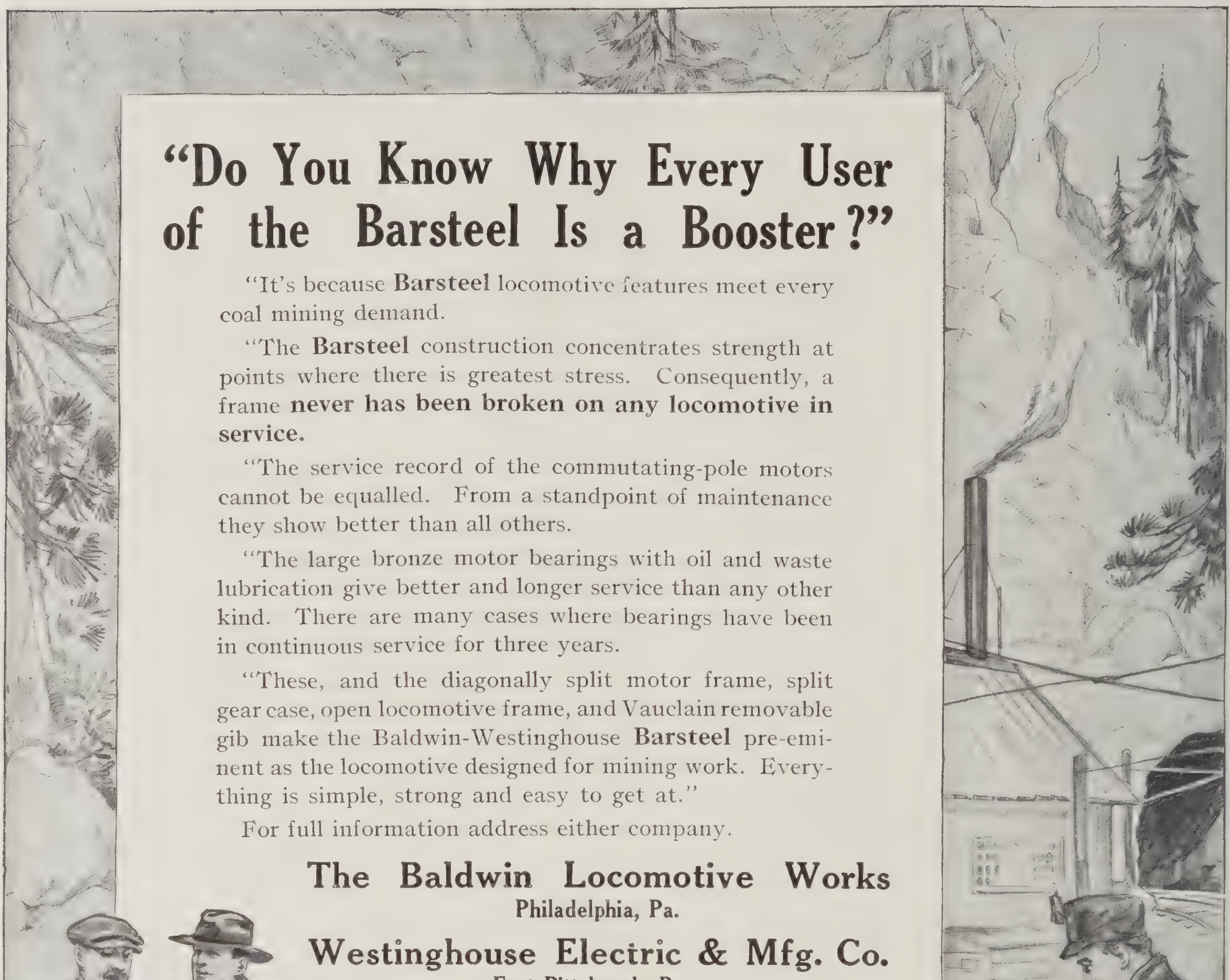
COAL AGE

Volume 7, No. 7
Issued Every Saturday
Hill Publishing Company

NEW YORK, FEBRUARY 13, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

Plant and Town of the Stag Canon Fuel Co., Dawson, N. M.



"Do You Know Why Every User of the Barsteel Is a Booster?"

"It's because **Barsteel** locomotive features meet every coal mining demand.

"The **Barsteel** construction concentrates strength at points where there is greatest stress. Consequently, a frame **never has been broken on any locomotive in service.**

"The service record of the commutating-pole motors cannot be equalled. From a standpoint of maintenance they show better than all others.

"The large bronze motor bearings with oil and waste lubrication give better and longer service than any other kind. There are many cases where bearings have been in continuous service for three years.

"These, and the diagonally split motor frame, split gear case, open locomotive frame, and Vauclain removable gib make the Baldwin-Westinghouse **Barsteel** pre-eminent as the locomotive designed for mining work. Everything is simple, strong and easy to get at."

For full information address either company.

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

"Write to a User and ask Him about the Barsteel"

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

ONE OF THE HILL ENGINEERING WEEKLIES

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000

None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

HERE'S a cordial invitation for you! I don't want these "Run-of-Mine Talks" to be all one man's ideas and opinions.

There's a whole lot to be said on the subject of advertising as applied to coal mining and some of you men at the mines who read the ads must have ideas on them that are worth expressing.

So here's an open invitation to you to send in any ideas or opinions you have on the ads in Coal Age, ads of articles that you think *ought* to be there, and so on.

Let's have some discussion on coal mine advertising—we can get a lot out of it in the exchange of thoughts.

This page is open to all of you—use it!

PERHAPS one of the best ways to get a line on the dependability of what you read in the advertising pages, is to find out the motives and principles on which the men who advertise are working.

For instance, here's a paragraph from a paper by L. L. King, Advertising Manager of the Goodyear Tire & Rubber Co., Akron, O:—

> "The most successful and the only honest way to deal with the public is *to play the game out in the open.* If there are true and interesting reasons why the public should buy something from a certain manufacturer, then this manufacturer should be glad of the chance to say so over and over again, through the medium of reliable advertising mediums."

□ □ □

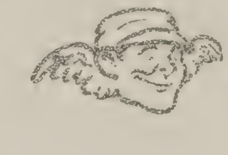
NOTE the line in italics, for that's the keynote of modern advertising—

And, "to play the game out in the open" is a pretty good hunch for all of us to follow.

COAL AGE

Vol. 7 NEW YORK, FEBRUARY 13, 1915 No. 7

The Driver *vs.* The Leader



By I. C. Parfitt

A Common Occurrence

A MOTOR with a large trip of loads is coming down a heavy grade. From defectiveness of brakes or other car mechanism, track deficiency or carelessness, a wreck occurs; timbers are knocked out; roof has fallen and the trolley wire is down.

General consternation reigns. The foreman appears upon the scene. "What in ——— is the matter *now?*"

Without taking time to look the situation over and formulate plans, he continues: "Now, you ——— get to work."

There's a noise like every one trying to do the same thing at the same time and doing it wrong.

"What are you doing there, you ———! Get out of the way! You don't know enough to slop a hog."

"Why in ——— don't you get busy there! Some of you good-for-nothing idiots, get hold of this car."

More noise as per above. Agitation increasing. Consternation beginning. Confusion reigning. Profanity and epithets (raining) likewise. Foreman busy everywhere, with his jaw.

Men busy everywhere doing little or nothing. Wasting energy. Becoming more excited and ineffectual, trying to obey contradictory orders. Excitement converging into lethargy. Personal abuse of the "wrong" man by foreman. Retaliation in kind. Man discharged.

Wreck finally cleared by bullheaded strength and awkwardness. Foreman retires from scene triumphant. *He* has done it all. Depression of spirits and prevalence of hard feelings among the men. Work automatic. Interest lacking. Loss of time twice or three times that required, but the foreman has demonstrated that he is—The Boss.

Another Wreck

A SIMILAR wreck occurs at another mine. The foreman arrives upon the scene. He takes a few moments to make a general survey of the conditions and size up the situation. Having formulated his plans, his orders and instructions are issued distinctly, intelligently and gentlemanly.

Encouraged and stimulated by his bearing, the orders are obeyed with promptness, intelligence and unanimity The work, under concentrated effort, progresses rapidly. In a short time the roadway is cleared, repaired and ready for operation.

The foreman questions the motorman and spragger as to the cause of the accident. His men, feeling assured that truthfulness is the best policy, soon place him in possession of the facts in the case. A mistake is considered, reprimanded and perhaps condoned. A willful or malicious act is visited with justice.

The mine work goes on with increased energy, interest and care.

Confidence is established and respect gained.

Query:—Which foreman is the efficient executive?

Driving Rock Tunnels at a Utah Coal Mine

By A. C. Watts*

SYNOPSIS—Most data on the driving of rock tunnels refer to work accomplished by individuals or firms specializing in this line. The work here described was done by an organization created for that purpose and recruited from the regular mine force. No specific attempts were made to break records.

As a general rule the only literature on driving rock tunnels is that descriptive of work in metal mines, or for irrigation, water supply and railroads. Such tunnels are usually driven by organizations specializing in this work and much effort is expended toward making records.

In coal-mining operations and the opening of new coal fields it is often necessary to drive rock tunnels but only small mention is made of them.

While, during the driving of the tunnels described herein, no special efforts were made to break any records the results attained were so good as to merit description.

The tunnels under discussion were necessary to open a new development adjacent to the Utah Fuel Co.'s Clear Creek mine No. 1, and were driven as haulage and air-course entries.

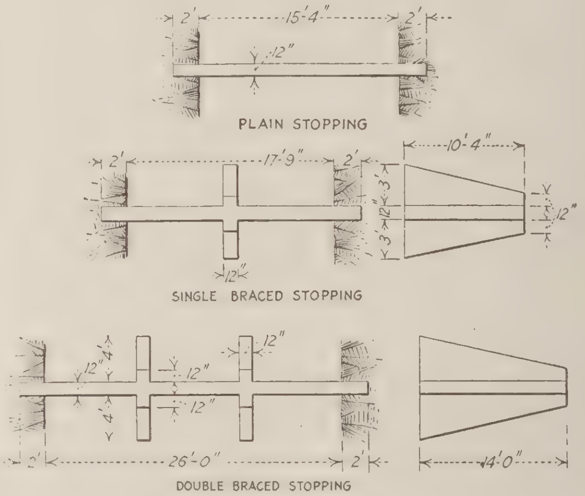
In order to systematize and expedite the work as much as possible a separate organization was created—made up of expert "hard-rock" men. Although kept distinct from the regular operating organization it was necessary to coördinate their work with that of the mine in order not to interfere with the production of coal.

Owing to the location of the tunnels it was possible to utilize the main haulage entry of the No. 1 Mine for the hauling out of waste rock and the taking in of supplies, while the power plant of the mine furnished power for compressors and electric haulage.

To determine the proper location and grade of these tunnels diamond-drill and surfacing prospecting was resorted to. The results developed the fact that the coal to be attacked lay just high enough above the old workings to prohibit locomotive haulage but not sufficiently high to give a properly balanced inclined plane. It was therefore decided to run on a ½ per cent. grade for the first half of the distance so as to permit locomotive haulage from the main entry of No. 1 Mine, and the last half on a 7½ per cent. grade to be operated with a double-drum hoist. The last half was laid with three rails from the upper parting in the coal to the lower parting in the rock with a double-track pass-by 300 ft. long, half way between the partings. The upper parting will have a grade just sufficient to permit loaded trips starting by gravity. The hoist for this plane will be equipped with motors sufficiently powerful to handle a loaded trip on the 7½ per cent. grade, to provide for derailments making it necessary to pull loaded trips back onto the track.

The starting points of the tunnels were laid out opposite the main haulage entry of No. 1 Mine about 2900 ft. from the mine portal so that the new territory would be entered about at its center. Approximately 600 ft. of entry was driven through the coal from the main haulage road of No. 1 Mine to reach the commencement of the main rock tunnel while the air-course tunnel was started from an old room which had been stopped against a fault. The lead from the main haulage road is a 200-ft. radius curve.

The main haulage rock tunnel was driven with a rectangular cross-section having a minimum height of 8 ft. and a minimum width of 10 ft., while the air course, of a similar cross-section, had minimum dimensions of 8 ft. in height and 12 ft. in width. Overbreakage and trimming have increased these dimensions on an average of one foot each way. Two tunnels were driven in order to provide for adequate ventilation of the new mine as it was impracticable to sink a shaft or drive an adit from the outside for air.



DETAIL OF COST PER CU. YARD

6 Stoppings and 1 overcast. Total 119.0 Cubic Yards
All hand work. Labor $3.15 per 8 Hrs. Carpenter's $3.40 per 8 Hrs.

ITEM	LABOR	MATERIAL	TOTAL
Reinforcing Material (Scrap Iron)	$0.278		$0.278
Gathering & Distributing Gravel in Mine	2.683		2.683
Cement	0.076	$2.659	2.735
Forms	1.936	0.554	2.490
Redistribute Gravel, Mix & place Concrete	3.835 *		3.835
Totals	$8.808	$3.213	$12.021

Gravel hauled in winter. Difficult to redistribute gravel and place concrete on account of old workings

* INCLUDES COST OF MAKING OLD WORKINGS SAFE

Plan and Cost of Reinforced-Concrete Stoppings

The minimum width of 10 ft. in the haulageway allows ample width for locomotive haulage but the incline end of the tunnel was driven 12 ft. wide to allow for the three-rail balanced inclined plane. The widening operations were accomplished after the tunnels had been driven through to the coal.

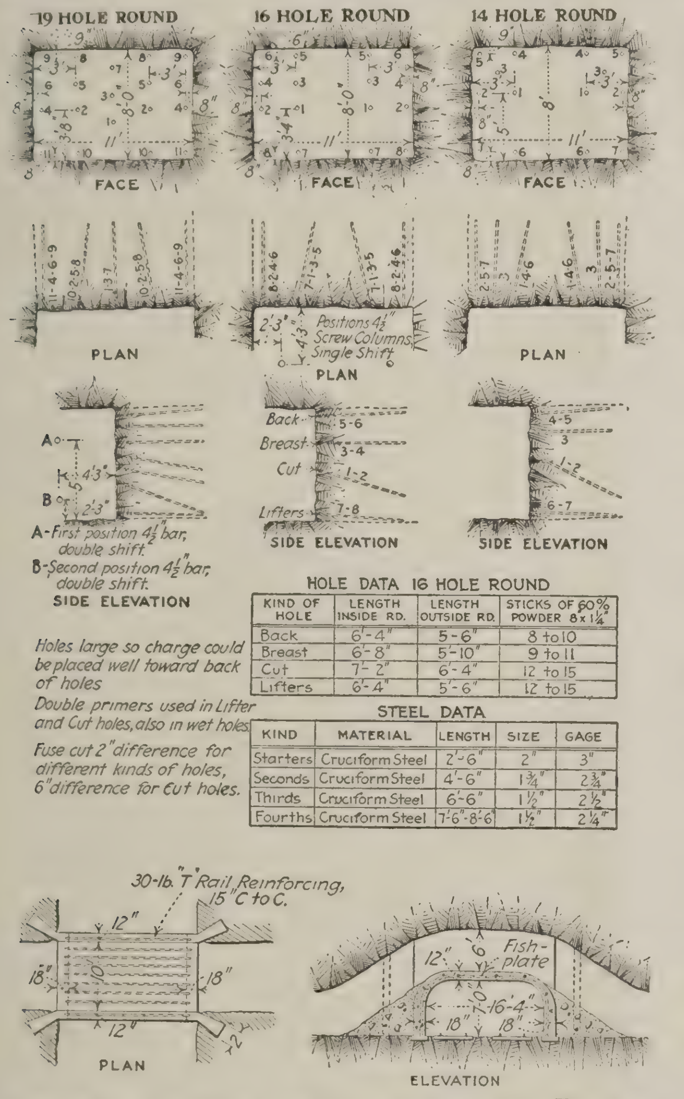
Sandstones and Shales Were Penetrated

The rock strata penetrated were sandstones and shales of medium hardness. The shales were the hardest to drill as the gumming of the cuttings made it difficult to keep the holes clean. The first halves of the tunnels, driven on a ½ per cent. grade, were parallel with the bedding planes of the strata and thus much harder to break. The last halves, driven on a 7½ per cent. grade, took the tunnels off the bedding planes somewhat but increased difficulties were encountered in the numerous small faults which were cut through as a main faulting plane was approached.

---

*Utah Fuel Co., Castle Gate, Utah.

Generally, when these faults were struck, caving took place sometimes to twice the height of the tunnels, thus necessitating the moving of large amounts of muck. Temporary timbering was necessary at many of these places. At one point an air vent to the surface was encountered although the cover was probably from 400 to 600 ft. thick.


19 HOLE ROUND
16 HOLE ROUND
14 HOLE ROUND
FACE
FACE
FACE
PLAN
Positions 4½" Screw Columns, Single Shift
PLAN
PLAN
A
B
A-First position 4½" bar, double shift.
B-Second position 4½" bar, double shift.
SIDE ELEVATION
Back
Breast
Cut
Lifters
SIDE ELEVATION
SIDE ELEVATION
Holes large so charge could be placed well toward back of holes
Double primers used in Lifter and Cut holes, also in wet holes.
Fuse cut 2" difference for different kinds of holes, 6" difference for Cut holes.
30-lb. "T" Rail, Reinforcing, 15" C to C.
Fish-plate
PLAN
ELEVATION

HOLE DATA 16 HOLE ROUND

KIND OF HOLE	LENGTH INSIDE RD.	LENGTH OUTSIDE RD.	STICKS OF 60% POWDER 8x1¼"
Back	6'-4"	5-6"	8 to 10
Breast	6'-8"	5'-10"	9 to 11
Cut	7'-2"	6'-4"	12 to 15
Lifters	6'-4"	5'-6"	12 to 15

STEEL DATA

KIND	MATERIAL	LENGTH	SIZE	GAGE
Starters	Cruciform Steel	2'-6"	2"	3"
Seconds	Cruciform Steel	4'-6"	1¾"	2¾"
Thirds	Cruciform Steel	6'-6"	1½"	2½"
Fourths	Cruciform Steel	7'-6"-8'-6"	1½"	2¼"

DETAILS OF DRILLING IN TUNNEL FACE AND PLAN AND ELEVATION OF OVERCAST

At another place a flow of black damp was struck which drove the men out of the tunnels.

The breasts of the tunnels often presented alternating bands of sandstones and shales, or of thin seams of coal and bands of sandstones and shales which required constant study in the arrangement and drilling of the shot holes, and on account of the spongy, springy nature of the ground, together with the numerous fissures and splits some holes in the rounds would miss fire or fail to break the ground. When these missed shots occurred it was customary for the succeeding shift to fire them or redrill and fire other shots. For about two weeks the ground was so bad on account of slips, fissures and faults, which caused the first shots to cut off the later shots, that a man was left on duty to fire all missed holes before the succeeding shift came in.

On the average the ground was fair drilling but in some places it was necessary to use water under pressure to clean out holes so as to render it possible to drill them at all. In such cases the water, at 100 lb. pressure, was forced into the holes through ⅛-in. pipe 16 in. long used as a nozzle. The time necessary to drill the rounds varied from one hour and 45 min. to the full 8-hr. shift. The outside back holes were drilled first, then the outside breast holes, then the inside breast holes, and so on as shown in the accompanying sketches, the numbers designating the order of drilling.

THE COMPRESSED-AIR SUPPLY

The source of power was the power plant of the mine, consisting of six 125-hp. 72-in. by 16-ft. horizontal return-tubular boilers hand fired with slack or the poorest grade of run-of-mine coal coming from the mine, and two Thompson-Ryan generators of 175-kw. capacity, 320 amp. 500 volts, driven by 19x18-in. McEwan engines of 260 hp. each at 200 r.p.m. Power was charged against the work at the rate of 1.24c. per kilowatt-hour.

Current from the generators was conducted about 200 ft. to a 24x64-ft. combination compressor and blacksmith shop, 40 longitudinal feet of which was used for the compressors. Two Ingersoll-Rand compressors of the Imperial type No. 10, were used. These compressors had a rating of 427 cu.ft. of free air per minute at 175 r.p.m. at sea level. Each machine was driven through a belt connection from a 500-volt 116-amp. 75-hp. General Electric continuous-current motor operating at 850 r.p.m.

Air was conducted to two receivers in the compressor house, one being 3 ft. in diameter by 8 ft. 3 in. long and the other 3 ft. 6 in. by 8 ft., then into the mine through a 4-in. pipe 3725 ft. long to a 3-ft. 6-in. by 8-ft. receiver, thence 350 ft. through a 3-in. pipe line to the starting points of the tunnels and through 3-in. branch lines to within 50 ft. of the faces, 1-in. air hose being used from thence to the drills.

The compressors were placed outside the mine mainly to insure getting dry air as the atmosphere inside the mine contains a large amount of moisture due to the sprinkling of dust and the natural wet condition of parts of the mine. Furthermore by placing them in the same building as the blacksmith shop it was possible to effect a saving in the attendance cost. During the day shift the running of the compressors was left to the blacksmith and his helper. By having the compressors outside the mine no trouble whatever was experienced by the freezing of the air drills.

Drill steel was sharpened with a Numa rock-drill sharpener. For heavy blacksmith work the smith set up an old Sullivan coal puncher for a hammer. To do this required only the fitting on of a hammer-block 4x6x6 in. in place of the bit of the puncher, setting the machine on a suitable frame and making a foot control. The expense of this makeshift was slight but the saving effected in the cost and quality of the work was noticeable. For forge fires the smith used a combination of coke breeze and slack coal from the Sunnyside mines of the company with good results.

The coal dust was first made thoroughly wet and then compactly built around the tuyere of the forge in a semicircle about 3 ft. in diameter and 12 in. high. Fire was kept up in the center with coke breeze. For one shift the material necessary to heat the drill steel amounted to one No. 7 wheelbarrow full of coal dust and 3 of coke breeze. The Sunnyside coal and coke used in this manner were found to make a splendid blacksmith fire, much better than by using ordinary coal partially coked.

Chicago giant rock drills, size 3¼ in., were used in driving while Ingersoll-Rand Jackhamers and Sullivan DA21 stoping drills were used for trimming and widening. Two drills were used at each face and were mounted as shown in accompanying drawing, one drill on each 4½-in. by 7-ft. double-screw column. In double-shift work, on account of the muck being in the way during the drilling of the first holes, it was necessary to mount the drills upon one 4½-in. by 10-ft. 6-in. single-screw bar with which was used a single-screw brace to the face to take up vibration of the bar. In this way the upper rows of holes were drilled first with the bar set near the roof and by the time these were completed the muck was cleared away from the face and the bar could be set up in a lower position and the remainder of the holes drilled. A 3-in. water main having ¾-in. hose connections was used along the back entry to within 50 ft. of the face. From these connections to the faces ¾-in. pipe was used with ⅛-in. by 16-in. special reducing nozzles.

For mucking plates sheet steel 4 and 5 ft. wide by 10 ft. long with two chains and ring handles at each end were used. These were laid for 20 ft. lengthwise of the entries up to within 4 ft. of the faces.

For rock disposal the ordinary end-dump mine cars built of wood were used. These held about 2.5 cu.yd. of material as loaded, the net weight of rock in the car being about 8100 lb. Cars were hauled by horses to a parting about 3500 ft. from the mouth of the mine. From this parting a 13-ton electric motor took them to the outside where they were dumped over ordinary goose-neck tipples. When the mine was working the motor hauled rock between trips of coal and whenever convenient. Eight to 10 cars made up the trip. Two tipples were used so that one could always be in a new position by the time the dumping space of the other was filled.

For framing timbers and making blocks and wedges a small sawmill was used. It consisted of one 36-in. circular cross-cut saw and one chisel-tooth rip saw, each connected to a 5-hp., 500-volt, direct-current motor. The method of timbering in bad ground is shown in the accompanying drawings.

Ventilation Was Secured by a Split

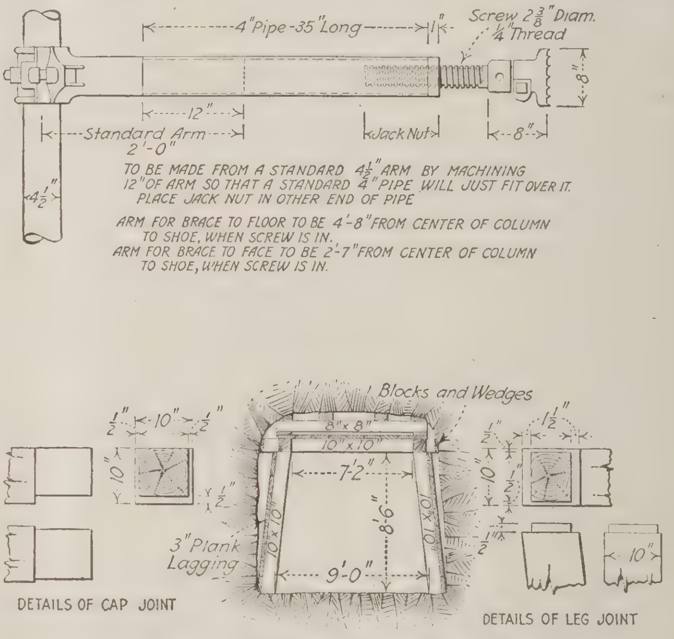
The main ventilation was accomplished, as in all coal mines, by giving the tunnels a separate split of air from the main ventilating system of the mine and driving crosscuts between them at regular intervals. To secure a separate split from the old mine it was necessary to build 6 concrete stoppings and one overcast. On account of the height of the stoppings they were built of reinforced concrete with reinforcing wings as shown in the accompanying drawing, old rails and wire rope being used for the reinforcing material. The reinforcement of the overcast was made with the same class of material. Ventilation at the faces of the tunnels was adequately accomplished from the drills when running. Before shifts went on any accumulated gases were driven out by opening the air cocks in the pipe lines and blowing.

The powder used was mainly 60 per cent. dynamite with sticks 8 in. long and 1¼ in. in diameter. This came 84 sticks to the case. The caps employed were Hercules 6X, and the fuse Bear Brand and ZL.

Labor, Organization and Rates of Pay

On single shift the machine men worked during the day, that is, from 7:30 a.m. to 4 p.m., and the muckers and drivers during the night shift beginning at 8 p.m. and ending when the muck was cleaned out. The shift for the machine men, muckers and drivers, while nominally 8 hr., was considered finished whenever their work was completed, and more often than otherwise they would get through with their work before the 8 hr. was up. On double-shift work the muckers and drivers went on duty at 8 a.m. for the day and at 6 p.m. for the night shift, while the machine men went on at 9 a.m. and 7 p.m. for the respective shifts.

There were two machine men to each drill or four to each heading. The two machine men per drill alternated as runner and helper day by day. Both received the same wages which were $3.50 per shift of 8 hr. with a bonus of 10 per cent. of the day's wage for each foot over 3 ft. of tunnel driven that they averaged per shift. The bonus was calculated at the end of the month instead of each day, except in cases of men quitting before the end of the month. The average wages earned by this system by the machine men was $4.17 per shift. These men were required to do the drilling, extend both the air and water lines, make up primers, load and shoot holes.


4" Pipe-35" Long
1"
Screw 2⅜" Diam.
¼" Thread
8"
12"
Standard Arm 2'-0"
Jack Nut
8"
4½"
TO BE MADE FROM A STANDARD 4½" ARM BY MACHINING 12" OF ARM SO THAT A STANDARD 4" PIPE WILL JUST FIT OVER IT. PLACE JACK NUT IN OTHER END OF PIPE
ARM FOR BRACE TO FLOOR TO BE 4'-8" FROM CENTER OF COLUMN TO SHOE, WHEN SCREW IS IN.
ARM FOR BRACE TO FACE TO BE 2'-7" FROM CENTER OF COLUMN TO SHOE, WHEN SCREW IS IN.
Blocks and Wedges
½"
10"
½"
10"
½"
8"x 8"
10"x 10"
7'-2"
8'-6"
10"x 10"
10"x 10"
3" Plank Lagging
9'-0"
1½"
½"
10"
½"
½"
10"
DETAILS OF CAP JOINT
DETAILS OF LEG JOINT

Details of Drill Column with Brace to Tunnel Face and Method of Timbering

Timbermen were paid the same wages as machine men including the bonus. There was comparatively little timbering to be done so that machine men were used for this work and it was thought fair to allow them the same wages as they would have earned if running machines.

There were four muckers to each heading who were paid $3.25 per 8-hr. shift and a bonus of 10 per cent. of the day's wage for each foot over three feet of tunnel driven per shift, just as paid the machine men. By this system the average wage earned by muckers was $3.84

per shift. The muckers laid all track, not including switches, put down the mucking sheets, loaded and unloaded drill steel and kept track clean for 100 ft. from the faces.

Drivers were paid $3.15 per 8-hr. shift without any bonus. They were required to take muck away from the faces to the parting, bring in empties and haul steel, powder, caps, fuse, rails, ties, etc., from parting to faces.

The dumpers outside were paid $3 and $3.15 per 8-hr. shift without any bonus. They were required to handle the rock—the extending of the tipples was done by the regular mine carpenters paid $3.40 and $3.15 per 8-hr. shift.

The blacksmith was paid $4 per 8-hr. shift and straight time for overtime. His duties were the sharpening of drill steel, general repairs and other blacksmith work.

The compressor attendants were paid $3.50 per 8-hr. shift and were required to run the compressors and assist the blacksmith.

The head foreman was paid $175 per month and his assistant $4.50 per 8-hr. shift.

Fortunately the tunnels were driven without any fatal or serious accidents.

UNIT COSTS OF STRAIGHT TUNNEL

Engineering		$0.0503
Superintendence		0.9885
Drilling	Machine men Machine men bonus	3.8221
Handling rock	Muckers Muckers' bonus Dumpers Extending dump	4.0331
Hauling	Drivers Motor men Shafts Stable expense Horse killed Ditch and track Tracks and switches	1.3193
Blacksmithing		0.3844
Power	P.H. charge Running compressor Repairs, compressor Pipe lines Repairs, drills	1.8604
Timbering		0.4389
Blasting material		2.7707
Machinery	Housing Setting Depreciation Miscellaneous	0.6655
Total cost per ft. of tunnels		$16.3332

The work of widening the main haulage tunnel for the pass-by and parting was done after the tunnels were driven to the coal. For this work Ingersoll-Rand Jackhamer drills with ⅞-in. hollow steel were used. The men were paid for straight time at the same rate as for tunnel driving, no bonus being given. The shots were detonated by electricity, using 6X detonators. A total lineal distance of 700 ft. 8 ft. high was widened from 3 to 5 ft., the unit cost for the work being as follows:

COST PER LINEAL FOOT OF WIDENING OPERATIONS

Superintendence		$0.4675
Drilling		0.3656
Handling rock	Muckers Dumpers Extend dump	1.3243
Hauling	Drivers Stable expense Motor men	0.3171
Blacksmithing		0.1712
Power	Compressor men Pipe lines	0.1681
Blasting material		0.5292
Miscellaneous		0.0486
Total cost per lin.ft.		$3.3916

If the cost of the widening operations is added to that of driving the tunnels the total expense per foot would be about $17, but if salvage is allowed on pipe and material left over and subsequently used for coal-mining operations the cost per foot is brought down to $15, which would be the net cost.

The average progress per shift for both single- and double-shift work during the whole time of driving the tunnels was 5.11 ft. The highest average per shift per month was 5.56 ft. The greatest distance driven in a tunnel in a single month was 323 ft. in 60 shifts.

Single-shift work was found to be less efficient than double-shift work, although to a certain extent this was due to the forming of a working organization and to the necessary experimenting with the drilling and shooting of the ground during the earlier stages of the undertaking.

Indiana's Mineral Output 80 Million Dollars

The principal mineral products of Indiana are coal, clay wares, cement, and stone, the aggregate value of these four substances in 1913 exceeding 90 per cent. of the total value of the output of the mines and quarries, according to a statement issued by the U. S. Geological Survey.

In 1913 the total value of the mineral production of Indiana was $46,607,864. To this total the coal mines contributed $19,001,881, the portland cement plants $10,218,867, the clay products $8,498,646, and the stone quarries $4,676,689. In 1912 the mineral output of the state was valued at $42,239,193, compared with which the production in 1913 shows an increase of $4,368,671, or over 10 per cent. These values do not include that of the pig iron produced in the state, which in 1912 exceeded $17,900,000 and in 1913 was over $20,600,000, nor do they include the value of the coke produced, which, in 1913, amounted to nearly $13,200,000. These two items make the sum total over $80,000,000. In the production of coal, which is the principal mineral product of the state, Indiana ranks seventh, with an output in 1913 amounting to 17,165,671 short tons, valued at $19,001,881, compared with 15,285,718 short tons, valued at $17,480,546, in 1912. The coal-producing counties are all in the southwestern part of the state and cover 6500 square miles.

Since the completion of its plant of 560 retort coke ovens at Gary by the United States Steel Corporation, Indiana has assumed importance as a manufacturer of coke and has advanced from the relatively low place of seventeenth in 1910 to third in 1912 and 1913. In addition to the plant at Gary, there are 100 retort ovens at Indianapolis, 50 of which were completed in 1913, 22 at Muncie, and 66 at Indiana Harbor. Another plant of 41 ovens is under construction at Indianapolis. The production of coke in Indiana in 1913 amounted to 2,727,025 short tons, valued at $13,182,136, an increase from 2,616,339 short tons, valued at $12,528,685, in 1912.

⁂

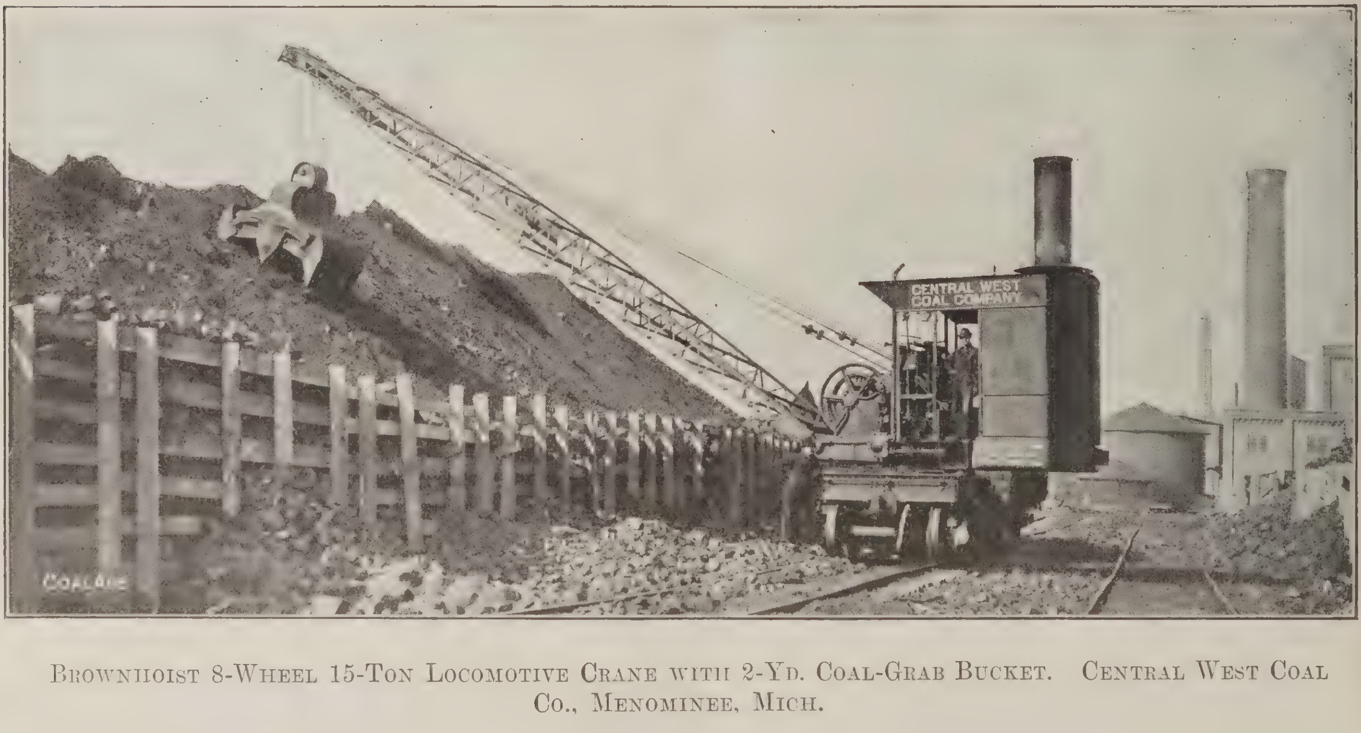
Responsibility for Fall of Slate—A miner is not entitled to recover against his employer for injury caused by a fall of slate, if he and his buddy knocked down props which supported the slate, in moving a track. (Kentucky Court of Appeals; Stringer vs. York; 170 Southwestern Reporter, 527.)

⁂

Duty to Make Mines Safe—The duty to make safe the place where a miner is extracting coal, being a duty not fixed by law, but by the mining contract, or, in the absence of a contract, by the rule or custom in force in the mine at the time, it is possible for the respective duties of the miner and the mine operator to vary in different mines. (Kentucky Court of Appeals; Patrick's Administrator vs. Eagle Coal Co.; 170 Southwestern Reporter, 960.)

Snapshots in Coal Mining

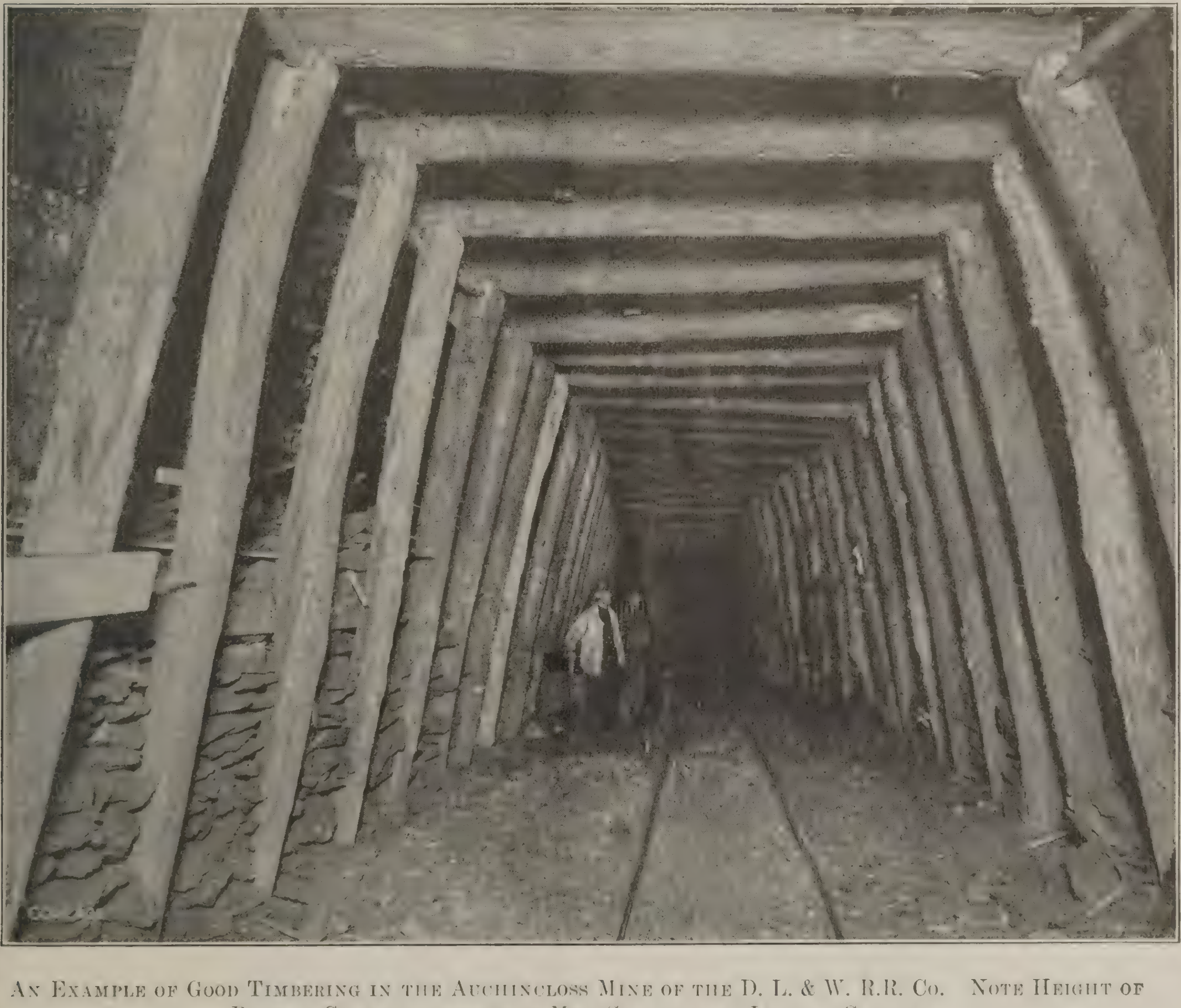
The Empire Coal Co.'s Plant in Alabama



Brownhoist 8-Wheel 15-Ton Locomotive Crane with 2-Yd. Coal-Grab Bucket. Central West Coal Co., Menominee, Mich.

BREAKER BUILDING OF THE SCRANTON ANTHRACITE COAL CO. AT MONTANA, ARK. A FAIRLY GOOD GRADE OF ANTHRACITE COAL IS MINED IN THIS FIELD

WASHERIES NOS. 1 AND 2 OF THE WEIR COAL & COKE CO. NEAR GIRARD, KAN. THESE WASHERIES ARE THE LARGEST IN KANSAS



AN EXAMPLE OF GOOD TIMBERING IN THE AUCHINCLOSS MINE OF THE D. L. & W. R.R. CO. NOTE HEIGHT OF ROOF AS COMPARED WITH THE MEN STANDING AT LEFT OF GANGWAY

A New Compensation Chart

By Leo Gluck*

As compensation laws are being enacted in several states, I have compiled a chart showing the present value of an annuity for the period of life a man might be expected to live if he had already attained a certain age. This period is known as the expectation of life. Let us suppose a man might be expected to furnish his wife $300 a year for the rest of his life to support herself and the children. Let us also assume he has arrived at the age of 30 years. According to the American table of mortality, it will be seen that he may be expected to live till he is 65.33, for a long series of observations show that this is the average duration of life of those reaching 30 years. If he should be killed at that time, to provide the sum of money which at 4 per cent. would pay an annuity of $300, $300 × 18.7453 or $5623.59 would be required.

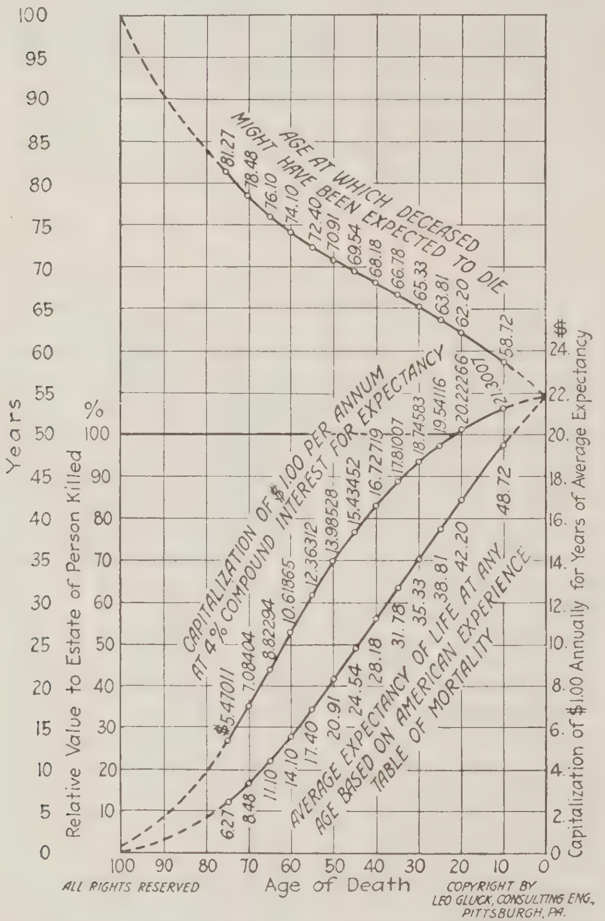


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Table for Calculating the Present Value of the Income Which a Man Might Have Expected to Receive Had His Life Not Been Shortened by Accident

The base line of the figure is divided to show the age to which the man is supposed to have arrived when an accident occurs by which he is killed. This is termed the "age of death." From this base are plotted off ordinates showing how long the man might have been expected to live but for the untimely accident. A curve is drawn connecting these ordinates which shows the relation of expectation of life to the age at which the workman is killed. This is the lower curve on the table. The topmost curve is obtained by extending the ordinates so that they represent the expectancy of life plus the age attained—that is, the age at which the man might have expected to die had not the accident intervened.

There is a third curve between the other two based on a scale of ordinates on the right of the diagram. This curve shows what is the present value of an annuity of $1 a year for the whole period of expectancy—that is, for the length of time the man might have expected to live according to the tables of mortality had not the accident intervened by which he lost his life.

Suppose he is killed at 40 years of age. We look for 40 on the base line and follow up the ordinate from that point to the first curve and learn that he had at that time an expectancy of 28.18 years. Following the ordinate still further to the upper curve, we find that had he not been killed in the accident, he might have anticipated living to the ripe age of 68.18 (that is, 40 + 28.18) years. To provide his heirs with $1 per year for the period of 28.18 years, it is necessary to set aside $16.72719, and this figure will be found on the middle curve at the ordinate just mentioned which is located above the figure 40.

A horizontal line has been drawn from a point on the middle curve immediately at its intersection with the ordinate for 21 years. This line has been extended to the left of the figure and the ordinate length has been figured, appropriately from 0 to 100. The compensational equivalent due to a man's estate if he were killed at 21 years of age would be 20 times the annuity found to be due him. This is figured as 100 per cent. The relative magnitude of other compensations at other ages of death can be found by tracing up the ordinates for such ages as far as the middle curve and tracing the horizontal line to the left over to the scale just described. Thus the compensation for a man who is killed at 60 should be roughly 53 per cent. of that of a man cut off by accident at 21 years of age.

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German Coal Prices

At the last meeting of the committee of the Rhenish Westphalian Coal Syndicate the basis prices for blast-furnace coke and coal were declared unchanged for the first quarter of 1915, but higher prices were fixed for the period from Apr. 1 to Aug. 31, 1915—namely, an average advance of 47c. per ton for coal and briquettes. In the case of coke, however, concessions will be made for the same period averaging 35¼c. per ton. The selling prices will be fixed accordingly.

The advance for coal and briquettes is accounted for by the considerably enhanced working costs caused by the reduction of the production and the higher rates the mines have to pay for the necessary material.

The November statistics give the coal contract deliveries as 4,600,119 tons, against 6,036,509 tons last year. For account of the syndicate, deliveries in coal were 3,309,342 tons, against 4,388,138 tons; in coke, 548,466 tons, against 807,797 tons, and in briquettes 335,807 tons, against 320,705 tons last year. The total coal production for November was 5,753,293 tons, against 6,041,509 tons for October, and 7,801,848 tons for November last year.

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Electrically Driven British Longwall Coal Cutters

By S. F. Walker*

SYNOPSIS—Three distinct types of longwall machines are in general use, but the problems incident to driving are in large measure common to all. The method of transmitting alternating current to the machine and the kind of resistance employed in starting are described in detail.

Three types of electrical machines for longwall work are employed in the United Kingdom. These are the disk, the chain, and the bar coal cutters.

The bar coal cutter was the type first introduced, but has only recently established itself as a thoroughly efficient machine. The disk coal cutter was for a long time the favorite, probably mainly because it could be depended upon, provided of course that it was supplied with sufficient power. The bar machine possesses an advantage over the disk type, in that it requires less power for driving. On the other hand, it does not answer well when hard material is encountered.

A short time ago the makers of one of the leading bar machines, in a paper read before one of the institutes, strongly advocated cutting in the coal in place of the clay underlying it. It is believed by some that this course was advocated because of the difficulty experienced with this type of machine in cutting in heavy clay, while, as a rule, no trouble is experienced when cutting in coal.

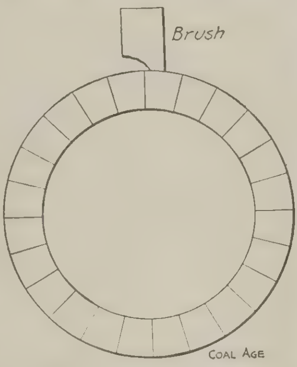

Fig. 1. Brush in Bad Condition

Broadly speaking, bar and disk machines are used for light and heavy work respectively; that is, when it is advantageous for any reason to cut in the underlying clay or in a parting of hard material, the disk machine is the more suitable; on the other hand, where the underlying material is soft, or where it is desirable to cut in the coal, the bar machine is making steady headway.

The chain machine, which is an adaptation of an American device introduced several years ago, stands halfway between the disk and the bar type. It will not perform the heavy work accomplished by the disk machine, but will negotiate difficulties which cannot always be successfully met by a machine of the bar type. It is also claimed for this cutter that it brings out the cuttings in small lumps instead of in dust.

Driving the Machine Is a Difficult Problem

The amount of power required by the various machines has an important bearing upon the question of drive. The successful driving of a coal-cutting machine by an electric motor is one of the most difficult problems the electrical engineer is called upon to solve. The space and weight allowable are necessarily small, and the conditions under which the motor and accessories have to work are such as to render operation extremely difficult.

The power required for driving the different types of coal-cutting machines varies widely. Bar machines sometimes work successfully with 10-hp. motors. Disk machines may require as much as 50 hp. The difference between an electric motor capable of furnishing 20 hp. maximum for a short time and the one which is required to develop 50 hp. for long intervals is considerable. The size and weight of the 50-hp. motor are necessarily much greater than those of the smaller machine.

All three forms of the longwall coal-cutting machine may be driven by either continuous or three-phase alternating-current motors. The distinguishing characteristic of the continuous-current motor is the fact that its armature carries a commutator built up of a number of segments of copper separated from each other by plates of mica. The current is delivered to the coils of the machine through carbon blocks or brushes bearing upon the surface of this commutator. Mining engineers distrust the direct-current motor, for, particularly under the conditions prevailing at the coal face, the commutator wears rapidly, and there is also the danger of sparking at the brushes igniting gas if the latter is present.

When the condition of the machine is perfect, the brushes carefully fitting upon the commutator, the face of the latter being true, sparking is reduced to a minimum, but there is nevertheless the danger that such a spark may ignite an explosive mixture, provided the latter is present in the machine case. Under working conditions both brushes and commutator are liable to wear, which materially increases the tendency to spark.

In such a case as that shown in Fig. 1, where the brush is making but poor contact with the commutator, pernicious sparking is liable to take place. Furthermore, while much has been done to render the case of an electric motor gas tight, this can never be accomplished. What is known as "breathing," which is the alternate inspiration and expulsion of air from the motor case due to varying temperatures of the machine when at work and when idle, allows ingress of a gaseous mixture if gas be present while the machine is cooling off. Instances are on record where explosions have taken place inside of motor cases.

Three-Phase Current Is Favored

For these reasons and due also to the fact that alternating current lends itself conveniently to distribution, mine managers and engineers strongly favor the three-phase current for all purposes about the mine. Motors utilizing this form of energy are made in two forms, what are called the squirrel-cage and the wound-rotor motors.

With the squirrel-cage rotor machine everything tending to cause sparking is eliminated. The rotor, or moving element, resembles a squirrel cage. It is a skeleton barrel of copper staves joined at either end by a copper ring. These staves are, of course, embedded in slots provided therefor in an iron core. A skeleton squirrel cage without the iron core is shown in Fig. 2. The core above mentioned is common to the continuous-current armature and to the rotor of all three-phase alternating-current motors.

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*Bath, England.

The squirrel-cage rotor possesses many advantages over other types, but, unfortunately, it has one serious drawback. The starting torque is so low that it cannot be made to move a coal-cutting machine from rest when fully loaded. In one form of squirrel-cage rotor, this difficulty is overcome by making the bars of a material having a comparatively high electrical resistance, such as german silver. With a high electrical resistance the motor will develop a considerably larger torque on starting. Thus equipped, however, the machine is comparatively inefficient, necessitating a larger motor for a given machine, also a larger demand for current from the distribution system.

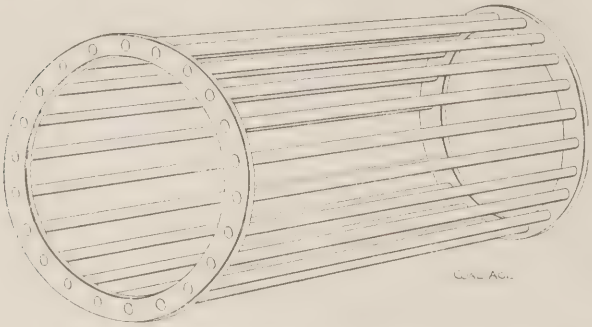

Fig. 2. Skeleton Squirrel Cage without Iron Core

Most Mines Use 3000 Volts

A large number of mines in the United Kingdom are supplied with three-phase alternating current at a potential of 3000 volts. In a few cases, 6000 volts are employed and transmitted to a point in the neighborhood of the individual mine. For coal-cutting service this current is transformed to 500 volts by stationary transformers and three-phase motors are employed at the above voltage at the coal face. Where continuous-current motors are used, the same potential is employed, and where the mine is supplied with alternating current, direct current is furnished by motor-generator sets or rotary converters in the ordinary manner.

Where alternating current is employed for driving coal-cutting machines, the wound-rotor motor has found most favor. This type of motor can be made to develop whatever torque may be required at starting, and the coal-cutting machine driven by it can start from rest under full load and cut its way into or out of the coal with as great ease as the continuous-current machine.

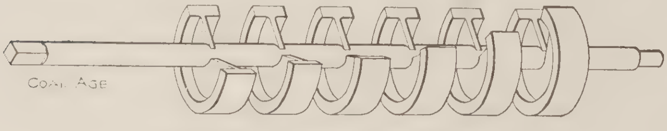

Fig. 3. Controller Drum

Both alternating- and continuous-current motors run at fairly high speeds, say from 500 r.p.m. upward, and the higher the speed, the smaller may be the motor for a given power. The bar type of coal-cutting machine has the advantage over the disk and chain varieties in that it runs at a much higher speed, say from 300 to 500 r.p.m., as against 20 to 70 r.p.m. in the other types. Consequently, a much smaller reduction is required between the motor shaft and cutting apparatus in the bar type of machine. With any form of coal cutter, however, some kind of reducing mechanism is required, and with the bar and chain machines, gearing is also necessary to drive the haulage drum by means of which the machine pulls itself along the working face.

This gearing is frequently the source of trouble, owing to the teeth clogging with the dust made by the machine. Cutting in the coal has the advantage, as coal dust does not appear to injure the gearing, while clay or bone dust does. Spur gearing is principally employed with beveled gears wherever necessary. Worm gearing has, however, been introduced to a limited extent.

Starting Apparatus a Disadvantage

Both continuous-current and three-phase alternating-current wound-rotor motors have two serious disadvantages when employed to drive coal-cutting machines. Both require special starting switches and resistances, and in the space available in coal-cutting machines for accessories, these may be a source of trouble. With the continuous-current motor, full line voltage should not traverse the machine upon starting. Should such a potential be delivered to the machine, it is probable that the insulation of its coils would be seriously damaged.

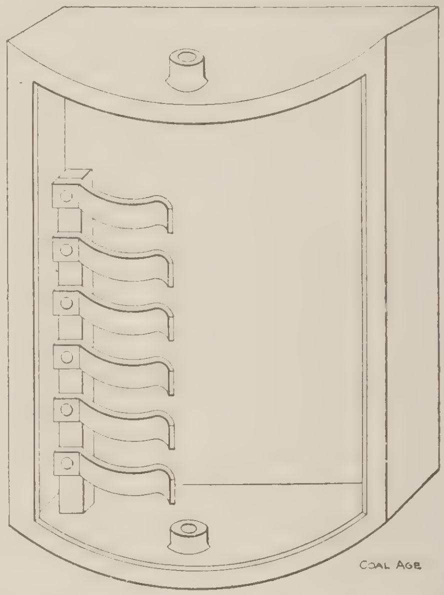

Fig. 4. Controller Case and Contact Fingers

The operation of the continuous-current motor depends upon its generating a reverse potential as the armature revolves. This cannot be done at starting under the conditions ruling if full-line voltage is delivered to the brushes. Consequently, some form of resistance must be interposed between the supply and the motor terminals. Also some form of switch must be employed which will cut in the whole resistance at starting, gradually diminishing it as the armature gets up speed.

With the wound-rotor motor a somewhat similar arrangement has to be made. Upon starting, a resistance must be inserted in each of the three circuits of the motor, the switch provided therefor being arranged so as to gradually cut out this resistance as the machine speeds up, completely short-circuiting the rotor coil when normal speed is attained.

The weak points in both these pieces of apparatus are the switch contacts and the resistance. The switch contacts may cause sparking as they move from one section to another, while there is always the danger of overheating or the failure of a junction causing sparking there. These dangers which exist under all conditions of motor service are particularly pernicious in the case of coal-cutting machines, on account of the small space available and the possibility of the presence of coal dust.

The form of switch which has been evolved for use with either continuous- or alternating-current motors is a modification of the well known street-car controller. In the case of coal-cutting machines, this is known as the drum type of switch. In this controller a drum of insulating material upon which are mounted segments of brass or copper, one below the other, each subtending a different angle at the center of the drum, is mounted within a suitable case. Attached to the inside of the case are a number of springs carrying brass fingers, which made contact with the segments of the drum, as shown in Figs. 3, 4 and 5. Connections are so made in this apparatus that when the drum is revolved by means of the operating handle outside of the casing, full resistance is thrown across the terminals of the motor, this being gradually diminished until in the final position the whole of the resistance is cut out and in the case of the alternating-current machines, the coils short-circuited.

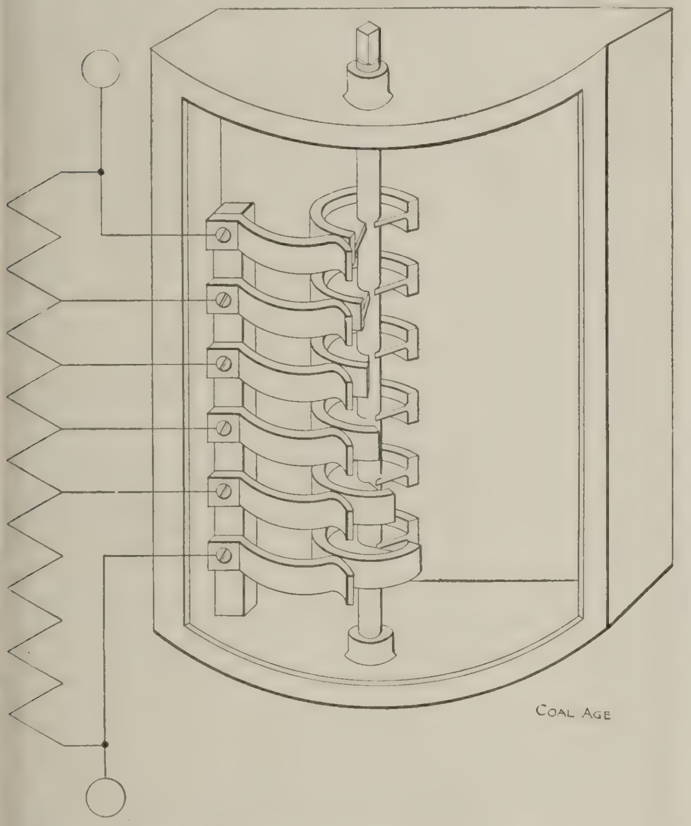

Fig. 5. Assembled Controller

Drum Controller Is Most Advantageous

The drum controller has many advantages. It can be placed in a small space and possesses rubbing contact. The fingers and segments slide upon each other, and thus tend to keep each other clean. Sparks pass between fingers and segments when connection between them is broken, but these may be subjected to the action of a blowout coil and the casing can be made practically air tight. The adoption of the drum switch and of the grid form of resistance, both of which ideas came to the United Kingdom from America originally, has apparently solved the problem of operating electric coal-cutting machines so far as the control of the resistance is concerned.

In the grid form of resistance the metal is stamped or cast in a zigzag form, as shown in Fig. 6, a certain number of grids equaling a predetermined resistance, there being a minimum of joints. This form of resistance also dissipates the small quantity of heat liberated during the starting period. This is a decided advantage over the old continuous-wire form of resistance.

The connection between the current-supply wire and the machine is perhaps the most troublesome problem involved in driving coal cutters electrically. In longwall workings, the coal face may range from 100 yd. up to half a mile, or even more in length. It is reached by roads protected by pack-walls leading from the haulage road. Down these "gate" roads, temporary supply wires are led to the neighborhood of the coal face. From here, what is termed a "trailing" cable carries the current to the machine.

The Greatest Difficulty Is with the Trailing Cable

Although the temporary wires along the road require considerable attention, since they are subject to falls, the main difficulty arises with the trailing cable. Between this conductor and the wire extending down the gate road is placed a gate-end switch box. Various forms of these boxes have been developed during the past 10 or 15 years, all of which were designed to not only prevent the machine operators from getting shocks but also to prevent explosions in the box itself. Figure 7 is a diagrammatic sketch of a typical gate-end box for three-phase service. It is made of cast iron with a hinged cover, and wide, carefully machined surfaces where the different parts of the box join.

The box is divided into two main compartments, one for the switches and the other for the fuses, one switch and one fuse being supplied for each phase of the current. Horizontally, also, the box is separated into six compartments, one for each switch and each fuse. The three switches are operated simultaneously by a handle on the outside, and the box cannot be opened until the switches have first been opened. Thus, when changing a fuse there is no danger of shock.

The trailing cable connects to the box by a plug which has four contacts, three for the three-phase conductors, and one for the ground wire. The three-conductor armored cable passes through a gas-tight gland, the armor being connected to the body of the box, to which the ground wire of the trailing cable is also connected. Where unarmored cables are used, a ground wire is led to a terminal in the gate-end box, to which the ground wire from the trailing cable also makes connection.

For continuous-current work, the same arrangement is followed. There are, however, only two switches and two fuses instead of three.

It is now usual for the trailing cable in three-phase work to consist of four conductors, and in continuous-current work, three conductors. The third conductor with continuous current and the fourth with alternating is the ground wire.

Throughout the United Kingdom, there has been a considerable controversy over the question of armored versus unarmored cables, and it has been decreed by the Home Office that armored cables shall be used in the majority of cases. The armor must be connected to ground at the bottom of the pit and also at the top. Furthermore, this armor must be maintained continuous. It has been decreed also that the armor shall be of sufficient electrical conductivity to carry any leakage current that may arise. This maintains the electrical potential along the outside of the cable as well as that of anything which the covering touches at zero, that is, the entire cable surface is grounded. In order to insure metallic continuity in the armor, joint boxes are employed. These bridge over the break in the armor at splices in the cable and protect them from dampness and mechanical injury. At the face, the ground wire is connected to the body of the gate-end box and to the frame of the machine. This is to avoid accident due to the machine being ungrounded. In several instances, the man who follows the machine, manipulating the haulage or guide rope, has been fatally shocked by it, owing to the whole of the machine being alive. By connecting the armor of the supply cable to the frame of the machine, the latter and all parts connected thereto, such as the haulage rope, are reduced to a zero potential, and the operator should be able to handle the haulage, or traction rope, or any other portion of the apparatus, except the brushes, in the case of a continuous current machine, or the equivalent parts of the alternating motor with perfect safety.

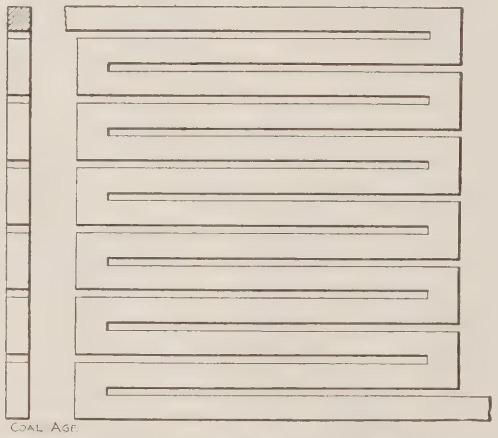

Fig. 6. A Resistance Grid

Difficulties Encountered in Maintaining the Insulation

Two serious difficulties have in the past arisen in the matter of maintaining the insulation of the trailing cable in a sufficiently perfect condition to protect the workman handling the coal-cutting machine from shock, also the insulation of the conductors as they pass into the machine. This trailing cable, of course, follows the machine along the face. It lies upon the floor and is subject to all the rough handling incident to proximity to actual mining operations. Lumps of coal and rock, iron tools, etc., fall upon it; the men walk on it, and the like. Various methods have been employed to overcome this difficulty, but apparently without success until recently.

A method of insulation which has met with considerable success in the United Kingdom is by covering the three- or four-conductor cable, as the case may be, with an outside envelope of a special quality of rubber. It was discovered by accident, as usual, that the rather low grade of this material employed for sheathing cab tires possesses important properties. It has considerable mechanical strength, resists oil, dampness, acid, fumes and almost all other ills to which trailing cables are subject. It is easily repaired in the factory when injured, and it is, of course, a simple matter to keep a spare cable on hand.

All the leading British cable makers are now turning out trailing cables covered with what is known as cab-tire sheathing. This appears to have surmounted the difficulty of injury to the trailing cable.

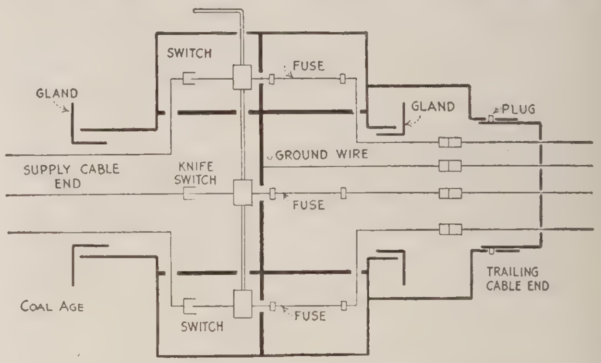

Fig. 7. Diagram of a Gate-End Box

The difficulty of insulating the conductors as they traverse the inner portion of the machine and of protecting the metallic switch, etc., has been met by a liberal use of mica and improved methods in working the same. Mica tubes are now employed, consisting of thin sheets rolled upon a mandrel and tied in place until they are slipped into the position which they are to occupy, usually holes in castings. In this form, it is necessary to hold the mica in place after it has been rolled or it would expand and fly open.

In this connection, it has also been discovered that there is mica and mica; furthermore, that micanite, which is used for many purposes in connection with the manufacture of electrical apparatus, will not answer where high voltages are employed, or where mechanical strength is required. Mica varies decidedly in its qualities, and if a poor insulation of this kind is employed, it has a pernicious tendency to break down, allowing the very connection to be made which it was intended especially to prevent, resulting in trouble, delay and danger.

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All rescue apparatus should be maintained in an effective condition. It should be under the charge of a skilled man. Periodic overhauling should be insisted upon. The men who form the rescue corps should be carefully trained under conditions as nearly similar to those of the mine as can be reproduced.

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The advantages of packing in longwall mining are: (1) A greater degree of safety, as roof falls are fewer. (2) There are no places in which gas can accumulate. (3) Absence of coal dust, most of it being behind the packing. (4) Reduction of the cost of timbering, as props can be withdrawn before the pack is built up and reset over and over again. (5) Increased output from the same length of working face. (6) Fewer men required. (7) A more rapid advance. (8) Roof and main roadways in much better condition. (9) Fewer cross-roads are required. (10) Less surface damage, due to caves.

Chart for Coal Purchasers

By W. V. Bowles

Although coal is bought for evaporating water, few buy it on an evaporative basis. The reason usually given is that the human element or "error" cannot be accounted or compensated for. Most engineers agree that the evaporative basis is the correct one on which to buy coal.

Assume a plant which requires, say, 3000 or more tons of coal a year, and it is desired to purchase coal on an evaporative basis. The first thing to do is to run a test on the boilers with various coals and make a chart from the records obtained. The accompanying chart is plotted from a stoker plant and illustrates the idea and plan of procedure.

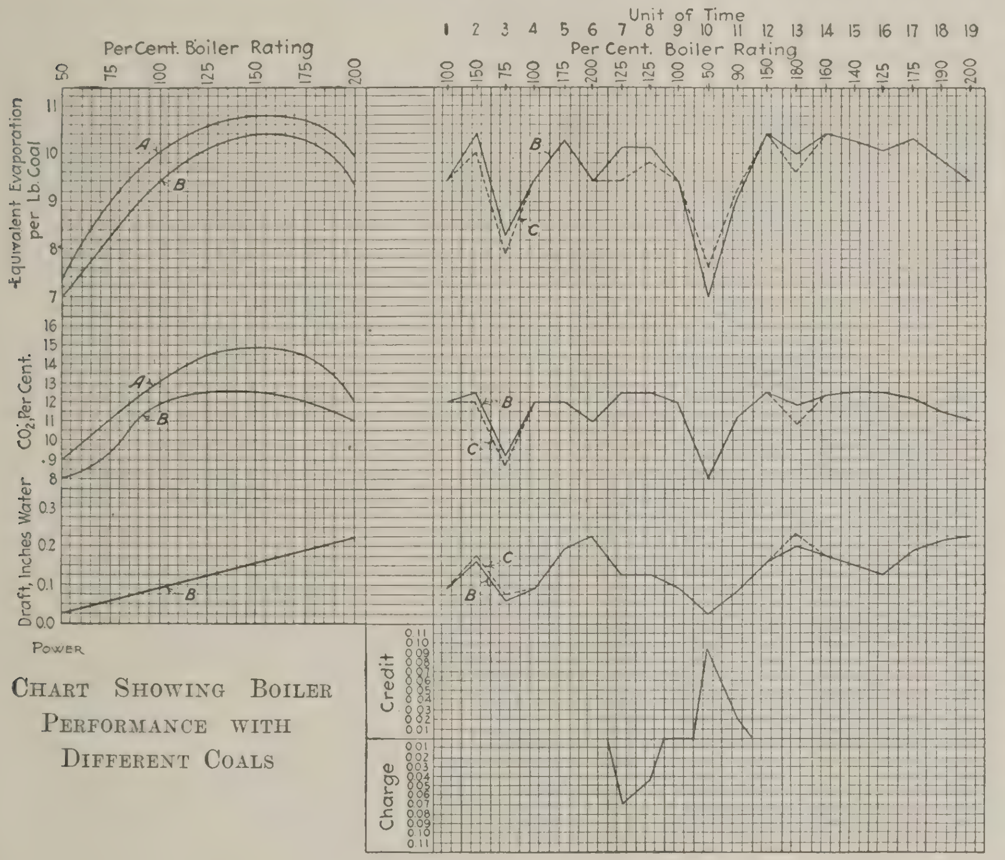


Chart Showing Boiler Performance with Different Coals

It is understood that the coal company should have a competent representative present during the test and at the calibration of all instruments and to have access to all records. First, the attainable evaporation and CO_2 curves are plotted at all boiler loads, together with a curve showing the best draft to use. Below is plotted a curve showing what is in the plant, termed "the adopted standard." This is based on a longer test when uncontrollable conditions may be taken into account.

The chart is also divided into a number of time periods, hours or days, as may be found most suitable. As each period is ended the average boiler rating is marked at the top, and below is plotted the adopted standard.

Referring to the charts under period 2, it is found that the average rating was 150 per cent. The equivalent evaporation should be 10.4 lb. per pound of coal, but the actual evaporation fell off to 10 lb. Following down the column, may be found the reason. The CO_2 dropped from 12½ to 12 per cent. Following still further down the column, the draft has increased from 0.16 to 0.175 in., showing the operating force to be at fault. A similar condition is indicated in the next column.

Under period 7 the evaporation dropped 0.069 per cent., but the operating conditions were according to adopted standards, when the coal company is penalized an equivalent of 0.069 on the coal burned during that period. If a better evaporation is gained than is shown by the standard line, as in period 10, the coal company is given a bonus equal to the increase; in this case, 0.092 per cent. If a shipment of bad coal comes in and the operating conditions are allowed to deviate from the standard, both will be shown in their correct proportion.

It may be found desirable to add draft lines to show conditions in other passes of the boiler, also temperature curves from the various passes. With proper checks on drafts, temperatures and CO_2, the human element can be accurately checked and accounted for; so there appears no good reason why the human element should control or influence the purchase of coal on an evaporative basis.

Such a chart should be an excellent thing to carry along from day to day for the benefit of the plant, even though it is not intended to buy fuel on this basis, for it will show the value of the firemen in dollars and cents.

Like all other kinds of record keeping these charts require much time to be made out. But in plants large enough to warrant checking of performances of apparatus a clerk is available who can plot curves from the tabular matter given him. Cross-section paper may be purchased that will fit nicely into large loose-leaf book covers.

COLLIERY NOTES

In rebonding old tracks, it is often advisable to use exposed bonds, since if the splice bars are removed from the old rails, the bolts frequently have to be cut, and it is often impossible to successfully draw the plates back into their original space.

An English authority has pointed out that most of the coal used in England for steam raising purposes is purchased in an unscientific manner. He suggests that if the coal was bought on rational lines, a saving of from 7 to 10% could be effected. This authority calls particular attention to the importance of the ash contents in coal. He stated that if the ash has a low melting point, the bars always become choked. The presence of sulphur generally results in the corrosion of furnace bars, boiler tubes and economizer tubes. This action is much more pronounced if steam jets are used under the furnace. The final suggestion was that all coal contracts should be arranged on a sliding scale basis, and payments should be made according to the heating value, a certain standard being fixed and a greater or less price should be paid according as the quality of the coal rose or fell from this fixed standard.

The Labor Situation

SYNOPSIS—The arbitration scheme in eastern Ohio is halted. The sale of the Bache-Denman property to the Union may not be consummated. A strike occurs in West Virginia against a change in the basis of payment, though the contract gives the operator freedom of choice.

After all, the miners' officials did not agree to arbitrate the eastern Ohio strike, and there is still a deadlock. The joint conference continued at the New Hollenden, Cleveland, during the greater part of last week without any tangible result. C. J. Albasin, the district president, is said to have been hopeful of a settlement, but what he hoped might happen is hard to understand.

What the Miners Wanted

The operators were ready to arbitrate and even agreed to make the scale of the arbitrators retroactive, so that it would apply from the time the men went to work. But the miners wanted 47c. per ton, at once, as the price of machine-mined run-of-mine coal, and they proposed that there be five arbitrators, two appointed by the miners, two by the operators and one by the other four.

They did not want a retroactive scale, but wanted the arbitration board to fix a date when their labors were completed. Thus by deadlocking on the selection of a fifth arbitrator, and perhaps by later delays, they could secure for themselves the 47c. rate for a long period of time.

If the operators declared that they could not pay so much and closed down, the cry of bad faith would be raised. If they stood the loss, it would be clear to everyone that they could afford to stand it indefinitely. The operators desire to pay 58c. for lump and 22c. for slack coal till the award is made.

The conferences adjourned on Friday, Feb. 5, to meet again on Monday, Feb. 8. Meantime, in deference to the investigators, nothing has been done to reopen the mines under "open-shop" rules.

The Ohio Legislature May Act

There was an informal meeting of the members of the mining and labor committees of both houses of the Ohio General Assembly to discuss the feasibility of starting an investigation into the labor situation in eastern Ohio. Many of the members of these committees were opposed to suggesting such an investigation on their own initiative, and it was practically decided to steer clear of the proposition at this time. Perhaps the legislature will be called upon by the presentation of a resolution or bill to make the investigation later, and it can then be taken up.

Representative Tetlow, of Columbiana County, has prepared a resolution which will be introduced in the General Assembly, providing for a thorough investigation of freight rates for coal shipments. It has often been charged that the present rates discriminate against Ohio operators, and it is believed the question can be settled once for all by the investigation. The resolution has the support of both operators and miners.

The Glens Run Coal Co. is asking to have its eviction orders dismissed, and no one is being evicted from company houses. The miners are comforted by this and by the fact that they are now assured that the shoes supplied them by the union may be worn by them and their families. C. J. Albasin says they are practically a gift from a school in Newark, and that permission to accept them had been granted by Charles Baine, the secretary of the International Boot and Shoemakers Union at Boston, Mass. A rumor has arisen that miners, driven out of Arizona by a smallpox epidemic, are to be brought to Ohio to work in the mines.

A Run-of-Mine Controversy in West Virginia

There is a strike at the Ronda mine of the Coalburg Collieries Co. on Cabin Creek in West Virginia. It appears that the mine has been run on a run-of-mine basis. The operators desire to avail themselves of a clause in the contract, permitting them to place their schedule on a screened-coal basis. The miners quote Clause 10 in the contract, which states:

> The mining rate per ton for splint or hard coal covered by this agreement is fixed upon a run-of-mine basis; screen lump coal may be mined and paid for on a lump basis, on a basis of 30 per cent. nut and slack over a 1½-in. screen.

The miners claim they are breaking the coal so fine that 35 per cent. of slack is made and therefore that the operators have no right to change the schedule to a basis framed on 30 per cent. of slack. But Clause 10 seems to make it clear that the change can be made at the option of the operator. It is said that the Dry Branch mine is also to be run on the screened-coal basis.

The rate proposed is 43c. per ton for the lump coal, and this, figuring on 30 per cent. of slack, is somewhat better than the present price for run-of-mine, which is 30c. per ton. The difference in favor of the miners is a cent on every 10 tons, if no more than 30 per cent. of slack is made as provided. D. C. Kennedy, the operators' commissioner, has been in Florida. The commissioner for the miners is John King. It is believed that the commissioners will decide that the company is well within its contracted right.

The Union May Not Buy the Bache-Denman Mines

The sale of the Bache-Denman properties in Arkansas to the United Mine Workers of America is said to have failed, but the statement has been denied. The Sebastian County Coal & Mining Co. is owner of much of the coal and the Union anticipated that these royalty holders would be well pleased to replace two tipples which union violence had destroyed. They should, of course, rebuild as often as the mob sees fit to destroy them.

Possum Hunters Menace Western Kentucky

The activities of the "possum hunters" in the western Kentucky coal field have subsided noticeably in the past two months. This change of conditions is attributed partly to the extreme weather conditions which have prevailed and partly to adverse public sentiment. While the mine operators are still pursuing their policy of vigilance, the county sheriffs have done much to relieve the tension by putting deputies on duty in the districts where the "possum hunters" have been most active.

At the recent session of the Circuit Court at Greenville, in Muhlenburg County, the judge granted the Commonwealth attorney's petition for a change of venue. Indictments against alleged "possum hunters" will thus be tried before juries in remote communities.

The Butler County Circuit Court, in session at Morgantown, convened Feb. 1. Judge McKensie Moss, of Bowling Green, delivered a vigorous charge to the grand jury, in which he urged a rigid investigation of the outrages alleged to have been committed by the "possum hunters." For many weeks the citizens and mine officials have been kept in a state of alarm by the periodical raids. A coal-mine tipple at Island Station was burned and many men and women have suffered whippings at the hands of these night-riding bands. Not only have these latter defied the law themselves, but they have threatened those who sought to interfere.

Despite Intimidation, Testimony Is Obtained

One farmer in Butler County was warned not to testify before the grand jury in Morgantown. Nevertheless, he appeared before the jury and told all he knew of the depredations. Under his arm he carried a gun loaded with buckshot.

Judge Moss said he would continue the court for two weeks if necessary to bring to justice the guilty parties.

The Hopkins Circuit Court now in session in Madisonville is likewise probing the "possum-hunter" outrages. Johnson Williams, who, while actually acting as guard for the Kington Coal Co., was whipped by the "possum hunters," was indicted by the grand jury for carrying concealed weapons. He was acquitted, however, when the necessity for his personal protection was established by the defendant's attorney.

The Carbondale Coal Co. resumed operation during the past week after a suspension of over two months. "Possum-hunter" raids caused such a general and constant alarm in this company's camp that a shutdown was necessary. Sixty-five negroes have been imported during the past few days from the neighboring camps, and, with the assistance of the county sheriff, the Carbondale concern feels that no further trouble is in store for it.

The Aftermath of the Colorado Strike

One hundred and fifty indictments for murder, arson, assault and rioting have been found by the grand jury in Colorado. Among those arrested are Eli M. Gross, state superintendent of free employment bureaus and vice-president of the State Federation of Labor; William T. Hickey, secretary-treasurer of that federation, and Charles Haines, secretary of the United Mine Workers at Walsenburg, Colo. Judge C. C. Butler, of Denver, Colo., will try the cases at the call of Judge A. W. McHendrie, of the third judicial district.

Electrical Development in 1914

By F. R. Davis*

SYNOPSIS—Refinement of design and an increased size of the units employed were the most noticeable characteristics of the year's progress. The demand for storage-battery and combination locomotives is increasing.

While some unique developments characterized the progress in the electrical industry during 1914, the general advance has consisted largely of improvements in apparatus that had already attained relatively high efficiencies, both electrically and mechanically.

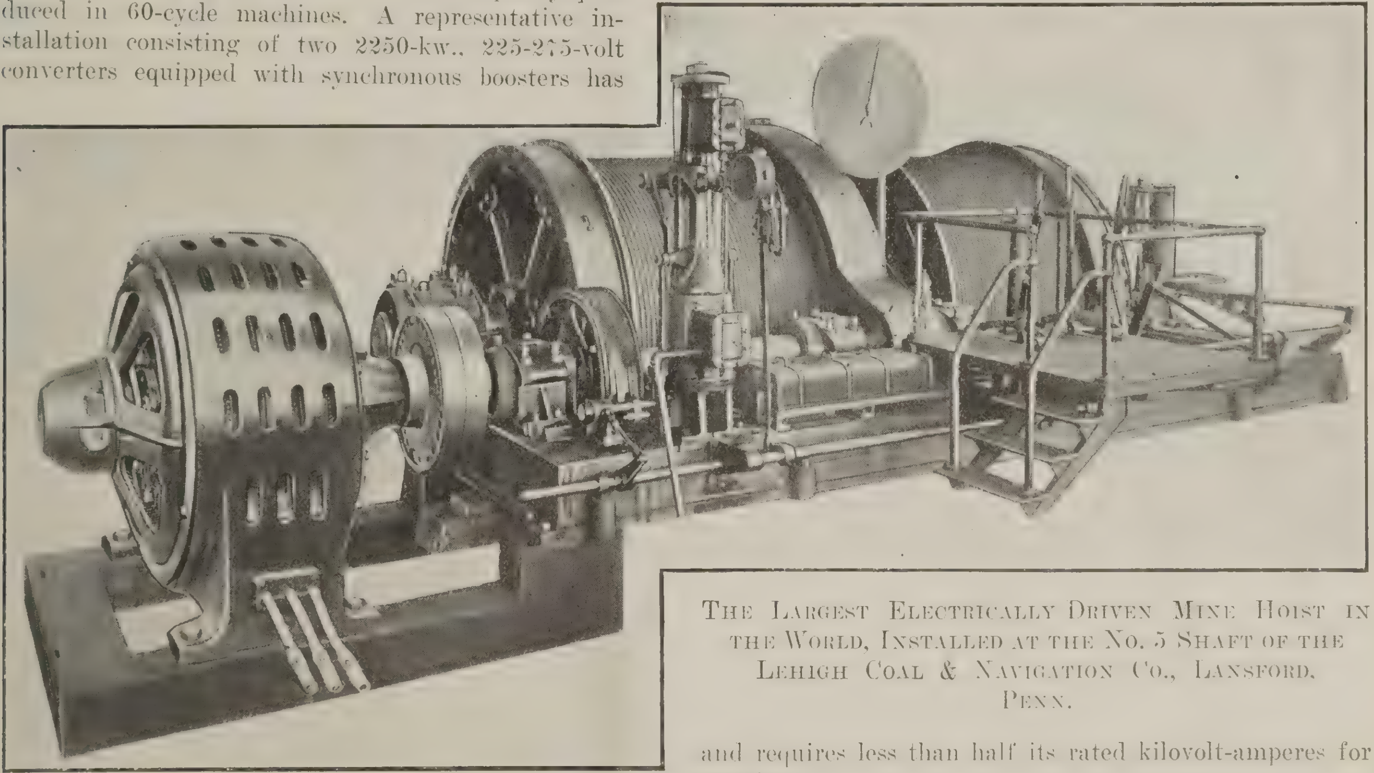
The essential features of the achievements attained embrace a marked refinement in design resulting in increased efficiencies for many classes of apparatus, economical concentration of large energy values in single machines, and a broadening of the field of application based on experiment and analysis of exhaustive operating data.

The advance in synchronous converters has been marked chiefly by the increased unit capacity produced in 60-cycle machines. A representative installation consisting of two 2250-kw., 225-275-volt converters equipped with synchronous boosters has been constructed for the Boston Edison Co. These machines have approximately 50 per cent. greater capacity than any 60-cycle machines of this type heretofore developed, and their successful operation has resulted in the adoption of still larger units.

The equipment of synchronous converters with synchronous boosters, which are integral parts of the complete machine, together with the arrangement of wattmeter control, constitutes a most important improvement in synchronous converter operation and insures a positive and automatic adjustment of the direct-current voltage. This is accomplished through control of the field excitation of synchronous converters provided with commutating poles. It insures correct excitation at all loads and voltages instead of a step-by-step correction, which has heretofore been necessary. The new system obviates the use of contactors in combination with a number of resistance steps, which were formerly required, and has been applied with entire success during the year to both 25- and 60-cycle units of the synchronous booster type.

A horizontal-shaft 6000-kv.-a., 50-cycle, 500-r.p.m. synchronous condenser constructed for the Southern California Edison Co., of Los Angeles, is of unusual interest, due to the fact that it was designed for operation on a 16,500-volt line, no machines of this type having been previously built for potentials exceeding 6600 volts.

In addition to the precautions necessary for insulation against this unusual potential, special efforts were made in designing the machine to minimize the losses; and as a result, there was produced a synchronous condenser of very high efficiency, utilized solely for power-factor correction. It is self-starting by means of a compensator and requires less than half its rated kilovolt-amperes for starting.



THE LARGEST ELECTRICALLY DRIVEN MINE HOIST IN THE WORLD, INSTALLED AT THE NO. 5 SHAFT OF THE LEHIGH COAL & NAVIGATION CO., LANSFORD, PENN.

Prior to 1914, the largest core type of transformers as produced by the General Electric Co. did not exceed 2000 kv.-a. in rated capacity, but during the year the maximum rating was carried up to 7500 kv.-a. The maximum rating of single-phase water-cooled, shell-type transformers was also increased by the construction of four units of 8333 kv.-a. capacity.

There has been a marked reduction in interruption to service in transformers of recent design, as they are now capable of withstanding momentary short-circuits under sustained primary voltage without injury to the coils. This has been accomplished largely through changes in the grouping of the coils and working to higher inherent reactance.

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*General Electric Co., Schenectady, N. Y.

A feature of unusual interest for the year is the development of a combination transformer which may be operated either self-cooled or water-cooled. It may be designed for normal operation with water circulated through the cooling coils, in which case, it may also be safely operated at 50 per cent. of normal load without the circulation of water and without exceeding its specified temperature rise.

On the other hand, this transformer may be designed for normal operation as a self-cooled unit, and be provided with the necessary cooling coils, which, when utilized, permit operating efficiently at 50 per cent. above the normal capacity.

The economical advantages of such transformers are obvious, especially for localities where the purchasing rate of water is high and the transformer is fully loaded only part of the time. This design also provides a factor of safety in case of interruption in the water supply, in which event the apparatus may still be operated at partial load instead of being shut down.

With the steady growth in the size of power plants and distribution systems, there has arisen among operators a fuller conception of the practical value of providing ample protective equipment, such as voltage-reducing devices for cutting down the station voltage under short-circuit conditions, arcing ground suppressors for short-circuiting arcs caused by grounded phases on delta connected transmission systems, and the recently developed and improved current-limiting reactances. A fuller appreciation of such devices is amply attested by a continual increase in the number of propositions for power-station equipment including this class of apparatus.

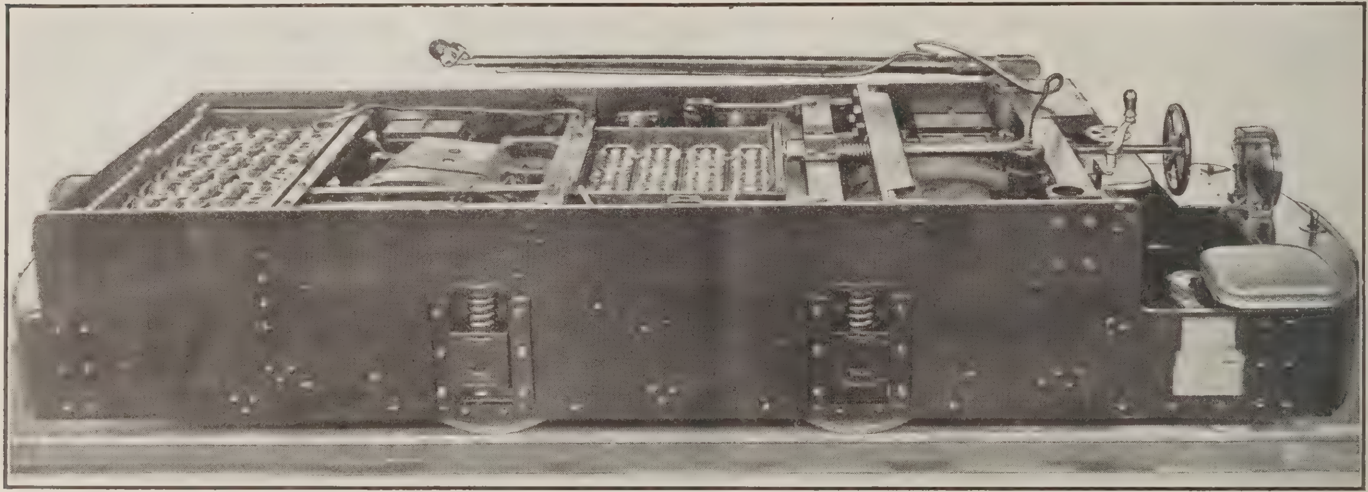
Reactances have been improved to a considerable extent during the past year, and the changes made have been based largely on the experience gained in numerous applications of the earlier types utilized for the protection of feeder lines. In order to facilitate calculations on the equipment necessary to meet the requirements of power systems having widely varying operating conditions and capacities, these reactances are now made in three distinct forms.

Commutating Poles and Ball Bearings Are Standard

All of the mine locomotives manufactured by the General Electric Co. in 1914 were provided with commutating pole motors and ball bearings as standard equipment, and the operating records of those placed in service during the year show that these improvements have reduced the number of interruptions to service and have resulted in decreased maintenance costs.

The increasing output of many mines has rendered it necessary to equip them with locomotives of relatively large capacity, capable of handling heavy trips over steep grades and long hauls. For this class of service there have been built a number of three-motor, 15- and 20-ton locomotives. The 20-ton unit combines some unusual features in design and construction. The body is made of rolled steel, each side frame being cut from a solid rolled-steel slab, while similar material in conjunction with steel channels is used for the end frames. The three driving motors are each rated at 85 hp., and are of the split-frame type. These particular locomotives were built for 42-in. gage, but the same construction and capacity can be utilized for a minimum of 36-in. gage.

There has been a definite increased demand for the storage-battery type of locomotive for gathering work, as it has been demonstrated that in this service each machine will effectively displace two or three mules. Heavy units are not, as a rule, required, and the locomotives of this class so far provided have been rated at from 3 to 7 tons. Most of these are of the straight storage-battery type; but a limited number have, in addition, been equipped so that they can operate from a trolley wire when in the main headings of a mine.



Combination Trolley and Storage-Battery Locomotive

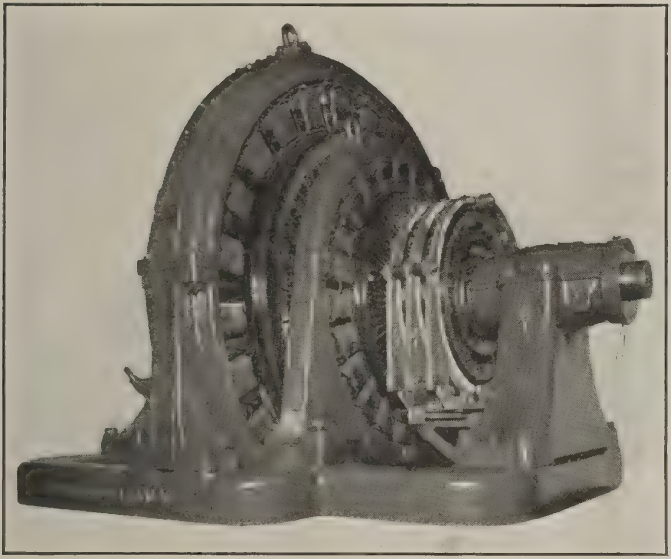
The advantages of this arrangement are obvious in that by means of a small self-contained motor-generator set, the battery may be automatically charged while the locomotive is running on the trolley. When the locomotive is working in the rooms, gathering the cars, a varying percentage of the battery charge will be consumed; but as soon as the machine is again operated on the trolley, these losses are automatically compensated.

With this dual system of operation, the battery need never be entirely discharged; and if space limitations are severe, it permits the use of a smaller battery than would otherwise be necessary. A representative machine of this type has been in operation in a West Virginia mine for a period of about four months. It runs on a 42-in. gage track and its overall height does not exceed 30 in.

The largest induction-motor, shaft-hoist equipment in America was placed in operation in November, 1914, at Lansford, Penn., for the Lehigh Coal & Navigation Co. The driving motor is rated at 750 hp., 300 r.p.m., using three-phase, 25-cycle current while the drive is through a single reduction gear.

Positive control of the hoisting speed is secured by means of an improved type of liquid rheostat and high-tension air-break contactors, the motor circuit being 2300 volts. This hoist serves a 600-ft. vertical shaft, hoisting 11,500 lb. per trip at the rate of 90 trips per hour with a maximum rope speed of approximately 1600 ft. per minute.

The liquid rheostat referred to above was developed primarily for mine-hoist service and insures safe operation at quick reversal. It employs two sets of fixed electrodes at different elevations. One set is widely spaced, while the other has large electrode areas and small spacing in order to obtain a very low final slip. The two sets of electrodes are connected in parallel after the electrolyte has reached a certain level corresponding to a predetermined decrease in rotor voltage. All parts of the rheostat itself are stationary, thus insuring absolute reliability. The electrolyte level is varied through the operation of a movable weir and a small motor-driven pump.



A SYNCHRONOUS CONVERTER WITH REVOLVING-ARMATURE SYNCHRONOUS BOOSTER

THE SMALL SUBSTATION

There are numerous localities remote from low-voltage distribution, but accessible to high-voltage transmission lines, where the small rural substation can be economically utilized for the distribution of electrical energy in capacities as low as 3 kv.-a. Under proper conditions, a market of this kind offers the operating company a sound financial basis for service, providing that the equipment can be installed at a reasonable price and can be depended upon to operate with low maintenance expense. The great extent of the field for this class of electrical equipment is indicated by numerous successful substations for small towns, farms, mines and quarries, pumping outfits, small isolated manufacturing plants and various contracting and construction jobs.

Experience has shown that, to avoid interruptions to service, the equipment supplied to meet the operating conditions indicated must be proof against damage from the weather, and, in order to provide this protection, all operating parts of switching apparatus which are liable to rust should be subjected to special treatment.

While considerable work had been done in the effective equipment of rural substations prior to 1914, the activities of the past year have been along the line of standardizing apparatus suitable for use in connection with various transmission voltages and in improving or redesigning standard apparatus previously utilized.

The complete standardized line now available has proved reliable in service and is designed to minimize danger to the equipment in case of disturbance on the main line; and, while it is proof against injury to itself or other apparatus, it does not require skilled attendance. Furthermore, it is largely semiportable, so that it can be installed or removed promptly and economically, and the fact that the entire line has been standardized permits an accurate predetermination of the cost of a rural substation when the operating conditions and service requirements are known. It also makes it possible to secure for the small community many of the economies inherent in high-tension transmission.

The vast number and varied character of the developments in the modern electrical industries render it exceedingly difficult to give in limited space comprehensive description of the progress made in any year. In this reference to a limited number of specific examples, it may be reiterated that most of the apparatus and devices cited, all of which were built by the General Electric Co., have already been subjected to the stresses of commercial service and have successfully withstood operating tests.

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Extracts from a Superintendent's Diary

I bought a ten volume Encyclopedia of History today from a young lady book agent; I did not particuarly need the books but the young lady so evidently needed money and encouragement that I could not resist the appeal.

This is not the first time that sympathy has made for an increase in the size of my library; in fact many of my books have been added for somewhat similar reasons.

It naturally follows that there are some books in my library that are seldom opened, but they are far from useless, nevertheless.

Ofttimes I go to my library in search of peace and quiet after a day of worries and weariness, and when I open the bookcase I have no idea as to the volume that I shall choose; it is at such times that a book with a history, quite independent of the matter between its covers, is liable to attract my attention and almost before I am aware of it, a complete picture from the past is flashed on my mind and I wander off in reverie.

I have two books in particular whose bindings seem to possess almost hypnotic power over my imagination. One is a book of precepts published by a clergyman more than a century ago. It was given to me by an old lady who has long since passed away. To my shame, I must admit that I have never read one-third of its contents, but all of the events of that lady's life, the circumstances that led up to the presentation, the heart-to-heart talk that accompanied it, and her interpretation of the precepts, all these are written on the back of that book as legibly as are the printed lines within its covers.

In some mysterious manner this dear old lady has accomplished, as concerns me at least, a task that only the greatest of authors are able to accomplish; she left behind a living, breathing message.

The other book came into my possession as a reward for a charitable act.

It was also written over a century ago and was brought into our camp by an old man, a dissipated wretch who before his death had disposed of all his earthly posessions to satisfy his craving for drink, with the exception of it and an old miniature of rare beauty. His affection for the book and miniature was explained after his death.

Because I paid the burial expenses, the proprietor of our camp's boarding house insisted that I should take the book and miniature.

Out of curiosity I read the book, and from marginal notes, I soon discovered that the last owner was a grandson of the author of the book, and the miniature was a likeness of his grandmother. The marginal notes made by the grandson show that he inherited the wanderlust from the grandfather, but the grandfather's genius did not accompany it. He had talent enough, however, to make his grandfather live again for me in the book which I now own through criticisms and remarks scrawled along the margins of the pages.

All of which leads me to believe that book knowledge is not an absolute necessity to insure the selection of a library that may bring joy and comfort to its owner. And I find much satisfaction in that conviction when my friends take a fling at the titles I have accumulated.

I started out with well defined ideas about the kind of library I wanted, but as with all well laid plans, I find unaccountable impulses have been responsible for most of the decisions; in appraising the library that has resulted, I cannot see where I should like to make any changes.

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Saving on Your Coal Bill

Dr. William Thomas, the efficiency expert, has recently drawn attention to the fact that in every dollar's worth of coal, a considerable saving may be effected by observing a few common-sense rules.

Whether you use a kitchen range, a hot-air furnace, a steam heater, an open grate or what not, it is the saving in waste which counts for most. After all, it is a matter of surface extent which figures in waste and coal consumption.

For each quarter of an inch of soot and fine ashes on a furnace, your coal loses 80 per cent. of its heating efficiency. For each sixteenth of an inch of soot on the inside of your stove, your coal used loses 25 per cent. of its heating capacity.

Plainly, then, the cue for the housewife, the janitor and even the easy-going *paterfamilias* is to clean soot away from each nook and crevice of every kind of a heater. To clean them two or three times a season is not enough. They should be cleaned every week.

Drafts require particular attention in the way of cleansing. Pipes, cracks, doors and folds in the sheet iron which goes to make up the furnace, range, or other kind of heater, should be especially looked after.

In this way one ton of coal will be made to give several times as much heat as it formerly did.

Explosion at Carlisle Mine in West Virginia

By S. A. Scott*

On Saturday, Feb. 6, at 7:40 a.m., an explosion occurred in the fifth left off the third right entry of the Carlisle mine. Because of the excellent condition of the other parts of the mine, the explosion was confined to this one entry. Bratticemen and firebosses went to the scene immediately and succeeded in saving four men who had been overcome. By 9 a.m. the superintendents and mine foremen from adjoining mines arrived and the work of rescue was started in earnest by 11 o'clock. The work of bringing out the dead was then started, being completed by 6 p.m.

Twenty men were killed and four were injured. One of these latter may yet succumb to his injuries. The mine in general was not damaged to any extent except the stoppings on the fifth left entry and the door of third right at this point. These were blown out by the force of the explosion.

At about 3 p.m. State Mine Inspector John I. Absalom arrived, his colleague, Lance B. Holliday, joining him about 5 o'clock. About 2 a.m. on Sunday the Bureau of Mines rescue car No. 8, temporarily located at Coalwood, W. Va., arrived at the mine.

Tipple at Carlisle Mine Where Recent Explosion Occurred

The work of rescue was directed by myself assisted by my assistant, T. C. Thomas, and the company's inspector, Edwards Grass. Assistance was tendered by all the companies operating the surrounding mines. It is likely that work will be resumed in about a week.

[The Carlisle mine is operated by the White Oak Fuel Co., a subsidiary of the New River Co., the post office being also Carlisle. The mine is at the head of the White Oak branch of the Chesapeake & Ohio Ry. and is located in Fayette Co. The bed operated is the "Sewell" and connection with the surface is by a shaft. The seam runs from 3 ft. 4 in. to 4 ft. 3 in., but apparently averages 4 ft. in thickness.

The last inspector's report (1912) states that the mine is gaseous, and that the roads in second and third right headings tend to get too dry and dusty and have to be kept watered down. Apparently the requisite care had been taken to keep the dust moist, for the explosion did not spread. A correspondent informs us that the disaster was caused by a door boy with an open light entering a room marked as dangerous.—Editor.]

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*General manager, The New River Co., Macdonald, W. Va.

Editorials

The Net Output of Anthracite

It is to be regretted that over one-tenth of the anthracite production is consumed at the mines for heat and power, and the proportion thus utilized seems to be on the increase. If this greater consumption arose from the introduction of mining machinery we could feel that it was justified, but entirely different causes for the growing consumption per ton produced must be sought.

In 1892 the U. S. Geological Survey put the consumption at 8.3 per cent. of the total output. In 1903 it was still only 8.5 per cent. according to the then newly formed Pennsylvania Department of Mines. In 1914 it had mounted to 10.2 per cent.

During the life of that Department and the chief inspectorate of James E. Roderick the amount of water handled per year has decreased from 13 tons per ton of coal produced to 11.7 tons. This is a considerable reduction and it would seem that the decrease in volume can hardly be equaled by the increase in depth. So that the water problem cannot be, as might be thought, the cause of the increased weight of coal consumed per ton produced.

Some increases in the coal used may be due to the power required for more perfect preparation. A more important cause may be the use of inferior coals under the boilers. However, if the coal used in 1903 contained 6 per cent. of impurity—surely too low a figure—the coal used in 1913 if it gave only equal power would have to contain 21.8 per cent. This figure as an average is probably higher than an investigation would show.

Other causes for increased use of coal are more numerous haulage systems, extensions of those existing, increased hoisting depth and the replacement of drifts by shafts. Still we wonder why the anthracite region as a whole has not balanced these increased drains by a proportionate economy.

It is perhaps not possible to compare the anthracite collieries with the bituminous mines of the country, for the water to be handled in the latter is not so great nor are the mines so deep. Furthermore some few mines obtain power from coal-oven heat or gases. Yet even after admitting the difficulties of the comparison, it does seem strange that the bituminous mines, inefficient as many of the plants are, used in 1913 only 2.44 per cent. of the coal produced or roughly one-fourth as much as the anthracite collieries.

Is some of this apparent inefficiency in anthracite plants due to the use of steam lines such as we have seen installed—one, for instance, 14 in. in diameter which together with a 5-in. extension was over a mile long? Is it due to the use of cylindrical boilers, which we hope are now only reserves, but which still form 11 per cent. numerically of the whole equipment though only 3 per cent. of the horsepower capacity?

Is it due to the existence in actual use of some valuable relics in the way of steam engines for which a museum of patents like those in London and Berlin should be provided? Is it the result of excessively long haulages and unnecessarily disconnected activities?

This we do not know—certain it is that while to the anthracite region we may look without disappointment for some of the most uptodate equipment we may also find there some plants which serve only to recall the early triumphs in the long and honorable history of engineering in the anthracite region.

We append a table showing the tonnages produced, the tonnage used for steam and heat at the collieries and the percentage the latter forms of the former as calculated from the state reports:

TABLE SHOWING PROPORTION OF COAL CONSUMED FOR HEAT AND POWER AT THE ANTHRACITE PLANTS OF PENNSYLVANIA

Year	Tonnage Produced	Tonnage Used at Plants for Steam and Heat	Per Cent.
1903	75,232,585	6,395,582	8.501
1904	73,594,369	6,912,358	9.393
1905	78,647,020	7,122,394	9.056
1906	72,139,510	7,198,140	9.978
1907	86,056,412	8,217,439	9.549
1908	83,543,243	8,320,032	9.959
1909	80,223,833	8,103,810	10.101
1910	83,683,994	8,396,895	10.034
1911	90,917,176	9,152,073	10.066
1912	84,426,869	8,804,759	10.429
1913	91,626,964	9,357,762	10.213

⁂

At Home and Abroad

We have frequently pointed out that the conditions obtaining in the United States are not exactly paralleled in Europe and that certain measures in one country would not always give similar results in the other. Much has been made of the success in Germany in creating a system of syndicates, from which greater profits to industry have accrued. Steadier operation, less poverty, more complete conservation, increased safety, and greater efficiency are also alleged. These contentions are also true in a degree—what degree is hard to determine exactly.

Certainly greater returns to industry are desirable because only by the accumulation of profits can efficient operation be secured, and they are of value also as an encouragement to thrift. Moreover they are needed in bituminous coal mining, if the absorption of the independent operator by the railroad on which he ships in the hard-coal region is not to be completely duplicated in the soft-coal industry. Already in large parts of the bituminous field, the independent operator has become a small factor, the railroad, steel, and even the copper interests having such large operating investments.

But while profits are assured both for capital and labor by combinations of the former, the other advantages we have listed are not so certain. Steadiness of operation is as much threatened by market conditions as by an excess of productive ability brought on by unrestrained trade. As for poverty, the miner makes less per day in Germany under syndicates than he does here. The eliminating of privation is almost wholly due to the first alleged byproduct of syndication—steadiness of operation—and this we shall consider in detail later.

Conservation may come as an outcome of law, or as a result of the largeness of the initial outlay which puts a high premium on the coal in the ground, or because of the high value of the mineral in place. An assured profit would rather *permit* than *induce* operators to be less wasteful of resources. The most profitable way to mine coal is unchanged by an increase in the selling price of the product, so long as new coal reserves can at any time be acquired. As soon as they cannot, the value of coal lands will increase without syndication, and conservation will be self-enforcing.

As regards safety as a result of syndication, we must say that we are not impressed with the safety exhibited in German mines, believing it more largely due to natural safe conditions than to any other cause. As for greater efficiency, this is apparent only in machinery, not in output per man. We concede, however, that greater profits should have the effect of increasing the output per man and per ton of coal utilized for power and heat.

We pass over these matters lightly but we wish to discuss the item, steadiness of operation, at some length, because we believe the coal operator has been disposed to credit to German and indeed to British shrewdness a condition in which those people have exercised little or no control. We take issue with those who ascribe to intelligent provision what is really the outcome of sheerest luck.

A pamphlet entitled "A Statement of Facts concerning Conditions in the Bituminous Coal Industry in the States of Illinois and Indiana" states that "The average number of working days per annum in these two states is only about 175 out of a possible 300 or more." The same pamphlet shows a diagram exhibiting the number of shifts worked in the Westphalia district in Germany for several years. It averages well over 300.

But in Europe the market is not nearly so seasonal as in America. In England and Germany, which are not so agricultural as the United States, the demand for coal for industry occupies a more dominant position. And industry is the flywheel of the coal trade, at least in correcting the annual variations of the demand.

Moreover as the temperatures never become as low in Germany or England as they do here and as the winter is shorter these conditions again accentuate the importance of the industrial demand. Furthermore, as the coal freightage is an important item in railroad operation, the demands of the locomotives are immensely increased in the winter by the demand for coal, and thus the conditions which disturb the uniformity of trade have secondary effects, which disturb them further in their turn. Nor should we overlook the effect of wintry storms in adding to the consumption of coal in locomotives, by their injurious effects on the operation of railroads.

It also should be noted that both Germany and England have a large trade in warm countries where the demand is wholly industrial and where wood is largely used to supply what little heat is needed for cooking and house warming. The avidity with which Italians seize on store boxes and even tree limbs and carry them away for firewood is not so much the result of real thrift as of national custom. The sales of the European mine owners to tropical and near-tropical countries help to smooth the curve of seasonal variations in the coal trade of Europe.

Furthermore the bunker and coaling-station trade of Europe, which is large, goes on unceasingly through the winter and summer, though this has probably less effect in steadying trade in Germany than in Great Britain.

Now, among coal-producing states in this country, Indiana and Illinois by reason of their closeness to the agricultural states, into sixteen of which their product goes, suffer severely by the lack of balance caused by the seasons and must continue to suffer more or less in the very nature of things.

Unfortunately the United States, like all countries where the people as individuals enjoy a high degree of prosperity, suffers severely from ebbs and tides in industrial activity.

Moreover, because our credits are large, we are the first to suffer when a depression comes. Thus the flywheel of the coal trade, which is industry, is inefficient, and sometimes we wonder whether the domestic or the industrial trade is the reciprocator and we question which demand should be regarded as the flywheel. In 1914, for instance, it was the domestic demand which proved the more reliable. But in Europe both the industrial barometer and the thermoscope show less variation than they do here and the Westphalia Syndicate has little or nothing to do with that uniformity.

As we have said, however, more equitable, equable prices would be good for the industry, helpful to the miner and no loss to the country.

A Real Improvement in the Coal and Coke Business

From Birmingham, Ala., comes word that England has placed an order for 6000 tons of steel billets, that the rail mill at Ensley has prospects of uninterrupted operation for a considerable time, that the Italian government wants quotations on 250,000 tons of coal, and that the Hattie Ensley furnace broke three production records during January. West Virginia reports that conditions in the coal trade have greatly improved in the past 30 days and that production is rapidly increasing.

Out in Ohio, the Youngstown Sheet & Tube Co. is planning improvements in the way of byproduct coke ovens and a new mill to cost $6,000,000. In the Connellsville region of Pennsylvania coke ovens which have long been idle are awaking to new life. The H. C. Frick Coke Co. alone has put 2500 ovens into operation within the past month, and other furnace interests have made increases in like proportion. Throughout the Pittsburgh district generally, resumption of operations at mines and industrial plants is of daily occurrence.

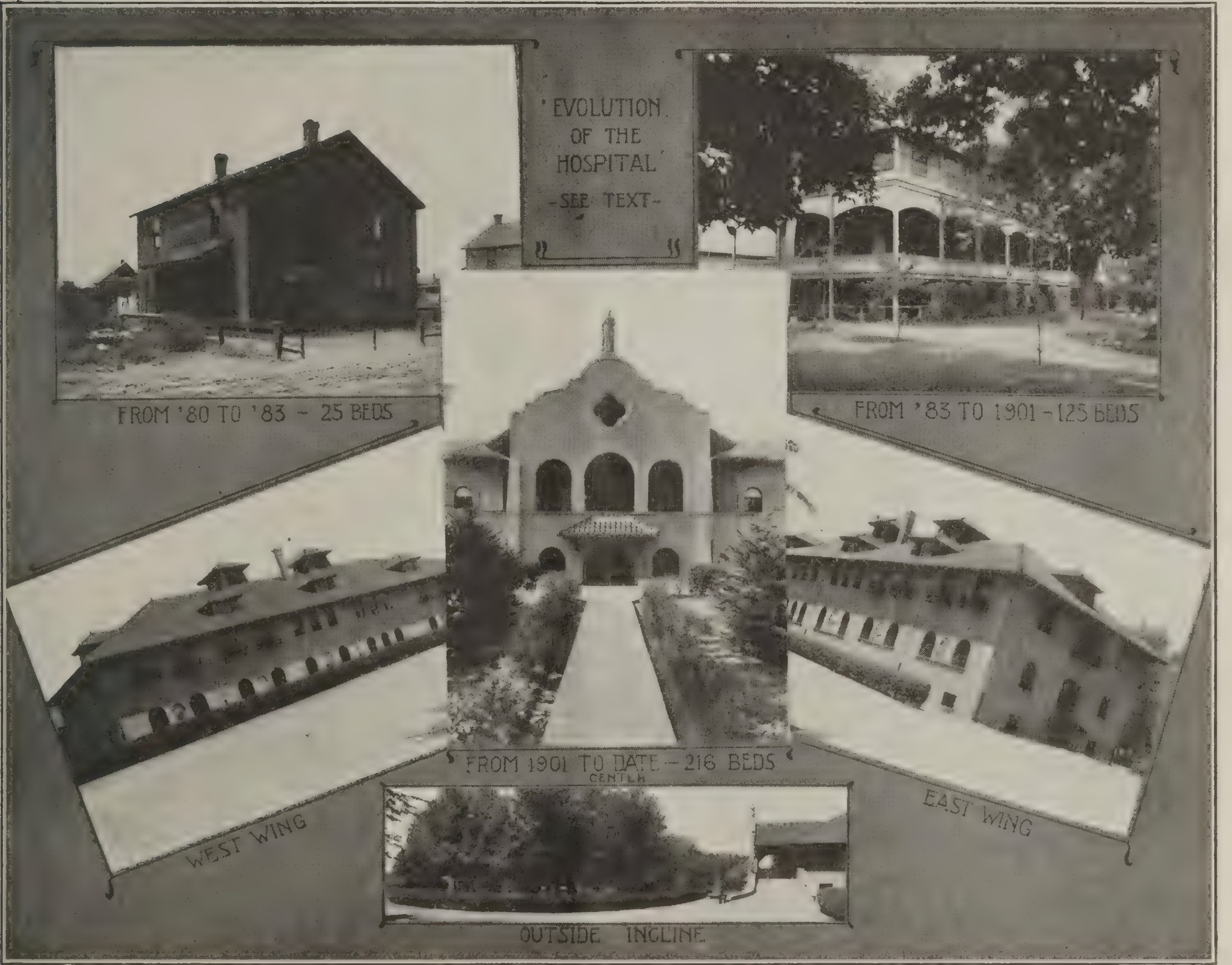
Iron has long been regarded as an industrial barometer. When the country buys iron, it has money to buy other things as well, and usually buys them. The market for iron is reflected in that for fuel, for bituminous coal, and coke and gas. The facts and figures given above, while by no means indicating that a flood stage of prosperity is immediately upon us, reveal unmistakably that the slack water of depression is past, and that the tide of industry is setting in the right direction.

Connellsville coke production, which is a fair measure of iron production, has increased approximately 20 per cent. in the past month. All of this increase has been due to the activity of the furnace interests. In the language of a western Pennsylvania contemporary, "The Connellsville coke region is smoking up."

Sociological Department

The Colorado Fuel & Iron Co.'s Hospital

SYNOPSIS—The Colorado Fuel & Iron Co. has a large and efficient hospital at Minnequa, a point convenient to all its mines. Many model features have been introduced to add to the comfort of the patients and the success of the surgeons.


EVOLUTION OF THE HOSPITAL -SEE TEXT-
FROM '80 TO '83 - 25 BEDS
FROM '83 TO 1901 - 125 BEDS
FROM 1901 TO DATE - 216 BEDS
CENTER
WEST WING
EAST WING
OUTSIDE INCLINE

The Colorado Fuel & Iron Co.'s Hospital Force Has Twice Moved to Larger and More Convenient Quarters

The pertinacious Frank P. Walsh, chairman of the Commission on Industrial Relations, asked John D. Rockefeller, Jr., at the recent inquiry in New York:

> Could not a sociological department, such as Mr. Ford established, if it was set up in New York, keep you thoroughly informed concerning your employees?

Mr. Rockefeller replied without any show of irritation:

> It would be entirely possible. But Mr. Ford showed he was making many millions of dollars, and so he could develop such a department with entire justice to his stockholders. But I think you will agree in the case of the Colorado Fuel & Iron Co., where the common stockholders have had no returns for many years, it would not be fair to undertake sociological work.

Mr. Rockefeller, at that inquiry, showed only a slight acquaintance with the affairs of the company and his reply would seem to indicate that he did not know that sociological work of importance was being conducted at the Colorado Fuel & Iron Co.'s mines or that annual reports were being made on the medical and sociological departments. We do not know when the first report was made, but we have before us the printed records of the medical department for 1907-1908 and sociological reports showing a well organized activity in 1903-1904.

The public in the East does not know anything of the extremely valuable work which the company has done, simply because of the failure to make such work public. A state organization with half as much deserving would have an efficient press writer to blazen its good deeds.

It is creditable to the New York "Survey" that it has not failed to speak favorably of the sociological work of the Colorado Fuel & Iron Co. while condemning unsparingly the alleged restriction of personal liberty by that corporation; nevertheless we are sure that up to the present no one has done that hospital work its due meed of justice. It may be added that even J. L. Lawson, the agitator of the United Mine Workers of America, admitted on the stand that the Fuel Co. had a "good hospital."

The three-day inquiry of the Industrial Relations Commission was partly devoted to the task of finding out what Mr. Rockefeller did not know about the affairs of the Colorado Fuel & Iron Co. and in besmirching him with insinuations which he could not meet and defend, so little did he know about the matters in question. It did not serve, we fear, any good end and was purposed only to add luster to F. P. Walsh's dubious laurels. It is not every self-advertising agitator who has such a glorious opportunity to heckle a leading financier.

If he really wished to know about the Fuel Co. he should have asked J. F. Welborn in Denver, and he could have obtained the truth from him. The public is disposed to believe that what Mr. Rockefeller did not say for himself and for the corporation in which he is interested cannot be said. That this is not true, a few succeeding articles in Coal Age will abundantly prove.

The purpose of the present article is to describe the extensive hospital of the Colorado Fuel & Iron Co., situated on Minnequa Lake, just south of Pueblo. This hospital treats both mining and steel-works cases. It is situated outside the coal fields, but is more convenient of access than if it were located at any one of the many coal-mining centers of the company which are situated in no less than six counties—Las Animas, Huerfano, Pitkin, Gunnison, Fremont and Garfield.

The pioneer hospital was one-half of a double frame dwelling, the scantiest kind of an attempt to meet the needs of the situation. Later the whole building was used, but in November, 1883, a new hospital on Abriendo Ave., Pueblo, was completed and occupied, and to the company's medical advisers the new quarters appeared palatial. At first there were accommodations for 85 patients and later room was made for 40 more, but by 1900 these quarters were found too restricted, and the ideas of the company had developed so that the officers were no longer satisfied with the accommodations.

AT PLAY
TUBERCULAR COTTAGE
MISSION GATE ENTRANCE TO HOSPITAL GROUNDS
A COURT
ENTRANCE
TWELVE YEAR OLD HOSPITAL FOREST

Some of the Exterior Views Showing Sylvan Surroundings with the Steel Works Not Far Distant

The Minnequa Hospital

It was decided therefore to build a fine hospital at Minnequa, where 20 acres of land were purchased, which has in the few years intervening become a forest.

It is not necessary to describe the hospital in full, for the pictures show how adequate it is for every requirement. It should be noted that it is practically only two stories high, so that it is exceedingly safe in case of fire. Furthermore every room fronts on the outside of the building. There are both X-ray and pathological laboratories. The former has a Scheidel-Western interrupterless X-ray coil with all accessories for doing the fastest and most deep-seated work. At the time of its installation it was the only machine of like capacity in southern Colorado and may yet be unexcelled.

The floor, ceiling and three of the walls of the operating room form a continuous sheet of lead, which reflects none of that cross light which is so annoying to the surgeon. The material is also waterproof, nonabsorbent and crackless; thus it offers no refuge for germs and no place which cannot be thoroughly cleaned. The floor is noiseless and not slippery. The fourth wall, which faces the north, is entirely occupied by a large sheet of plate glass, through which the room is lighted.

INDIAN SUN-PARLOUR
WHERE BABIES ARE BATHED AND WEIGHED DAILY
TYPICAL BED-ROOM
CONTENTED YOUNG AMERICANS

Where in Quiet and Sunlight Human Repairs Are Effected

The room in which anaesthetics are administered is painted in green and decorated with pictures and frames in sepia and other browns—colors which psychologists say are least irritating to sufferers. The curtains are white. A sensitive or nervous patient is especially affected by unpleasant surroundings, hence the less disagreeable and shocking the environment, the more a patient is likely to take an anaesthetic without resistance. A struggle involves loss of strength, which, of course, is detrimental to the patient during and after an operation.

So, to avoid unpleasant thoughts, the patient is allowed to see no instruments, no preparation for operation, no doctors, nor nurses in operative regalia, and to hear no sounds suggestive of operation. The anaesthetic is given by a specialist, assisted by a nurse who accompanies the patient from the ward. The subject is unconscious when removed to the operating room.

No Stairs in the Hospital

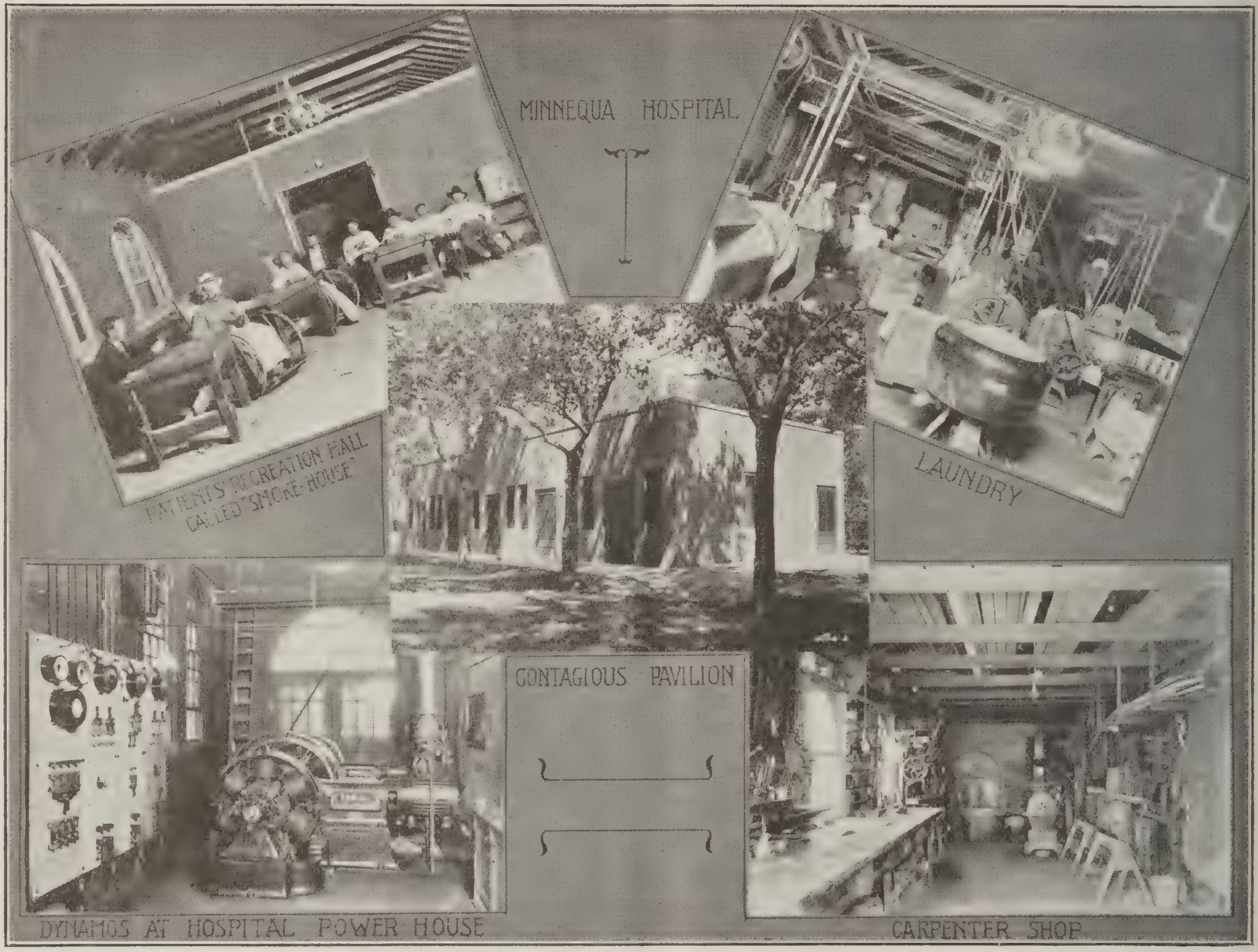
Another excellent feature is the fact that there are no stairs in the hospital. As Doctor Corwin states in his report, any given tread and rise in a stairway are suited to patients of a certain strength and height and ill suited to all others. They are never desirable for the travel of cripples and children and are never really safe.

Of course, an elevator is an excellent convenience, but it is inadequate in a fire. As the Minnequa hospital is only two stories high, it is possible to use slopes or ramps leading from the ground floor to the story above. Up and down these inclines the wheeled chairs and beds on rollers can be pushed with ease.

In 1913 a contagious-diseases ward was added. In the building pleasantly termed the Casa Vivienda, the doctors and nurses live in most comfortable quarters and here lectures are given to the latter. Laura A. Beecroft who graduated at the West Penn Hospital in Pennsylvania is matron.

THE NURSES' SCHOOL

These nurses take a three-year course. During the junior year they study anatomy, nursing, materia medica, bacteriology and medicine. The second or intermediate year they are taught anatomy, nursing, bacteriology, dietetics, materia medica, bandaging, nursing ethics and medicine. The senior year embraces the study of clinics, anatomy, obstetrics, bandaging, surgical technique and materia medica, and lectures are given on hygiene, gynecology, eye, ear, nose, throat and nervous diseases. The course includes three months' obstetric experience in a Chicago hospital.


MINNEQUA HOSPITAL
PATIENTS' RECREATION HALL CALLED "SMOKE-HOUSE"
LAUNDRY
CONTAGIOUS PAVILION
DYNAMOS AT HOSPITAL POWER HOUSE
CARPENTER SHOP

THE HOSPITAL HAS AN EXTENSIVE EQUIPMENT AS WELL AS EVERY COMFORT

The operating table in the obstetric ward is cleverly arranged with wheels that can be raised or lowered so that there is no need to remove the patient to a litter but the table itself can be transported to the bedside, thus saving unnecessary lifting.

Each department is handled by experts. Dr. R. W. Corwin, the chief surgeon, attends all cases requiring the surgical care of the abdominal and pelvic regions. Dr. William Senger attends diseases demanding medical treatment and those needing surgical treatment of the head and neck. Obstetrics and surgery of the chest and extremities fall to Dr. Bon O. Adams. Diseases of the chest and the administration of anaesthetics are apportioned to Dr. R. H. Finney. Diseases of eye, ear, nose and throat are tended by Dr. J. J. Pattee. Dr. Josephine M. Dunlop is the pathologist. Dr. Philip Work acts as interne. Henri T. Mershon is the radiologist.

POLYGLOT HEALTH BULLETINS

Doctor Corwin issues a monthly bulletin on sanitary and sociological subjects. In September, 1914, it was about the health of infants; in October and November, about that of children. In December it discussed in plain terms the health of school children and the dangers of germs. These bulletins are translated into Polish, Spanish and Italian and being in the simplest of language cannot fail to convey their message of safe and sane living.

Subjects treated include alcoholism in infants, the crime of feeding children with all kinds of indigestible materials, the dangers of decayed and uncleaned teeth and the continual menace to which school children are exposed, if proper precautions are not taken, when drinking, eating and playing together.

Colorado has a healthful climate but as a result it is full of sickly people who come from other climes to recover their depleted strength. Consequently there is need for residents to be at least as careful to avoid exposing themselves to disease as in other states where climatic conditions are more trying to the afflicted.

As will be seen in the illustrations, the hospital has its own farm thus securing to the patients uncontaminated that part of the dietary which is most necessary for their well-being. Other pictures of the hospital will be published in an early issue.

THE MINNEQUA HOSPITAL FARM

Panama-Pacific Exposition First-Aid Meet

It was decided at the Terre Haute, Ind., meeting of the American Mine-Safety Association last year that the Third National Contest should be held at Pittsburgh in connection with the Second National Mine-Safety Demonstration. It will be remembered that the first demonstration, held Oct. 31, 1911, was practically the parent of the association. W. H. Taft, then President, W. L. Fisher, then Secretary of the Interior, and many other notables were present.

The second demonstration, however, was to be held as part of the dedication of the new Bureau of Mines buildings at Pittsburgh. Seeing that these will not be ready for dedication or occupancy till 1916, the demonstration must be delayed, so the advantage in holding the association meeting in Pittsburgh in 1915 is no longer apparent, especially as it is inadvisable to choose any one place for two consecutive years.

The Second Mine-Safety Demonstration will be at least as important as the first, as it is intended that the date shall be arranged so that the President and other important Government officials can attend as in 1911.

In consequence of the facts mentioned the secretary of the American Mine Safety Association, H. M. Wilson, engineer-in-charge of the work of the Bureau of Mines in Pittsburgh, invites suggestions as to the proper provisions to be adopted. He suggests that the meeting might be held in Ishpeming, Mich., or in Fairmont, W. Va., or possibly in Knoxville, Tenn. In the latter place it would be combined appropriately with the Annual Southern Interstate Contest. There are other places also where annual contests are held and these might well be considered as possible places for the Association's meet.

He also suggests that it might be well to consider the possibility of regarding the Panama-Pacific Field Meet as the Association's regular event. As this is so far in the West it is probable that only a few Eastern teams will compete. It is feared therefore that the event could hardly be regarded as national.

With the letter in which the above statements are made and suggestions invited is one also from Mr. Wilson asking for entrants for the meet at San Francisco, Sept. 23 and 24, and one from J. A. Holmes, director of the Bureau of Mines, requesting suggestions as to that contest.

It is proposed that the first day be devoted to a demonstration of skill. All who enter will be given souvenir banners, badges or other mementos. All teams will be rated by the judges but the two in any state which receive the highest award shall be eligible to compete on the second day for interstate supremacy and the award of prizes.

All teams are invited to enter. Each team will have to pay its own charges for traveling and maintenance, but there will be no entrance fees. It is expected that each team will provide its own rescue and first-aid equipment, though, on advance request, the Bureau of Mines may lend its artificial breathing apparatus. The Bureau is anxious to be of service and to aid in the instruction of teams desiring to enter. It invites suggestions of all kinds as to the conduct of the meet.

The contest at San Francisco will give the participants an enlarged sense of the value and importance of the great work in which they are engaged and stimulate not only the competing teams but those which have failed in the elimination contests for they will realize what a slightly greater proficiency in training might have won for them.

A Thought on the War

Charles Wagner in "Justice" strikes a happy note when he says the following:

"Along the ponderous lines of march of hostile armies ready for the shock of battle, among engines of war unknown to the ancients, I distinguish something still more foreign to them. It is a red cross, the common emblem of whole corps of doctors, guards and nurses, with the paraphernalia of their calling.

"Tomorrow, when war has done its work, and even in the thick of the fight, these people will rescue the wounded, bind up their wounds, watch over them, without asking to what country they belong. They will be doing the fine and simple deed that Christ immortalized in the parable of the Good Samaritan.

"As I look at them I think—this thing will kill the other. The sentiment which leads you to run to each other's aid, even under a rain of bullets, will some day be stronger than all the reasons put together that draw you into this inhuman warfare.

"The red cross will triumph over the cannon.

"The future belongs to the nurse, to the little gray sister, to all helpful powers, however humble; for two allies are theirs—suffering humanity and the merciful God."

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 30—In the discussion of needed mine legislation there is no more important subject than the relation of the mine foreman to the state and state law in which the mine is located over which he has charge.

Attention has been drawn many times to the difficult position occupied by mine foremen and the suggestion has been made previously, Coal Age, Vol. 5, p. 899, that, in justice to a large number of this class of faithful and conscientious men, who are often placed in difficult situations by the requirements of the law, the mine foreman should be a state official, acting under the supervision and by the direction of the mine inspector of the district or state in which his mine is located. Such a provision of the state mining law may possess some legal difficulties; but these certainly cannot be greater than what exists at the present time. Reference was made to this condition by quotations cited from the bituminous law of Pennsylvania, in the letter to which I have just referred.

Anyone familiar with the situation knows that a large portion of the mine foreman's time is commanded by the Department of Mines or the state mine inspector, compelling him to see that the provisions of the mining law are strictly obeyed. On the other hand, the mine foreman is an employee of the company or operator of the mine, who demand his entire energy in maintaining the daily output of the mine at its full capacity. The foreman is, in fact, a "coal-getter" in the sight of his employer, but a safety inspector in the eyes of the law.

This condition and unfortunate position of the mine foreman have been well described in Letter No. 25, Coal Age, Jan. 30, p. 217, where the mine foreman is referred to as a "bumping block" between the inspector and the company. I believe safety in mines requires that the mine foreman should be placed on an equal basis with the district mine inspector if he is to be held responsible for the operation of the mine in compliance with mining laws. Such a provision would enable him to see that the law is carried out, without subjecting him to the danger of the loss of his position, as is the case under the present existing conditions.

It frequently happens that some of the most vital requirements of the mining law conflict with a company's policy or established methods in the operation of the mine; and this, naturally, places the mine foreman in an awkward position. His desire to please his employer often brings him into conflict with the law. No argument is required to convince one that there is, as stated in Letter No. 25, a "bad kink" in the mining law in this respect. If the purpose of the law is to insure the greatest safety in mining and reduce the number of mine accidents, why not remove the mine foreman from the unfortunate position in which he is placed by the requirements of the law and enable him to act freely as his judgment and knowledge dictate? To overcome the difficulty presented by the compensation of the foreman by the state, the law might require the coal operator to pay into the state treasury a sum of equal value.

In order to still further secure the position of mine foreman, in respect to the correctness of his judgment in the operation of the mine, the law should provide that the mine foreman shall be given a fair trial before removal from office, by an executive board composed of at least two district mine inspectors and one member of the operating company. In my estimation, this would be a just and practical way of removing the present intimidation under which the mine foreman is obliged to act at the present time

Philip M. Weigle.

Hooversville, Penn.

Letter No. 31—The discussion in Coal Age of what is needed to improve the present mining laws in different states calls to mind a very interesting problem that is now before the courts and the Pennsylvania state legislature as to the eligibility of certain applicants for mine foreman's certificates. According to the anthracite mine law, in order to obtain a mine foreman's certificate, the applicant must not only be able to pass the required examination, but must also give "satisfactory evidence of at least five years' practical experience as a miner." The question is now being fought out in the Pennsylvania courts, What is to be understood by the words "practical experience as a miner"? Does the law necessarily require a candidate for a mine foreman's certificate to spend five years in the actual blasting and loading of coal at the face; or may it mean that time spent in the mines, following the different lines of work necessary to the operation of a colliery?

Judge McCarrol, presiding over the Dauphin County court, recently handed down a decision in favor of the latter version; but an appeal has been made from his decision and the question will probably be carried to a higher court.

There is now a bill before the legislature introduced by Hon. A. B. Garner of Schuylkill County, to change the reading of this law, so as to make its meaning more definite if it is required that a man must actually mine coal for five years in order to become eligible for a mine foreman's certificate.

The question may well be asked, however, Is it necessary that a man should spend five years at the face blasting coal, in order to become a competent mine foreman? Let us look at the question from both sides and, to illustrate, take the careers of two young men working in an anthracite colliery.

Both of these young men, we will say, start in the breaker picking slate, but soon get jobs inside the mine tending doors or switches or spragging cars at the bottom of the shaft or slope. Later, following the ambition of most boys in mines, they will probably be found driving mules. From this point their careers may diverge: "A" having grown big and strong gets a job laboring for a miner in a gangway or breast. If in a gangway or flat breast, his principal duties for a time will be loading the cars and helping the miner to stand timber. After a while he is given a breast auger and starts drilling holes for blasting, working under the supervision of the miner, who prepares the charge and loads the hole.

After two years of this work, "A" is entitled to and obtains a miner's certificate. For three years longer, he works a gangway or breast as a miner, with one or more laborers to help him. During all this time his work has been strictly at the face and he has become very proficient in the shooting of coal and in standing timber. If the mine is a gaseous one and all of his section is on safety lamps he, of course, becomes familiar with the construction and use of the lamp. If he is observing he learns from the fireboss and the more experienced miners the manner of detecting and handling gas. If he is studious and ambitious, he studies in his spare time and takes the examination and is granted a certificate which qualifies him to take a position as fireboss, and later he becomes mine foreman.

Now, let us see what "B" has been doing all these years. Instead of getting a job of laboring for a miner, after driving mules, he works as a company man on repairs. He is put to work with one or two men who have been employed, possibly for several years, laying and repairing track, putting in switches, building and repairing brattices, batteries and stoppings. He is often called to assist in putting a derailed car or trip back on the track or to replace a set of timber that has been knocked out. The fireboss may call him to help run a brattice to the face of a gangway or breast where there is an accumulation of gas. Sometimes a pump runner is out and the foreman calls on him to take the man's place.

Thus, "B's" experiences are many and varied although he has never blasted a pound of coal; but he too is ambitious and observing. While repairing track or putting up brattice at a working face, he has learned how the miner makes his cut, places his holes, prepares the powder and loads, tamps and shoots the hole. In building stoppings and carrying brattice, he has learned the methods of ventilation and become familiar with the construction and use of the safety lamp. When assisting the fireboss he has noted the cap on the lamp when it is taken into gas, and observed the flame that is produced by a greater percentage of the gas, and has learned how to handle the lamp under these conditions. He has been taught how to carry off the gas without endangering the lives of the workmen. He is often called to go into old workings to lift track or draw timber and learns by experience the danger of blackdamp. The repairman is often sent to assist the engineers in making surveys. When laying track at the foot of a slope or on a plane, he sees the importance of the use of a blueprint or plan. He thus comes in touch constantly with important phases in mining that the man who spends all his time at the face never sees. He is called on to assist in the work of laying steam and water pipes to and from the pumps.

In short, there is scarcely any work necessary in the mining of anthracite coal with which "B" does not come in contact, sooner or later. While he has had less experience than "A" in the handling of explosives, the shooting of coal, the dressing of a face and setting timber, in all other essentials of mining he has had as much experience or more. Provided, then, that each of these men passes the required examination satisfactorily, is not one just as much entitled to a certificate as the other?

Geo. D. Evans.

Pittsburgh, Penn.

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Longwall in the Pittsburgh Seam

I notice, in the excellent account given of the last meeting of the Coal Mining Institute of America, held at Pittsburgh, Dec. 8, 1914, that W. Seddon opened the discussion of the question: "Is the Longwall System Applicable to the Pittsburgh Seam of Coal?" It is stated, Coal Age, Dec. 19, p. 986, that S. A. Taylor followed Mr. Seddon and pointed out the lack of adaptation of the longwall system of mining to this seam, known in Ohio as the "No. 8 seam." Mr. Taylor is reported as saying that "the roof breaks up too high, sometimes as much as 20 ft.; and the bottom is too soft."

I fail to understand how this reference of Mr. Taylor's applies to the discussion of the longwall system of mining, since success or failure in longwall is not a question of the roof breaking high, but rather a uniform settlement of the overburden on the packwall and the waste of the seam. I would suggest that the longwall system, properly applied, avoids the "high breaks" that would occur in other systems of mining. The matter of chief concern in longwall work is that the roof strata immediately above the coal are not too frail, so as to permit the weight of the overburden to be thrown forward on the face sufficiently to break down the coal and, at the same time, keep the face open for work.

Neither does the fact that the bottom is "too soft" apply so much to longwall work as it does to room-and-pillar work; because, in the former case, the roof pressure is distributed uniformly over a greater area, while in the latter the weight resting on the pillars often causes a soft bottom to heave and obstruct the roadways, thereby causing much annoyance and expense. This condition is very largely eliminated in the longwall method when the packwalls are properly built and there is sufficient waste material. Moreover, there are in the longwall method less roadways to maintain and more space is available for storing the waste.

I would remind those gentlemen whose remarks did not favor the adoption of longwall in the working of coal in the Pittsburgh measures that many of the deepest shafts in the world are worked longwall. From one to three years were required to sink these shafts, which are equipped with the most uptodate machinery at great expense. The longwall system of mining has been generally adopted in these cases, because it means a more complete extraction of the coal, at a lower cost.

It is quite common for men not acquainted thoroughly with the principles and practice of the longwall system of mining to object to its adoption in their mines, preferring to use the old methods with which they are familiar. Some years ago, the Youghiogheny & Ohio Coal Co., in eastern Ohio, held monthly meetings. At one of these meetings, the longwall system was discussed by the men present, and it was remarkable to hear the numerous objections raised to this method, by men who were unfamiliar with its working. One of the superintendents said that "the roof would not stand"; another said that they "could not get the coal out of the rooms which were 200 ft. deep"; another asked, "How would it be possible to ventilate the workings on the longwall plan?" Many of these questions showed that the men were not familiar with the principles of longwall.

I believe that the conditions in eastern Ohio are as favorable for longwall work as could be desired. When one considers the expense of working a block of coal, say 400x800 ft. on the room-and-pillar plan; driving, say 50 rooms on 32-ft. centers a distance of 200 ft.; and sums up what must be paid for yardage in turning rooms and driving breakthroughs between them; and takes into account, besides the delay and cost of taking the machines from room to room to cut the coal, the laying of tracks in the rooms and switches on the entries and other expenses such as the increased cost of gathering the coal at the face, to say nothing of the large percentage of pillar coal lost beyond recovery, even the most skeptical must allow that the longwall system presents advantages not possessed by any other method of mining.

For example, contrast the conditions just mentioned with the fact that the longwall method permits the entire extraction of the coal with a large reduction of expense for maintenance of roads, timbering and ventilation, besides reducing the number of drivers and mules required and the mining of the coal in better shape, generally, with less loss in fine coal and dust. In my experience, one or two mules for an output of 500 or 600 tons in longwall work would compare favorably with seven or eight mules for the same output of coal in the room-and-pillar system of mining.

The extra expense for the building of packwalls in longwall work is more than compensated for by the reduction in other expenses that I have mentioned. It would be necessary in adopting this method to form a new scale for machine men and loaders, since this work would not be as difficult or consume the time that would be required in room-and-pillar work. I would suggest, in closing, that the adoption of the longwall system of mining coal, in eastern Ohio, might prove the solution of the present strike difficulty in that state.

G. R. Waddell.

Moundsville, W. Va.

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The Mine Superintendent

Letter No. 1—The foreword, Coal Age, Nov. 21, p. 815, arrested my attention; I read the same with great interest and care. It is the story of a superintendent of a coal mine who, in an attempt to bridge over the market conditions that were seriously embarrassing his manager, proposed to reduce the cost-sheet by temporarily cutting out the yardage account for driving new entries.

He very generously suggested to the manager that he could recover this by double-shifting the entries at a later time when market conditions were improved. When this improvement came, however, the demand for coal found the mine superintendent unable to bring the daily output up to the desired point; and for this he was severely censured by the mine manager, who laid the entire blame for the shortage on the superintendent's shoulders.

Assuming that this is a supposed case, I fail to find any justification for the implied suggestion that the results called for the superintendent's resignation. In any judicial case, where a second person is privy to a deal, he is held equally guilty with the first party. I would suggest that, in the present instance, the manager had every confidence in his superintendent, and together they agreed on a plan that would reduce the cost of producing coal. Both were alike responsible for the results. It may be assumed that the manager was afraid that the outcome would cast a shadow on his reputation and fearful of being criticized for an error of judgment, he laid the whole blame on his superintendent. However, no man with red blood in his veins would do this, but he would share the responsibility with his superintendent.

This superintendent, with a heart as big as a pit wagon, with neither malice nor prejudice, and loyal to his manager as Damon to Pythias, was purely the victim of circumstances. The unfortunate conditions that resulted in the superintendent's downfall might have been avoided, possibly by a modification of the system of mining, with a view to reducing the price paid for narrow work. Or, perhaps, the selling price of the coal might have been advanced by improving the quality of the output; or by producing a greater percentage of lump coal that would bring a higher price, by using a different powder for blasting or by a different system of mining the coal.

However, with great generosity, he suggested a method by which he assumed the entire burden of the condition prevailing in the market. I am forced to the conclusion that the manager had two codes of ethics, one of which he applied in his dealing with the superintendent, while he employed the other in all transactions with his board of directors or stockholders. I agree fully with the moral suggested in Coal Age, namely: "It is easy to overrun a credit account." But I am convinced that the *manager* and not the *superintendent* was the guilty party in this respect.

The story teaches that extreme economy is neither wise nor prudent, and any false measures employed to tide over a depressed condition are always expensive in the end. It would have been better for this condition to have been met by the manager making arrangements for deferred payments on interest-bearing debts, or in some similar way, as the trouble arose from a depressed market condition for which the operation of the mine was not responsible.

R. Z. Virgin, Supt.,
West Virginia-Pittsburgh Coal Co.

Colliers, W. Va.

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Effect of Head on Motor in Pumping

Referring to the inquiry of Richard Todhunter, asking what will be the effect on the motor driving a centrifugal pump if the discharge head is reduced from 150 ft. to 75 ft. while the motor is operated at the same speed, Coal Age, Jan. 23, p. 178, permit me to say that I think the pump engineers are in error when they claim that "the motive power is considerably overloaded" owing to a large quantity of water passing through the pump when the latter is discharging under a reduced head.

In the assumed case, the pump motor has a constant speed, which means that this motor is shunt-wound. If the head under which the pump discharged were to be increased from 150 ft. to 300 ft. I would say that the motor would become overheated and burn out under the increased load; but, in the present case, when the discharge head is decreased from 150 ft. to 75 ft. and the load on the motor reduced thereby it would be impossible for the machine to be overloaded. Under the reduced head, the amount of water pumped will undoubtedly be greater than before; but the rate of increase in quantity is not as great as the rate of decrease in head; and, as a consequence, there is a decrease of load and the motor will perform its work more easily than before.

For the sake of illustration, let us estimate the power required to operate the pump—first, under a head of 150 ft. and then under a head of 75 ft., assuming a general efficiency of, say 65 per cent. in each case. The size of the pump not being given, I will assume that it is capable of producing a velocity of 400 ft. per min. in the column pipe under a head of 150 ft., which gives

$$G = \frac{0.7854 \times 4^2 \times 400 \times 12}{231} = say\ 260\ gal.\ per\ min.$$

We may assume that, under this head, there is a slippage of, say 15 per cent. Then, 260 gal. per min. is 85 per cent. of the theoretical discharge of the pump, which is therefore 260 ÷ 0.85 = say 300 gal. per min.

The loss by slippage in the pump will vary directly as the square root of the head, which would make the loss when the head is reduced one-half $\sqrt{0.5} = 0.7$ of the loss in the first case. The loss in the first case was 300 — 260 = 40 gal. per min.; and, in the second case, it is 40 × 0.7 = 28 gal. per min. This makes the discharge under the reduced head, 300 — 28 = 272 gal. per min., as compared with 260 gal. per min. under the full head of 150 ft.

Now, estimating the power required to operate the pump in these two cases, we find,

First case, $H = 0.00034 \times 260 \times 150 =$ say 13 hp.
Second case, $H = 0.00034 \times 272 \times 75 =$ say 7 hp.

Electrically, assuming a line voltage of 220 volts, the current consumption in each case would be, since 1 hp. = 746 watts,

First case, 746 × 13 ÷ 220 = 44 amp.
Second case, 746 × 7 ÷ 220 = 24 amp., nearly.

I think this illustration, showing as it does a lower power consumption under the reduced head, should prove that a shunt-wound motor having a constant speed could not be overloaded by reducing the head of discharge.

H. D. ROBERTS,
Mine Foreman.

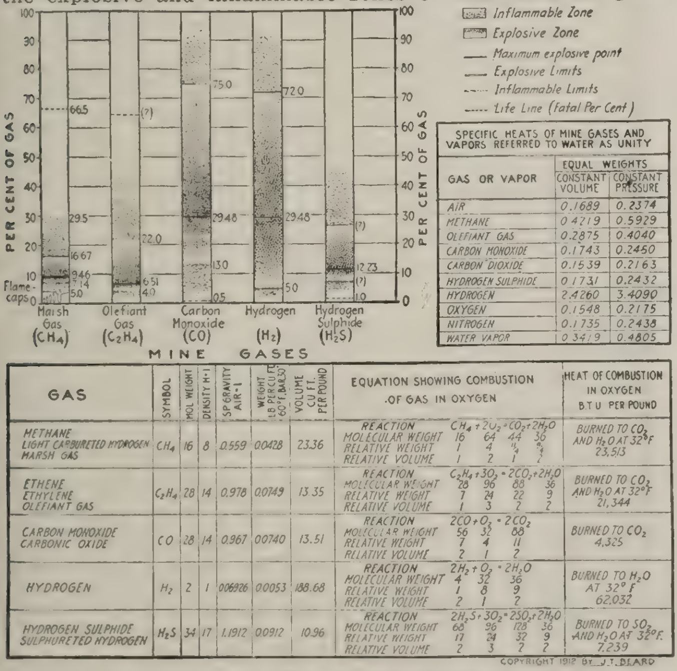
Rock Forge, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Explosive Mine Gases—The diagram given below combines, in a compact form, most of the important reactions and data, relating to the combustion and explosion of those mine gases that form explosive mixtures with air. In the upper left-hand corner is a graphic illustration of the relative extent of the explosive and inflammable zones of each of these gases when mixed with air. The horizontal lines, in each gas column, mark, approximately, the maximum explosive point and the lower and upper explosive and inflammable limits; also the fatal percentage is indicated by the dotted lines. These marks are explained by the legend in the upper right-hand corner. The specific heats are given for equal weights of the gases, for constant volume and constant pressure, referred to water as unity.



SPECIFIC HEATS OF MINE GASES AND VAPORS REFERRED TO WATER AS UNITY

GAS OR VAPOR	EQUAL WEIGHTS	
	CONSTANT VOLUME	CONSTANT PRESSURE
AIR	0.1689	0.2374
METHANE	0.4219	0.5929
OLEFIANT GAS	0.2875	0.4040
CARBON MONOXIDE	0.1743	0.2450
CARBON DIOXIDE	0.1539	0.2163
HYDROGEN SULPHIDE	0.1731	0.2432
HYDROGEN	2.4260	3.4090
OXYGEN	0.1548	0.2175
NITROGEN	0.1735	0.2438
WATER VAPOR	0.3419	0.4805

GAS	SYMBOL	MOL WEIGHT	DENSITY H=1	SP GRAVITY AIR=1	WEIGHT LB PER CU FT 60°F, BAR 30"	VOLUME CU FT. PER POUND	EQUATION SHOWING COMBUSTION OF GAS IN OXYGEN	HEAT OF COMBUSTION IN OXYGEN B.T.U. PER POUND
METHANE LIGHT CARBURETED HYDROGEN MARSH GAS	CH_4	16	8	0.559	0.0428	23.36	REACTION $CH_4 + 2O_2 = CO_2 + 2H_2O$ MOLECULAR WEIGHT 16 64 44 36 RELATIVE WEIGHT 1 4 $\frac{11}{4}$ $\frac{9}{4}$ RELATIVE VOLUME 1 2 1 2	BURNED TO CO_2 AND H_2O AT 32°F 23,513
ETHENE ETHYLENE OLEFIANT GAS	C_2H_4	28	14	0.978	0.0749	13.35	REACTION $C_2H_4 + 3O_2 = 2CO_2 + 2H_2O$ MOLECULAR WEIGHT 28 96 88 36 RELATIVE WEIGHT 7 24 22 9 RELATIVE VOLUME 1 3 2 2	BURNED TO CO_2 AND H_2O AT 32°F 21,344
CARBON MONOXIDE CARBONIC OXIDE	CO	28	14	0.967	0.0740	13.51	REACTION $2CO + O_2 = 2CO_2$ MOLECULAR WEIGHT 56 32 88 RELATIVE WEIGHT 7 4 11 RELATIVE VOLUME 2 1 2	BURNED TO CO_2 4,325
HYDROGEN	H_2	2	1	0.06926	0.0053	188.68	REACTION $2H_2 + O_2 = 2H_2O$ MOLECULAR WEIGHT 4 32 36 RELATIVE WEIGHT 1 8 9 RELATIVE VOLUME 2 1 2	BURNED TO H_2O AT 32° F 62,032
HYDROGEN SULPHIDE SULPHURETED HYDROGEN	H_2S	34	17	1.1912	0.0912	10.96	REACTION $2H_2S + 3O_2 = 2SO_2 + 2H_2O$ MOLECULAR WEIGHT 68 96 128 36 RELATIVE WEIGHT 17 24 32 9 RELATIVE VOLUME 2 3 2 2	BURNED TO SO_2 AND H_2O AT 32°F. 7,239

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DIAGRAM OF EXPLOSIVE MINE GASES

The Coal Age Pocket Book

Diagram of Testing Lamps—The diagram given below is of interest in connection with the testing for gas with different types of safety lamps burning hydrogen, alcohol, naphtha or a nonvolatile oil. In the upper right-hand corner are given the heights of flame cap or elongation of flame caused by different percentages of methane or marsh gas present in the mine air. The presence of other gases or dust will, of course, modify the results, as has been previously explained. The effect of carbon dioxide is to diminish the length of the flame and destroy the cap. On the other hand, carbon monoxide and dust lengthen the flame and assist the formation of the cap.

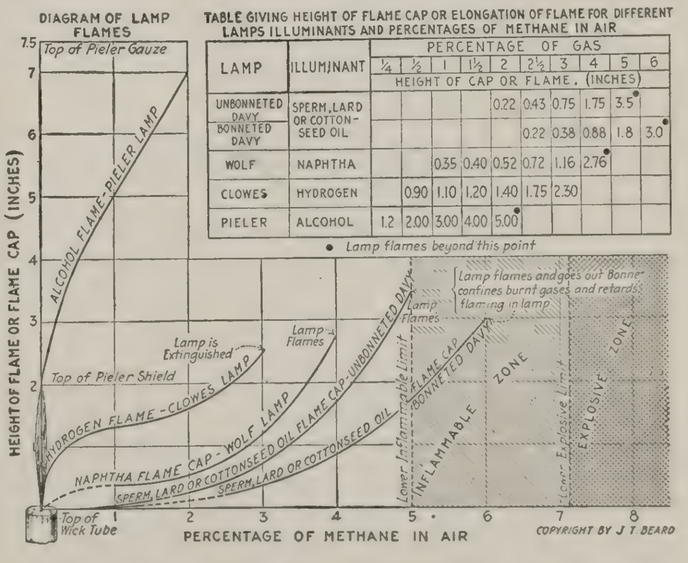

TABLE GIVING HEIGHT OF FLAME CAP OR ELONGATION OF FLAME FOR DIFFERENT LAMPS ILLUMINANTS AND PERCENTAGES OF METHANE IN AIR

LAMP	ILLUMINANT	PERCENTAGE OF GAS									
		¼	½	1	1½	2	2½	3	4	5	6
		HEIGHT OF CAP OR FLAME. (INCHES)									
UNBONNETED DAVY	SPERM, LARD OR COTTON-SEED OIL					0.22	0.43	0.75	1.75	3.5●	
BONNETED DAVY							0.22	0.38	0.88	1.8	3.0●
WOLF	NAPHTHA			0.35	0.40	0.52	0.72	1.16	2.76●		
CLOWES	HYDROGEN		0.90	1.10	1.20	1.40	1.75	2.30			
PIELER	ALCOHOL	1.2	2.00	3.00	4.00	5.00●					

● Lamp flames beyond this point

DIAGRAM OF FLAME CAPS IN TESTING FOR GAS

The heights of flame cap given for the Davy and Wolf lamps are the minimum caps, produced by drawing down the flame to its lowest point. The heights given for the Clowes-hydrogen lamp and the Pieler (alcohol) lamp are for the elongation of the flame due to the gas. The original flame of the Clowes lamp is 0.3 in., while the flame of the Pieler is adjusted so that its tip reaches the top of the shield at a height of 2 in., as marked in the diagram.

Inquiries of General Interest

Safety-First Bulletin

Kindly give the name of the bulletin or paper issued by the Safety-First Organization, which was recently organized in the United States. I have made some inquiries and learn that such a bulletin is published, but I have been unable thus far to discover the name of the paper or where it may be obtained. I understand, also, that the Welfare Department of the U. S. Steel Corporation issues a paper of the same character.

INQUIRER.

Washington, Penn.

There are several publications of this nature issued by different corporations and interests. A bulletin entitled "Safety" is published monthly by the American Museum of Safety, 29 West 39th St., New York City. This bulletin is free to members, but a charge of 15c. per copy is made to others desiring the same.

A publication entitled "Safety Engineering," but known popularly as the "Magazine of Safety," is published by the Safety Press, Inc., 80 Maiden Lane, New York City.

Another publication entitled "Human Engineer" is edited by Winthrop Talbot, M. D., and sold at 25c. per copy, or $1 per year. Address the Human Engineering Co., Sta. B, Cleveland, Ohio.

The U. S. Steel Corporation publishes from time to time a safety bulletin entitled "Standard Requirements for Safety." We understand that this bulletin is issued by the corporation in the interest of its employees, with the purpose in view of increasing their knowledge and appreciation of what is required to secure the greatest degree of safety in the performance of their work. There is, naturally, a limited supply of this publication. It is issued by the Committee on Safety and Welfare, of which C. L. Close, 71 Broadway, New York City, is chairman.

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Permissible Mine Lamps

Will you kindly publish in the columns of COAL AGE, as early as possible, a list of the different types of safety lamps and electric lamps that have been approved by the Federal Bureau of Mines for use in coal mines.

INQUIRER.

Dubois, Penn.

The above inquiry was submitted to the Bureau of Mines at Pittsburgh, and the following reply has been received from J. W. Paul, mining engineer in charge of mine-rescue work and appliances, for the bureau. Mr. Paul states as follows:

"In reply to your letter of Feb. 1, permit me to say that the bureau has not as yet established a list of safety lamps approved for use in gaseous mines; but there is now in the hands of the printer a schedule of tests that will be made by the bureau for the purpose of establishing such a list. When this has been printed, which should be within a couple of weeks, copies will be sent to the various lamp manufacturers inviting them to submit lamps for test for determining their permissibility. The tests heretofore conducted on safety lamps were made at the instance of the chief of the Department of Mines of Pennsylvania for his information in approving the lamps for use in the bituminous mines of that state.

"As for portable electric mine lamps, the bureau, about a year ago, adopted a schedule of tests for establishing a list of permissible lamps; and so far has approved three lamps, the Hirsch, Ceag and Wico, as being safe for use in gaseous mines."

J. W. PAUL, Mining Engineer,
Bureau of Mines.

Pittsburgh, Penn.

⁂

Extracting Pillars by Machines

Kindly explain the method in use of extracting pillars by machines in coal mining, assuming that the conditions in the seam are favorable to the use of machines.

MINE FOREMAN.

Pittsburgh, Penn.

In extracting pillars by machines, two general plans adapted to different conditions of roof and floor are employed. Where the roof affords sufficient support, the rooms are driven up the usual width of 7 or 8 yd. When this is done, a cut is taken through the pillar at the face, with the machine. This cut is made the same width as the rooms. Having cut through the pillar at the face, a stump 5 or 8 ft. wide is left and another cut made with the machine through the pillar the same width as before. In making these cuts, the coal is loaded out as it is mined, after which the stump 5 or 8 ft. wide is removed with a pick and that coal loaded out. A third cut is then taken through the pillar, the same width as before, leaving a stump 5 or 8 ft. wide, which is removed with the pick after the coal cut by the machine has been loaded out. This process is continued until the entire pillar is removed back to the entry stumps.

Under less favorable conditions of roof and floor, the rooms are driven up narrow, say 4 or 5 yd. in width, leaving pillars between them varying from 10 or 20 yd. to 100 yd. in width. When the rooms have reached the limit, a cut 4 or 5 yd. wide is made with the machine through the pillar at the face; and this being done, the pillar is worked back on the retreating plan, by undercutting the coal with the machine across the entire width of the pillar, and loading out the coal as it falls. In this method one or two rows of posts are set parallel to the face, leaving room only for the machine to work. As each successive cut is made across the pillar and the coal loaded out, a new row of posts is set, after which the row in the rear is drawn, allowing the roof to fall. In this manner, the entire pillar is worked back to the entry stumps.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—Describe the following methods of haulage: Self-acting incline or gravity plane; electric-motor haulage; rope haulage on slopes; endless-rope haulage and main-and-tail-rope haulage. State where and to what conditions each is best adapted.

Ans.—In a self-acting incline or gravity plane, the arrangement permits the descending loaded car to haul the empty car up the incline. These two cars are connected by a rope that passes over a drum or sheave at the head of the incline, and the movement of the cars is regulated by a brake on the drum.

Electric-motor haulage, as its name implies, is a plan in which electric locomotives are used to haul trips of loaded cars out of the mine, returning with the empty trip.

Rope haulage on slopes is another name for engine-plane haulage. In this plan, the engine is generally located at the head of the plane and draws the trip of loaded cars up the incline by means of a rope to the end of which the cars are attached. The empty trip is then allowed to run back down the slope drawing the rope after it. The descent of the empty trip is regulated by a brake on the drum.

In endless-rope haulage, there is a single rope, which is led from the drum or sheave of the engine into the mine to a tail sheave at the inby end of the haulage road. Passing over this sheave, the rope is returned through the entries to the engine at the mouth of the mine. In this system, the rope is kept continually running and the cars are attached to it by a special friction clutch or by a form of hook that the weight of the car causes to hold the rope fast.

In main-and-tail-rope haulage, there are two ropes. The main rope passes from the engine into the mine where it is attached to the head end of the loaded trip. The tail rope passes from the engine into the mine and over a return or tail sheave at the inby end of the haulage road, after which it is attached to the rear end of the loaded trip. In this manner, the trip is hauled out of the mine by the main rope, dragging the tail rope after it. The ropes are then changed, the tail rope being attached to the head end of the ingoing empty trip, which is thereby drawn into the mine, pulling the main rope after it. The two ropes are attached to separate drums, which are controlled by brakes.

Gravity-plane haulage is adapted to the lowering of loaded cars from a mine opening to the track below. Electric-motor haulage is adapted to the haulage of coal in mines operated by electricity and in moderately flat seams. Engine-plane haulage is adapted to all cases where loaded cars are to be drawn up an incline and the empties lowered, where the weight of the cars and the inclination of the track render gravity-plane haulage unsafe. Endless-rope haulage is generally adapted to large outputs in moderately flat seams. Main-and-tail-rope haulage is better adapted to undulating haulage roads in otherwise flat seams.

Ques.—If an airway is 2000 ft. long and 6x8 ft. in section, the velocity of the current being 500 ft. per min., what is the power producing the circulation?

Ans.—The rubbing surface in this airway is

$$s = 2\ (6 + 8)\ 2000 = 56{,}000\ sq.ft.$$

The power producing this circulation is then,

$$U = k\ s\ v^3 = 0.00000002 \times 56{,}000 \times 500^3 = 140{,}000\ ft.\text{-}lb.\ per\ min.$$

Ques.—Why are accumulations of coal dust dangerous in bituminous mines of this state (Pennsylvania)? What would be your method of eliminating the danger as nearly as practicable?

Ans.—Bituminous coal is frequently highly inflammable and often gaseous. Much of the coal is reduced to fine dust, in working, and this dust floating in the air increases the explosive condition of the mine. The occurrence of a heavy or blownout shot in the vicinity of any considerable accumulation of dust, either on the floor or timbers of the mine, may raise a sufficient cloud of the fine dust to cause an explosion when ignited by the flame of the shot. As far as practicable, all accumulations of dust should be loaded out of the mine. Where it is impossible to remove the danger in this manner, the roof, floor and ribs of the opening as well as the timbers should be thoroughly sprinkled with water for a distance of 20 yd. back from the face before a shot is fired in the place.

Ques.—In an entry that is wet, there is a small amount of marsh gas generated. Under these conditions, what is the greatest percentage of gas in which you would allow blasting to be done?

Ans.—Before a blast is fired, the place should be examined to see that there is no accumulation of gas at the roof or in any cavity or void place. The percentage of gas in the air current passing through the place should be less than 1 per cent. to insure safety. Every precaution should then be taken to avoid a "tight shot," which might give trouble. The coal should be well mined, and a moderate charge of powder used. All holes should be inspected, charged and fired by competent persons.

Ques.—How would you approach a mine fire to insure safety to the workmen and what methods should be employed to extinguish the fire?

Ans.—All workmen should be withdrawn from the return side of the fire. The work of extinguishing the fire should be performed from the intake side. Competent men should be chosen to do the work and only safety lamps should be employed.

The method to be adopted for the extinction of the fire will depend on its character and the headway the fire has gained. In the early stages of a gob fire, the smoldering material may be loaded out to advantage. Water applied to a gob fire will often render the condition worse, unless it is possible to completely drown out the fire. Where gas feeders have been ignited in the waste, it may be possible and necessary to extinguish these by the explosion of a small amount of dynamite in the vicinity.

Coal and Coke News

Washington, D. C.

Experience during the past week is considered to show that the proposed ship-purchase measure now pending in the Senate will either not be adopted at all or will be passed in such a form as will largely limit its effectiveness as a provider of vessel tonnage. Even strong advocates of the bill hardly claim, now, that the prospective measure will help the shipper of heavy freight.

So far as products like coal are concerned, therefore, it is expected they will continue to suffer from the lack and high cost of shipping in the export trade until relief is had through natural means and that consequently the material improvement of conditions in that trade, as affecting the movement of the goods in large quantities is not to be expected in the near future. Evidence submitted during the struggle thus far, however, shows that it is the shippers of the heavier articles, and of coal in particular, that have suffered most severely until now from the insufficiency of tonnage.

The Personnel of the Trade Commission

It is now generally understood that the President has definitely determined upon nearly all the members of his new Trade Commission and that among the men to be named will be, as already reported, Joseph E. Davies, the present Commissioner of Corporations, George T. Record of New Jersey, E. R. Hurley of Chicago, and one or two others whose names appear less certainly fixed. George Foster Peabody of New York, who no doubt could have been named had he himself been willing, has steadily declined to become an active office-holder.

It is understood that, as soon as the new commission is actually constituted, it will be asked by mining interests to look into conditions in the bituminous industry, with a view to determining what, if anything, can be done to bring about the establishment of a limitation of the over-severe competition in certain of the fields under conditions that will be in harmony with the spirit of the new law and of already-existing industrial legislation in general.

There is no indication thus far of the probable outcome of any such effort. Proposals along this line have been made from time to time to congressional committees during the past few years but thus far have had no success.

Annual Session of the U. S. Chamber of Commerce

The annual session of the U. S. Chamber of Commerce came to a close in this city on Feb. 5, after an unusually large and successful meeting at which special attention was given to the shipping situation, and incidentally general business conditions throughout the mining region were touched upon.

The convention, however, refrained from special or particular action as regards the position of any individual branch of business likely to be directly affected by such action or by legislation, except in so far as the usual resolutions of a broad type might indirectly relate thereto. General business and export trade prospects were discussed at the banquet of the convention by the Secretary of Commerce, while other well-known speakers on trade prospects were heard at the several sessions.

HARRISBURG, PENN.

During the past week a bill was introduced in the House by Mr. Bovee, asking for an appropriation for the improvement of the port of Erie by constructing a modern commercial steamboat landing or wharf upon state lands within the harbor, the primary object of which, it is stated, is better facilities for the shipment of ore and coal over the Great Lakes. The coal to this port is carried by the Bessemer & Lake Erie and the Pennsylvania railroads.

The harbor of Erie is the only port in the state on the Great Lakes. Congress has recognized the importance of the preservation and permanent improvement of the harbor of the port at Erie by appropriating large amounts. It is contended that the port is congested by reason of the inadequate wharves and docking facilities for the handling of coarse freights, such as coal and ore.

The state is the owner of the land lying between the foot of Peach St. and the United States Harbor line, a distance of about 560 ft. upon which land a wharf could be built with the consent of the Commonwealth.

The bill asks for an appropriation of $100,000 or so much thereof as may be necessary for the purpose of constructing and building a modern commercial steamboat landing or wharf upon the state lands, and dredging the approaches on both sides of the wharf.

The Governor is empowered to appoint a commission of five persons to have power and authority vested in them to build the wharf.

After the completion of the dock and until the Legislature shall otherwise provide the mayor and council of the City of Erie shall have power to enact ordinances, etc., regulating the manner in which the dock shall be used.

New Examining Boards Are Appointed

New boards of mine inspectors' examiners and mine foremen's examiners were appointed by the county court for Luzerne and Carbon counties on Feb. 5. An entirely new board of mine inspectors' examiners was named and the old board of mine foremen's examiners were renamed, with the exception of two miners in the 10th sub-district, who were replaced by others because they had been promoted to mine foremanships.

The new board of mine inspectors' examiners include E. R. Pettebone, chief engineer of the Delaware and Hudson Co., A. B. Jessup, general manager of the G. B. Markle Co., mining engineers; Patrick Dougherty of Lansford, John J. Hanlan of Avoca and Daniel P. Bolton of Nanticoke as practical miners.

For several years the work of the Mine Inspectors' Examining Board has been a subject of criticism by mine workers and Union officials, some of whom charged that only sufficient candidates were passed to fill vacancies in the several districts.

Last year the court named Messrs. Gallagher, Miles, McEneany, Evans and Dougherty, who held an examination of five candidates last July and forwarded a report to the Department of Mines. The board never heard from the report and has not been paid, its work having been ignored. It was stated at the time that the Chief of the Department of Mines held that no examination was necessary last year as there were no vacancies to be filled in any of the 8 districts.

It is reported that the miners named on the new board were suggested by officials of the United Mine Workers of America so that further criticism of its work will be eliminated.

PENNSYLVANIA

Anthracite

Summit Hill—The mine fire which has been burning here for the last 62 years and which was believed to have been conquered, has broken out afresh. During the time that this fire has been in progress, coal estimated to be worth millions of dollars has been burned, and great expense has been incurred by the Lehigh Coal and Navigation Co. in fighting this fire. The task of extinguishing it seems hopeless.

Taylor—Several hundred men working in the breaker at the Sloan colliery of the D., L .& W. Coal Co. fortunately escaped injury and possible death on Feb. 6, when two sticks of dynamite, unloaded from a car of coal, passed through the rolls and exploded. The explosion shook the building and put the rolls out of commission. Sixteen hundred hands employed in and about the colliery were sent home for the day.

Kingston—Notice has been served by the Delaware, Lackawanna & Western Coal Co. upon its foremen, driver bosses and others who have charge of employees that hereafter they must not enter saloons. This move on the part of the company is in keeping with the "safety first" movement in the operation of its collieries. The notice to the bosses states that they are expected to set an example for the men, and that any one who violates the company orders and enters a saloon does so at the risk of losing his job.

Plymouth—After lying dormant for several weeks, negotiations for the purchase by the Kingston Coal Co., of the Dodson Colliery, of the Plymouth Coal Co., have been reopened, and prospects of the deal going through are said to be good. Because of litigation over mine caves between Plymouth Borough and the Plymouth Coal Co., the colliery has not been operated for the last 8 months.

Harleigh—Several hundred employees at the No. 7 colliery of the G. B. Markle Coal Co., who have been idle for several weeks following the destruction of the breaker by fire, are now being given employment at night as at that time the coal from another mine will be prepared at the Harleigh breaker.

Bituminous

Pittsburgh—Two steamers of the Monongahela River Consolidated Coal and Coke Co., tne "Sam Clarke" and the "Alice Brown" left Feb. 5 with 490,000 bushels of coal for southern points. Other steamers are expected to leave soon.

Charleroi—January was the best coal month since October, although not an especially good one, in shipments through Lock No. 4. The coal sent down stream during this period amounted to 13,919,000 bushels. Bad weather interfered but slightly with shipments in January, and navigation was only closed for 124 hours during the month.

Connellsville—The H. C. Frick Coke Co. recently lighted 1500 additional coke ovens lying in Fayette and Westmoreland Counties. This order will furnish work for 1500 men, and increase operations of the company from approximately 42 to 60 per cent. A week earlier 1000 ovens were lighted, making 2500 ovens in all.

Windber—The mines of the Berwind White Coal Mining Co. have been working five days a week since the beginning of the year, the longest period they have been continuously operated since the last of July. The company has obviously found a new market for its fuel, or at least a market for the tonnage formerly delivered to the North German Lloyd Steamship Co. before its fleet of vessels was driven from the Atlantic immediately following the outbreak of the war. There is a constantly expanding market for the smokeless coal of this section, due to legal enactment by the more populous centers against smoke producing fuels.

Johnstown—Thomas A. Edison is now constructing a plant in this city costing about $25,000 to $30,000. Mr. Edison and the Cambria Steel Co. have closed a contract whereby Mr. Edison can build his plant on the Cambria Steel property and extract benzol from the coke gas that arises from the nine different batteries of ovens of the company. When completed, it is believed, the byproduct of the Cambria ovens will amount to from 1500 to 1800 gallons a day. It is expected the plant will be ready to start about Mar. 1.

Uniontown—Receivers for the Tower Hill-Connellsville Coke Co. on Feb. 5 filed a petition in court asking permission to insure the fulfilling of a large contract with the Youngstown Sheet & Tube Co. In the petition it is stated that the receivers have entered into a contract to furnish 16,000 tons of coke per month to the Youngstown corporation for one year. The contract price is $1.75 a ton, slightly below the figures quoted in the market, but it is claimed this will permit the operation of the plant at a profit.

WEST VIRGINIA

Grafton—John T. McGraw, of Grafton, is reported to be negotiating with New York interests for the sale of 65,000 acres of valuable coal lands in this section, at a figure running into the millions. The property will be reached by the West Virginia Midland R.R., which is to be standard-gaged, and will be developed at once, if the deal goes through. The B. & O. which is interested in the road, is said to be backing the proposed extension and improvement.

Charleston—Conditions in the coal industry of the New River district has improved much in the last 30 days. January showed a 25 per cent. increase over December, and there has been marked improvement in the coal trade generally since the first of the year.

The judiciary committee of the house of delegates recently met and decided to report unfavorably upon the House Joint Resolution No. 5 pertaining to the classification of property for taxes. This is the measure which contemplated the taxation of coal, oil and gas production which has been causing much comment.

Bluefield—A plan of reorganization of the Big Vein Pocahontas Coal Co. has been prepared by the Committee in charge and a new firm which will succeed the old one and operate the properties involved will be organized. This new company will be incorporated under the laws of West Virginia with an authorized capital stock of $1,800,000, and will also have authority to issue $350,000 of five year, 6 per cent. convertible bonds. The Fidelity Trust Co., of Baltimore will be the trustee for the bonds, which will be dated Jan. 15, 1915.

Boomer—It is reported that the mines in this vicinity will go on full time with full force shortly, as there has been a marked improvement in the work of the mines recently. Considerable coal is now being loaded for Lake trade in anticipation of the opening of navigation.

ALABAMA

Birmingham—Investigation into the probable coal supply along the Warrior River shows approximately 670,000,000 tons of available coal. This investigation was made by W. E. Leake, a well known operator and engineer. The report made by Mr. Leake considers each section of the coal-bearing field along the Warrior River and contigious thereto that is within easy access of the stream. It is figured that this coal can be barged to Mobile for from 30 to 50c. per ton as against the present all-rail rate of $1.10, and as the quality of the coal in the Warrior River district is of the best, the tonnage moved should be large.

The semiannual examinations for first- and second-class mine foremen's and for fireboss' certificates was recently held by C. H. Nesbitt, chief mine inspector, and his board of examiners. Twenty-nine applicants presented themselves for examination.

KENTUCKY

Whitesburg—Representatives of the big coal companies in Letcher County have gone before the Board of Tax Supervisors to protest against increases in assessments of their properties, which have run in the aggregate to $1,000,000. These increases include the following: Consolidation Coal Co., $124,000; Mineral Fuel Co., $100,000; Swift Coal & Timber Co., $100,000; Mineral Development Co., $60,000.

Jackson—The Davis Coal Co.'s mines near here, after a month's shutdown, have been reopened and full time operations will soon be in order.

St. Charles—It is understood that the Carbondale mine near here, which has been shut down for several months, will resume soon. It gives employment to 150 men, most of whom have been idle during the term of suspension.

Richmond—The property of the Big Hill Coal Co., in Bell County, was sold by John C. Chenault, receiver, to H. B. Hanger, of Richmond, who in turn sold the property to the Caney Creek Coal Co., of Chattanooga, Tenn. S. F. Rock, who was superintendent of the mines, has resigned and returned to his home here.

Frankfort—Bell County has been selected by the State Board of Health and the Rockefeller Foundation for an experiment in intensive community work and a mining camp near Middlesboro, yet to be selected, it is understood, will be developed into conditions approximately ideal from a sanitary and hygienic standpoint. A sanitary engineer and two nurses will be paid by the Foundation during the experiment and the nurses will be chosen by the Kentucky Tuberculosis Commission. The mine owners and operators of the state are taking much interest in the experiment.

OHIO

Columbus—The chances for the establishment of standard preparations of bituminous coal in the states of Ohio, Pennsylvania, West Virginia, Indiana, Illinois and Kentucky are not as bright as formerly, according to the statement of those interested in the movement. Considerable opposition to the plan of making 1¼-in. lump only has arisen and the doubt arises if such a rule can be enforced in case it is adopted. But the plans for holding a general conference of committees representing the above mentioned states has not been abandoned and every effort will be made to bring about standardization of sizes.

Prominent coal men in Ohio are making an effort to have one of the experimental stations on mining, authorized by congress, located in Columbus.

Senator Gallagher recently announced that he would offer a bill to amend the Green run-of-mine law by which amendment operators and miners would be permitted to enter into contract for mining coal in any manner and at any price. If they are unable to reach an agreement, however, the run of mine plan must prevail.

INDIANA

Indianapolis—Among the bills introduced in the Indiana Legislature now in session is one providing that the operators shall pay for shot-firing; another aims to prohibit strip-mining and a third provides for the codification of the mining laws of the state.

ILLINOIS

Murphyboro—Several days of heavy rain fall and back water from the Big Muddy River recently caused a suspension at the large No. 9 mine of the Big Muddy Coal & Iron Co., on account of several dangerous cave-ins.

Tilden—The Crystal mine has suspended operations here on account of a disastrous cave-in in the air shaft. Fortunately, no one was injured at the time, and if rainy weather ceases, the plant will be in shape to operate again in a short time.

The mine of the Bessemer Coal & Mining Co. here has suspended operations indefinitely. The cause given is lack of business at a profitable figure.

Cambria—The Carterville & Big Muddy mine has been taken over by a company of men headed by Rudolph Specker, a brewer of Murphysboro, who are bondholders to the extent of about $30,000. The mine has been shut down indefinitely.

East St. Louis—Although freight rates have gone up, effective Feb. 1, on coal from the southern Illinois fields to St. Louis, Mo., the rates from the same fields to East St. Louis will not go into effect until the Illinois State Utilities Commission has made an investigation. The hearing has been set in Springfield, Illinois, for Feb. 16. The rate which was to go into effect on the first was an advance of 5½c. a ton. This would make the East St. Louis local rate 37½c. a ton. It is likely that the rate will remain 32c., however, inasmuch as the manufacturing industries in East St. Louis and adjoining cities have been built up with the express understanding that their coal supply was to come in on the low rate.

Springfield—Judge Creighton, in the Sangamon County Circuit Court, on Feb. 4 refused to grant a temporary writ of injunction brought by Samuel H. Putnam, of Chicago, a bondholder of the defunct Illinois Collieries Co. to restrain the Pittsburgh Coal Co. from selling the property of the Collieries company.

IOWA

Des Moines—Coal operators of the state have decided to take no action on the Clarkson State Insurance Bill as the opinion of 50 operators present at a meeting of the Iowa Coal Operators Association was divided regarding the merits of the measure which provides for a State Insurance Fund. No stand was therefore taken, and no resolution passed regarding the proposed measure. This will be left to members of the executive committee.

FOREIGN NEWS

Paris, France—With winter weather of unusual severity prevailing, France faces a coal famine because the Germans hold the territory from which most of the fuel is obtained in normal times. It is estimated that the present monthly demand is 4,000,000 tons more than is produced, which makes it necessary to draw upon reserve supplies, and to use wood for fuel.

PERSONALS

Stephen B. Sexton, president of the East St. Louis Real Estate Exchange, and head of the firm of Sexton & Son, has been elected a member of the Board of Directors of the Southern Coal & Mining Co.

Osborne Mitchell has been appointed general counsel for the Petroleum Iron Works, Pennsylvania Tank Car Co., The Pennsylvania Tank Line, and the Pressed Steel Products Co. His office will be in the Wick Building, Columbus, Ohio, after Feb. 15. The corporations above named are strongly interested in safety and welfare work, and Mr. Mitchell's duties will entail extensive investigations in this field.

OBITUARY

Henry Harrison Harvey, pioneer coal operator, and prominent in industrial circles throughout the Wyoming Valley, died at Wilkes-Barre, Penn., Feb. 4, from heart trouble. For years he was superintendent of the Harvey Mines at West Nanticoke. Since his retirement as a coal operator he has been identified with many movements of enterprise, and has sought to develop the community.

Charles P. McCafferty, owner and manager of the Monarch mine at East Brady, Penn., in the Allegheny Valley, died at his home on Feb. 2, of apoplexy, leaving a wife and two daughters. He had been the president of the Allegheny Valley Operators' Association since it was organized several years ago and was highly esteemed on account of his excellent character and his charitable disposition. He was born in Fairview, Butler County, Penn., in 1848.

F. M. Lechner, aged 78, a well known inventor of Columbus and the originator of the first successful mining machine, died suddenly last week of apoplexy. His first patent on mining machinery was granted in 1877. He later organized and became president of the Lechner Mining Machine & Manufacturing Co. J. A. Jeffrey soon afterwards purchased the business and patents and then organized the Jeffrey Mfg. Co. Mr. Lechner retained stock in the new company and represented it in Europe for about 10 years. He leaves two sons.

CONSTRUCTION NEWS

Hazleton, Penn.—Plans are being prepared by the G. B. Markle Co. for the rebuilding of the Highland Breaker at a cost of approximately $200,000.

Youngstown, Ohio—The erection of a battery of coke ovens capable of producing 50,000 tons monthly and of a finishing mill with a capacity of 25,000 tons per month, is planned by the Youngstown Sheet and Tube Co. The construction of the coke ovens has been positively decided upon, while the exact nature of the finishing mill remains yet to be determined. An outlay of more than $6,000,000 will be required to carry the plan through.

Great Falls, Mont.—The Roberts & Schaffer Co., of Chicago, has been awarded the contract by the Cottonwood Coal Co., for a complete fireproof coal tipple and washing plant to be erected at the mine at Lehigh, Mont. The tipple will have a capacity of 3500 tons per day and will be built to accommodate self dumping cages and mine skips. It is to be equipped with modern coal screening and picking facilities, driven by electric motors throughout. The washery will have a capacity of 2000 tons daily. It will be built of reinforced concrete and steel, and will be equipped with facilities for coal drying. It also will be electrically operated.

Wendell, W. Va.—The Maryland Coal Co., with headquarters at No. 1 Broadway, N. Y. City, is remodelling its tipple located at the mine at Wendell, W. Va., to a considerable extent in order to double the capacity. The latest machinery, dumps, chain hauls, etc. ,will be installed. The general contract has been let to Arthur S. West, 15 East Fayette St., Baltimore, Md. He in turn has let a contract to the Canton Lumber Co. of Baltimore for the supply of lumber, to the Eastern Railway Supply Co. American Bldg., Baltimore, for hardware, nails, etc., and to the Stockdale Machine & Foundry Co., for the equipment. The total expenditure will be $40,000.

Pittsburgh, Penn.—As the House of Representatives has reported favorably the sum of $300,000 for the Bureau of Mines, it is expected that the preliminary work on the new buildings to be erected on the Magee site adjoining Schenley Park and the Carnegie Institute of Technology, will be begun about Mar. 15. There is available $150,000 for the preparation of the foundations and other work. The structure complete, including necessary apparatus, will cost $500,000. A second appropriation authorizes the creation of 10 new substations of the Bureau which will be situated at various convenient points throughout the country with one in Alaska. There are now six sub-stations and eight mine rescue cars. The number of cars is to be increased to 23. The administration of these sub-stations and the mine rescue cars will be from the headquarters of the Bureau of Mines in Pittsburgh as at present.

NEW INCORPORATIONS

Hopkinsville, Ky.—The Southern Coal Co. has filed articles of incorporation, with a capital of $50,000. Thomas P. Cook, O. F. Tutt and T. L. Evans are the incorporators.

Middlesboro, Ky.—The Wasioto & Black Mountain R.R. Co. has filed an amendment to its articles of incorporation, increasing the limit of its indebtedness to $10,000,000.

Newport, Ky.—The Logan & Kanawha Coal Co., with $25,000 capital, has been incorporated here, having been organized by Fred Legg, F. A. Walker, Howard Benton and others.

New Waterford, Ohio—The New Waterford Mining Co. has been incorporated with a capital of $50,000 to mine and sell coal by F. F. Leuk, A. P. Mullins, J. E. Morgret, R. D. Anderson and D. A. Warner.

Chattanooga, Tenn.—The Old Virginia Coal Co. has filed applications for a charter, listing its capital at $50,000. The incorporators are J. R. Barnes, W. L. Lawton, H. B. Bonney, C. W. Lusk and W. B. Miller.

INDUSTRIAL NEWS

Whitesburg, Ky.—It is alleged that the Roberta Coal Co. will build a mining plant near here.

Columbus, Ohio—The announcement is made by the executive committee of the Michigan-Ohio-Indiana Coal Association that the annual meeting will be held at Cedar Point during the week of June 20, possibly the 22, 23 and 24.

Hinton, W. Va.—Shipments of coke over the Chesapeake & Ohio for the last two years show a decreased tonnage for 1914 of 65,577 tons, or over 18 per cent. During 1913, 361,535 tons were shipped, while in 1914, 294,598 tons were moved.

Columbus, Ohio—At the instance of Mayor Karb of Columbus a committee has been appointed to receive donations of food and clothing to be shipped to miners and their families at Rendville, Perry County, where suffering has been acute.

Wellsville, N. Y.—The Kerr Turbine Co. has appointed W. E. Storey as its Toronto, Can. representative, with offices in the Kent Building. Mr. Storey was formerly identified with the Under-Feed Stoker Co., and more recently with the Goulds Mfg. Co.

Duluth, Minn.—During the year 1914 almost a quarter of a million cars of coal and coke were shipped from the docks on the St. Louis Bay water front. During the year 248,845 cars were shipped. This compares with 257,283 cars in 1913, and 276,384 cars in 1912.

Buffalo, N. Y.—There is prospect of a duty on anthracite coal and coke imported into Canada, as the country needs more revenue to meet war expenses. About 20c. a ton is proposed. The present duty on bituminous sizes is 53c. a ton and on slack, 13 cents.

Huntington, W. Va.—Another of the large coal interests of the New River field is preparing to open offices in Huntington. W. H. Deegans, who controls eight companies and as many operations in Fayette County, has leased quarters in the First National Bank Building. From these offices will be conducted the sales department of the business.

Birmingham, Ala.—The Pratt Consolidated Coal Co. is constructing an electric tram line from its Maxine Mine to a point on the Warrior River, where the back water from Lock 17 will touch. This is being done to facilitate the movement of the coal down the Warrior when Lock 17 will have been completed, which is now a matter of only a short time.

Bluefield, W. Va.—S. H. Meem and R. S. Haskins, of Bluefield, who lately leased coal land in the Perry County field near Hazard, Ky., will soon start development work. The property lies on the Lexington & Eastern branch of the Louisville & Nashville Ry., and in a section being rapidly developed. A dozen or more coal-mining plants are in close proximity.

Birmingham, Ala.—Inquiries are coming to the coal operators here from Greece and other foreign countries for coal, Greece being willing to take 50,000 tons if it could be delivered in reasonable time. The lack of bottoms will be a great hinderance. Italy's and Sweden's former source of supply has been cut off and these countries are anxious to get Alabama fuel.

Fayetteville, W. Va.—An embargo was recently placed on eastern shipments from the New River region, resulting in a stagnation of coal movement. This measure was adopted on account of the congestion of the coal traffic at tidewater. Several thousand cars are now awaiting movement. It is expected that the embargo will be raised in a short time and shipments resumed.

Columbus, Ohio—According to the financial statement of the Hocking Valley Ry. Co. for the month of December, there is a heavy falling off in operating earnings compared with the corresponding month in 1913. The revenues during December, 1914 were $414,791 a decrease of 28 per cent. from December, 1913 when they were $574,411. The heaviest decline was in freight revenues.

Bristol, Tenn.-Va.—An appreciably increased coal tonnage is moving South from this section and has been since the first of the year, an indication that Southern industrial conditions have been much improved. The Virginia fields have suffered sharply on account of the stagnation of the cotton market but the coal operators believe the worst is now over and that business will rapidly improve.

Washington, D. C.—The Interstate Commerce Commission on Feb. 5 denied the petition of the Illinois coal operators who sought to bring about a regrouping of mines in the state for rate-making purposes. The operators particularly sought to decrease the so called Springfield group, and alleged that application of the same rates to northwestern points of shipment from all mines in that group was unjust.

Cincinnati, Ohio—High water on the Ohio River, which brought down quantities of driftwood, nearly caused the loss of several coal barges of the Marmet Coal Co. recently. Eight loaded and six empty barges broke away when struck by a large amount of driftwood, and floated some distance down the river, but were all caught by pursuing steamers and tugs. Several men narrowly escaped drowning in the mixup.

Pittsburgh, Penn.—Extensive coal land purchases in Washington County are being hinted at by Pittsburgh brokers, specializing in this class of property. Offers to buy tracts of coal have been given brokers, and they report having spent much time with owners of such land. The volume of inquiries is large, and the prices offered are said to be fair, and it would not be surprising to see considerable land change hands.

Philadelphia, Penn.—The suit in the United States Circuit Court of Appeals of the Pittsburgh-Buffalo Co. against the American Fidelity Co., a surety corporation, ended Feb. 4 with an opinion by Judge Victor B. Woolley, reversing the Western District Court and ordering a new trial. The case involves a claim of about $12,000. The claim was for alleged breach of contract on the part of J. J. Dimmick & Co. on refusing to take further orders of coal.

Columbus, Ohio—Charles H. Boardman, president of the Murray City Coal Co. and treasurer of the Tidewater Coal & Coke Co., with offices in the Wheeler Bldg., Columbus, has filed a petition in bankruptcy in the United States Court with liabilities of $357,101.39 and assets of $3138. Included in the liabilities are notes and accounts due to the Union National Bank, which has been liquidated amounting to $122,000. Of his liabilities, $259,850 are secured.

Des Moines, Ia.—The sale of Indiana coal to tile plants in Iowa, which has been of considerable magnitude in past years, is lessening because of the inroads of southern Illinois coals. The selling of Iowa domestic coal at home is also decreasing because of the competition of Franklin County fuel and Eastern splints. The production of Iowa coal is gradually becoming less, and authorities estimate that 25 years will see the exhaustion of the present known Iowa coal fields.

Knoxville, Tenn.—More than 100 coal operators and representatives of mining interests in east Tennessee and southeastern Kentucky were present at the recent session of the Southern Appalachian Coal Operators' Association's convention. Col. James R. Wooldridge, of Wooldridge, Tenn., was elected president, succeeding E. C. Mahan, and James E. McCoy was reëlected secretary. Mr. Mahan served for two terms and declined a third. The Commercial Club was host to the visitors at a luncheon and the annual banquet was held in the evening, with President-elect Wooldridge as toastmaster.

Birmingham, Ala.—The Alabama operators, through the Alabama Coal Operators' Association, has petitioned the Interstate Commerce Commission to have the rates on coal to various Mississippi Valley points reduced. They claim that although the haul from the Illinois and Kentucky field is practically twice as long as from Alabama, that these districts have a freight rate to the common points of only about 15 to 20c. per ton higher than from the Alabama fields, and to practically all of the smaller points the same rate as Alabama. They claim that this is discrimination and that the rates should be adjusted.

Chicago, Ill.—It is apparent that the stealing of coal during the winter months in the Middle Western States, which has been a considerable problem to the carriers and retail dealers in past years, has decreased greatly thus far this season. The railroads are policing shipments while in transit much more rigorously than before; and appear to surround shipments of coal with better protection, and show a disposition to coöperate more with the retailers to prevent losses from this source. It is also noticeable that the carriers show greater willingness to pay claims for loss and damage to coal while in transit than in the past.

Coal Trade Reviews

General Review

January anthracite shipments the lowest in years and prices becoming heavy. Ocean freights the ruling factor in off-shore bituminous. No definite indications of any improvement. Middle Western markets demoralized.

The extremely flat conditions in the anthracite trade are reflected in the official statement of January shipments, which show the smallest movement for that month in years. In spite of the constantly recurring cold snaps, buying is not stimultaed, and the outlook for the current month is even more discouraging. With the exception of a fairly persistent call for some of the smaller steam sizes, there is practically no demand in any direction. Prices are naturally under a heavy pressure, and the April circular is being quoted on the domestic grades.

The chaotic situation in ocean freights continues to be the predominating feature on the Atlantic Seaboard. However, it is clear that some of the larger interests believe they have the freights well in hand as is evidenced by the closing of a number of contracts at a very slight advance over last year's figures. As a result of the steady increase in export freights on other commodities, no coal charters are reported, and the acuteness of the situation is shown by the purchase of two large Lake carriers for use in the Coastwise trade.

Spot prices on the West Virginia grades have hardened up slightly at Down East points, and it is generally agreed that the high-grade Pennsylvania coals will very probably make large inroads on the Hampton Roads grades in those markets. In the other Eastern sections there seems to be a disposition among buyers to increase their purchases very slightly, and there are indefinite indications of an improved undercurrent, but the situation in the main shows little of a real encouraging nature.

A very modest increase in the manufacturing demand in the Pittsburgh district, supplemented by a broader domestic demand, as a result of the colder weather, has created a more hopeful spirit, but on the other hand buyers are confident that they will be able to negotiate new contracts at a reduction over last year's figures. But it is clear that the recent effort to stimulate an artificial activity with sanguine reports of different kinds, has collapsed. There has been a reaction in the Ohio trade as a result of the mild weather and continued industrial depression, and the market has been forced down to new low levels. Stocks in the hands of the retailers appear larger, though the floods are interrupting shipments to some extent.

The demand has practically ceased entirely in the Middle Western market, prices have softened, some demurrage coal is already noted at the principal distributing centers, and reports indicate that there is a large tonnage of consignment coal en route in all directions. The trade is clearly distressed to absorb the large surpluses accumulating, and shippers on the open market are having an extremely hard time with nothing encouraging in sight unless it be a continued spell of exceediglny low temperatures.

ATLANTIC SEABOARD

BOSTON

Hampton Roads coals unchanged as to price f.o.b. but situation begins to clear up. Georges Creek and the Pennsylvania grades await developments. Water freights are easy at the advanced rate. Anthracite has again relapsed into dullness.

Bituminous—The situation on Pocahontas and New River shows signs of settling down. The high water freights have caused some apprehension, especially to consumers directly on Tidewater but now it appears that interests that control their own transportation have made a smaller advance over last year's prices than was looked for. In some cases yearly contracts have been closed at only 7c. up from last year's opening on cars at Providence, Boston, and similar points. A quiet canvass continues on the part of such shippers and a fair amount of business is being entered up.

There is no change in prices fo..b. Hampton Roads. The demand is only scattering and there is still plenty of coal standing at all the piers. The spot market at Boston and Providence for distribution inland is slightly improved. Prices have hardened a little, showing the influence of higher water freights.

The on-car basis for season contracts at Boston points seems to be \$3.85@3.90, the former being the price to the closer buyers; \$3.85 analyzes into \$2.85 f.o.b., at 77c. water freights, and 23c. for discharging, weighing, and insurance. This shows how willing some shippers are to discount the freight market.

The Georges Creek shippers are confining themselves to filling expiring contracts. There is little heard from them with regard to season prices alongside and it is assumed they are waiting until their Southern competitors have settled down into some consistent policy. All-rail and f.o.b. they are following the lines of 1914.

Shippers of the Pennsylvania grades are showing an active interest in the market at Tidewater as well as all-rail. The difference in rates between anthracite transportation and bottoms on the open market makes the New England trade look attractive and it is probable that receipts this year from Philadelphia will be materially increased. There is nothing definite as yet to be reported but it is likely that some of the high grade Cambrias and Somersets will make inroads on West Virginia's usual tonnage in this market. There is no spot market worth mention but there is quite a little inquiry for contract.

Water Freights are easy at \$1, Hampton Roads to Boston, all kinds of transportation, the demand being extremely quiet. By some this rate is regarded as artificial, there is so much tonnage offering, but so far that basis is being firmly maintained. Two steamers have lately been bought to come from off the Lakes and this will help out the supply of bottoms along the coast.

Anthracite showed a mild spurt for a few days. The low temperatures were not sustained, however, and inquiry has again fallen off.

Prices on bituminous are quoted about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	\$0.90@1.50	\$1.15@1.65	\$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	\$2.70@2.75
Boston†	....	....	....	3.85@3.95
Providence†	....	....	....	3.80@3.90

* F.o.b. †On cars.

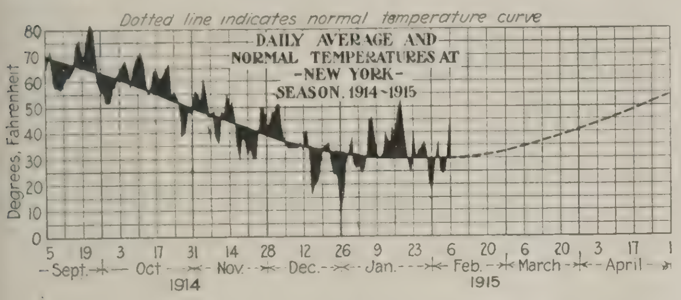
NEW YORK

More bituminous on consignment and numerous embargoes in effect. Heavy restriction in the anthracite regions and market in the worst condition for a long time. Fair demand for steam grades.

Bituminous—The soft coal situation has shown no material change during the past week. There is possibly more free coal at the piers, but so far this has had no material effect upon prices. Numerous embargoes are in effect to South Amboy and open-market sales are much limited. Contract requirements are about the same as they have been for some time past. Mines producing the best grades are working 80 to 100%, while those mining the poorer qualities are working anywhere from one to four days weekly.

There is considerable interest being taken on the part of the New England middle houses over the Coastwise vessel situation. There has been no change in vessel rates but shipments for Hampton Roads to Boston and other New England ports are being restricted by reason of the shortage in transportation; \$1 has been paid in numerous cases. Brokers are asking \$1.10, but we have not heard as yet of any case where this has been paid. The middle houses in New England are showing an inclination to keep in close touch with Pennsylvania shippers and a few sales of Pennsylvania coals have been made to take the place of Southern coals. This has not as yet affected the market but there is still hope on the part of many, and an expectation on the part of most, that further business will develop within the near future, increasing the demand for the Pennsylvania product. The market is quotable as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal trade is in worse condition for this period of the year than it has been for a long time. The whole anthracite region is restricting to from two to three days per week, the retail demand is extremely light and dealers have most of their equipment tied up for lack of business.



Broken coal, in the harder grades particularly, is short in supply and active in demand, due principally to the restriction. Egg coal, both hard and free burning, is the best size according to demand. Stove and chestnut sizes, in both hard and free burning grades, are a great drug. Prices on all of the prepared sizes vary all the way from the April to the winter circular. Individual coals in odd lots are to be had at material concessions. Company coals are held firm at the prevailing circular.

The steam sizes are in better condition, so far as prices are concerned, due to the restriction. Pea coal is steady at the circular and easy as to supply and demand. Buckwheat, rice and barley, particularly in the better grades, are short and are held firm. The poorer grades are sold at some concession but prices are much better than usual during periods of full-time work at the mines. The steam size situation is generally satisfactory.

The market is quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	5.10@5.35	5.30	5.00@5.30
Chestnut	5.60	5.30@5.60	5.55	5.25@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.75@2.25
Barley	1.80	1.70@1.80	1.75	1.47@1.55

BUFFALO

Consumers apparently have all the coal they need and excess stocks are becoming apparent. Loading into Lake vessels and curtailing of mine operations. Slack generally scarce.

Bituminous—Many of the trade no longer report any new leads, while consumers have large stocks and are not using their coal rapidly. On the other hand there are some who now look for a genuine stir before long. There has been much effort to create an artificial activity by sanguine predictions but that plan has failed. There is a scarcity of slack at the moment, due to the slow sale of three-quarter but the price has not improved and is not expected to right away. The demand for sizes has not changed much, except that mine-run has profited some on account of the light supply of slack. Certain shippers report renewals of contracts at old figures though they are careful not to say what these figures are.

There is no change in the prices of bituminous, all quotations being on the basis of $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes 25c. lower than Pittsburgh.

Anthracite—Retailers appear to be satisfied with their sales, and they look for a further increase before the turn of winter. But the shippers are not so well satisfied; some of the leading mines have been shut down two or three days a week and others are piling up surpluses, either in Lake vessels here or in storage depots. The line business is quiet and promises to remain so. The heavy storm of last week tied up deliveries four or five days, but the consumer was not disturbed.

The Lake cargoes held here now embrace more than 150,000 tons and more than one company has taken tonnage for early loading. Reports from the Northwestern trade agree that there is a good tonnage moving, but that there will be a good surplus left over when spring opens.

PHILADELPHIA

Anthracite gives no indication of improvement. Rigid curtailment still in effect. Bituminous continues sluggish, with demand and prices at low ebb.

Anthracite—The past month has been the poorest experienced in this vicinity for the last fifteen or twenty years. The open weather, combined with certain economic conditions, reduced the demand to practically nothing, and the prospects for the current month are equally unfavorable. Outside of a call for buckwheat and rice, for which the demand is in excess of the production during a curtailment, the market is inert. Dealers appear to have sufficient stocks to carry them over until the opening prices on the first of April; that is, providing no unusual weather conditions prevail. There is no difficulty at the present time in securing almost any domestic size at, or near, the April circular. Egg seems to be in better call than either stove or nut, reflecting a condition which usually prevails at this season.

There is a general feeling in the trade that there is not likely to be much if any change in current conditions. Dealers are buying only where necessary to fill gaps in their stocks, and jockeying their supplies so as to carry over as small a tonnage as possible into April.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	5.00
Stove	5.00	5.00
Chestnut	5.25	4.80@4.90

Bituminous—There seems to be little or no indication of improvement in the bituminous situation. Outside of a slightly increased activity at Tidewater, the market continues lifeless and without feature. Considerable coal is moving from Tidewater, mostly Georges Creek, but the line trade is almost at a standstill insofar as new business is concerned. Continuous soliciting nets poor results, and the future hold out little hopes for an improvement either in demand or prices. Prices are on about a parity with the previous week, ranging from 90c. to $1 for medium grades, and 25 to 30c. higher for the better qualities.

BALTIMORE

Inquiries are more numerous, though for small lots. Export business picking up again. Colder weather aids the hard-coal business.

A number of small inquiries have appeared in the local market, and while the tendency to buy in small lots has not been generally overcome there is more of a disposition to close for larger tonnages than has been evident for some weeks past.

Colder weather is helping the anthracite business and small-order trade is especially active. Deliveries from mines to terminals have been comparatively easy, although much of the coal has arrived here in a badly frozen condition.

The foreign business is again showing evidence of a revival. Charters announced here the past week included the following: Steamer "Gothard," to Italy; schooner "D. H. Rivers," to San Juan; steamer "Rio Parahy," to Genoa; steamer "Hova," to Savona; steamer "Signe," to Havana; and steamer "Hopemoor," to Alexandria.

An interesting announcement was made to the trade in a new interstate commerce schedule which places an additional tax of $2 for every car reconsigned while en route on the railroads centering here. Heretofore this has always been done by the roads free of cost.

HAMPTON ROADS

Movement over the piers light. January tonnage larger than December but somewhat smaller than expected.

Dumpings over the piers at Hampton Roads have not shown up well. The Coastwise movement has only been about fair while export cargoes have been few and small. With the exception of two cargoes the entire export movement went forward in schooners.

During the month of January there was shipped from Hampton Roads 886,535 tons of which the Norfolk & Western dumped 401,427 tons, the Virginian Ry. 247,433 tons and the Chesapeake & Ohio 237,675 tons. These figures show an improvement over the December dumpings by over 50,000 tons but it was expected the January tonnage would show up much heavier.

Recent clearances have been noted as follows:

Vessel	Destination	Vessel	Destination
Eagle Wing	St. George	Calumet	Para
Elizabeth Gilbert	Puerto Cabello	**Merity**	Rio de Janeiro,
Eleanor F. Bartrim	Rio de Janeiro,	**Sif**	Unknown
Frances M.	Rio de Janeiro		

Note:—Schooners are noted in **bold face** type.

OCEAN FREIGHTS

Freights still advancing. Very few export charters.

Since our last report the market has again advanced to new high levels, owing to the increased demand for steamers for grain, cotton, etc. Very few charters have been completed for export coal and none of these reported.

The market is still hardly quotable, but approximate steamer prices on coal may be take nas follows:

To	Rate	To	Rate
Havana	**$2.75**	Guantanamo	**$3.25**
Cardenas or Sagua	3.25@3.50	Demerara	**5.50**
Cienfuegos	**3.25**	Bermuda	3.75@4.25
Port of Spain, Trinidad	3.00@3.50	Vera Cruz	3.25@3.50
St. Lucia	3.00@3.50	Tampico	3.25@3.50
St. Thomas	3.00@3.25	Rio	**9.60**
Barbados	3.00@3.50	Montevideo, Buenos Aires or La Plata	**8.88**
Kingston	**3.25**	Mediterranean	9.60@10.80
Curacao	**3.00**	Valparaiso	**7.20**
Santiago	**3.25**		

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Rio Pirahy	British	Baltimore	Genoa	2297	
Signe	Norwegian	Baltimore	Havana	1302	
Alice May Davenport		Norfolk	Para	952	$4.50
Edith H. Symington		Norfolk	Charleston	881	0.95
Fannie Palmer		Norfolk	Rio Janeiro	1726	5.60
Jacob M. Haskell		Norfolk	Pernambuco	1362	6.00
Augustus H. Babcock		Norfolk	Pernambuco	1299	
Isabelle B. Wiley		Philadelphia	Paramaribo	611	
Geo. W. Truitt, Jr.		Norfolk	Savannah	647	1.15
Laura C. Anderson		Baltimore	Key West	766	

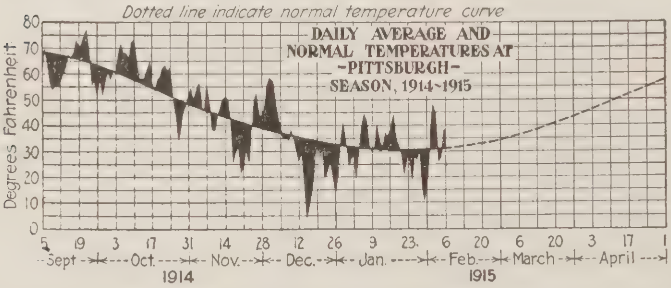
Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Demand slightly improved in some quarters. Negotiations on Apr. 1 contracts not yet under way. Prices unchanged. Operations at close to 60% of capacity.

Domestic demand is now at a fair rate, the weather being moderately cold, while the dealers, not having laid in any stocks to speak of, are steady buyers. There has been a slight additional increase in demand from manufacturers, but chiefly on regular contracts, purchases of free coal by manufacturers being light. Railroad consumption is about the same as earlier in the year.



While very few twelve-month contracts for coal expired Dec. 31 there is a relatively large number to expire Mar. 31. So far as can be learned no active negotiations are yet under way and both buyers and sellers seem to be somewhat reserved. The buyers expect to be able to close at lower rates than a year ago and the sellers probably feel that the expectation is more or less justified by conditions.

There is about the usual amount of shading on free coal as demand is not heavy and operators are usually found who are anxious to dispose of a limited tonnage. Ordinary quotations remain as follows for prompt lots: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district. Mining operations in the district are at close to 60% of capacity.

COLUMBUS

Warmer weather has again slackened the demand. Operations less active than formerly and buying is limited. Small sizes still strong.

The higher temperatures of the past week have caused a decrease in the domestic demand and buying from this time on will be from hand to mouth. The tone of the market is not as good as formerly and future prospects are dependent upon weather conditions.

Stocks in the hands of retailers are larger and with the coming of the warmer weather they have not been selling as much. Contrary to the usual custom, there were fewer cancellations of orders during the recent warm spell than formerly. Dealers have been content to let shipments come forward, taking their chances on some wintry weather before spring. A strong preference for Pocahontas and the fancy grades is still shown in the retail trade. Hocking lump is also in good demand. Retail prices are firm at the levels which have prevailed for some time.

Steam business is still slow and there are no hopes for immediate improvement. Railroads are taking a little more tonnage for the movement of trains. Ordinary manufacturing is not improving much. Quite a few steam contracts expire soon and considerable attention is being devoted to their renewal. The best feature of the steam trade is the demand for fine sizes which are firm because of the curtailed production of lump. Nut, pea and slack is quoted as high as 70c. and coarse slack bout 10c. less.

Production during the past week has shown a decrease due to the warmer weather and also to floods which have put a number of mines in the Pomeroy Bend district out of commission. The Hocking Valley produced about 45% of normal and the same figures prevail in the Crooksville, Cambridge and Jackson district. Pomeroy Bend produced about 60 per cent.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.60	.....
Inch and a quarter	1.45	1.50	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.65
Coarse slack	0.55	0.60	0.55

CINCINNATI

Milder weather, and lack of railroad and industrial buying have set the trade back and prices are lower. Prospects are not encouraging.

The absence of any winter weather has enabled domestic consumers to get along with less fuel than heretofore, which, together with the continued industrial depression, has forced the market to a lower level than for some time. Prices have been substantially reduced, consignment mine-run being offered in small quantities as low as 75c., with quotations of 95c. at the mines. As usual, however, reductions have failed to stimulate immediate buying, large consumers continuing to hold off, awaiting the expected revival in business.

Some members of the trade continue optimistic for an active spring business. The railroads are expected to be heavy buyers of all kinds of supplies, which will aid the manufacturing industries materially. But at the moment the market is about as slow as it could be, and producers have relinquished hopes of any real winter business.

COKE

CONNELLSVILLE

Continued light demand for prompt furnace coke and prices a shade easier. Production by furnace ovens sharply increased, owing to more steel-works furnaces blowing in.

Demand for coke from the merchant operators has not increased, as blowing in of blast furnaces is still confined to steel interests that make coke themselves. Their coke production has been increased very considerably, while the merchant ovens maintain the same gait as formerly. The prompt furnace-coke market has been under such continuous pressure, with coke constantly offered and scarcely any takers, that prices have receded a trifle further and standard grade can sometimes be picked up at $1.50, a total decline of 10c. within 30 days. The contracts made for three and six months at $1.65@1.70 now look much better to the operators than they did when made. There are no further developments in connection with the Thompson failure at Uniontown. The market is quotable as follows: Prompt furnace, $1.50@1.55; contract furnace to Apr. 1, $1.60; prompt foundry, $2@2.40; contract foundry, nominal, $2.15@2.35, per net ton at oven.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 30 at 242,608 tons, a gain of 28,398 tons, made entirely by the furnace ovens, and shipments at 240,240 tons, an increase of 28,233 tons.

Buffalo—Shippers are obliged to be content with supplying the ordinary demand and watching for the expected stir in the iron market that must take place before there is any upturn in coke. Prices appear to be at the bottom, so that when any change does take place it will have to be for the better. Quotations rule on the basis of $4.25 for best Connellsville foundry and $3.30 for stock coke.

Columbus—Coke trade is more active in central Ohio and prices are ruling firm all along the line.

Chicago—Shipments of domestic coke have been absorbed as fast as made at good figures. There has been some recession in the prices of furnace and foundry coke for which the demand is indifferent. Prices are as follows: Byproduct, $4.60@4.95; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.60@4.75; gas coke, $4@4.25.

SOUTHERN

BIRMINGHAM

Orders light, dealers holding off for spring prices. Steam grades show a very slight improvement.

A few scattering orders have been received for lump coal, but the tonnage moved is very light. The dealers are probably waiting until the spring prices go into effect on the first of the month, which will mean a reduction of about 50c. per ton on the regular schedule, although the prices now being obtained are but very little higher than the spring circular.

Steam coal, while showing some slight improvement, is far from normal, though some inquiries are being received on requirements for contracts. Shipments are light, and prices remain about the same. Blacksmith coal is moving satisfactorily, but the tonnage from now on will begin to fall off. There is practically no change in the pig-iron situation.

LOUISVILLE

Steam movement continues slow and the market is generally soft with prices weak.

The movement of the steam sizes has not shown any considerable improvement, although it is more active than for several weeks. Generally speaking the market is soft. Top prices are $1.75 for block coal, 90c. to $1 for 6-in. run-of-mine and 60 to 70c. for nut and slack, all prices f.o.b. mines. The range is downward from these figures, with summer prices more or less generally prevailing.

MIDDLE WESTERN

INDIANAPOLIS

Mines working only half-time. Steam grades moving slowly. Domestic lump in fair demand, but not up to normal. Prices unchanged at the mines.

The weather has been milder but not sufficiently so to make much difference in the consumption. The domestic lump trade is still the best factor and is just now feeling some impetus from a restocking movement.

The steam trade is somewhat draggy and operators have about concluded it will not improve much until the usual spring acceleration. Mine prices are: 75c. for screenings; $1 to $1.10 for mine-run; $1.25 for steam lump; $1.65 for best domestic lump. Some small "independents" in the city are cutting retail prices 25 to 50c. a ton under the schedule of the members of the retailers association. The prevailing retail prices are:

Anthracite chestnut	$8.50	Kanawha lump, forked	$4.75
Anthracite egg and stove	8.25	Hocking lump, forked	4.75
Anthracite grade	8.00	Hocking washed egg	5.00
Pocahontas lump, forked	6.25	Luhrig lump, forked	4.75
Pocahontas lump, shoveled	5.75	Luhrig washed egg	5.00
Pocahontas mine run	4.75	Linton No. 4 lump, forked	3.75
Pocahontas nut and slack	3.75	Indiana lump, forked	3.50
Blossburg smithing	5.50	Indiana lump and egg, screened	3.00
Cannel lump	6.50	Connellsville lump coke	6.50
Jackson (Ohio) forked	5.50	Indianapolis by-product coke	6.50

CHICAGO

Prices sagging and domestic demand sluggish. Steam coals soft. Anthracite business steady.

Mild weather has ruled during the past week and the tendency has been towards a slackening demand and softening prices. A small amount of demurrage coal is now on track and it is reported that consignment coal from all directions is en route to this market. It becomes increasingly difficult to quote staple prices for this market.

The West Virginia smokeless coal has fallen off as much as 50c. in the price of lump. Some of the operators are trying to hold to old figures on prepared sizes, but most of them seem to have abandoned circular quotations and are slaughtering prices.

Most of the Illinois domestic coal is being sold at $1.50, and a considerable quantity of Indiana domestic has been disposed of in the open market at $1.40. Screenings are averaging 60c. to 65c., and the indifferent absorption tends to bearishness.

Franklin and Williamson County domestic coals sold as low as $1.35 but screenings are slightly firmer than elsewhere in Illinois. Saline County coals are also weak.

The Indiana mines are averaging about three days per week, and it is evident that some of the operators are trying to force the market. Considerable 6-in. lump from the No. 5 vein is being sold in the Indianapolis market as low as $1.25

There is a little better movement of lump from the Springfield district, and screenings have been sold as low as 55c.

It is still hard to obtain fixed prices on Eastern Kentucky coals; it is reported that quite a tonnage of consignment coal is being sacrificed at low figures and it is evident that the area of distribution is widening.

Some Hocking coal on demurrage has been sold at sacrifice prices, but shipments from the mines seem to be at list.

A dull tone seems to prevail in anthracite. Independent operators are quoting prices 10c. to 30c. below circular, but there is little free coal on hand. The demand for egg seems to be improving, and chestnut is steady.

Prices f.o.b. mines are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.50@1.75	$1.50	....	$1.50@1.60	$1.50@1.75
4-in. lump	.	..	$1.40@1.65	....	...
Steam lump	....	....	1.25@1.35	1.20	...
2½-in. lump	....	....	1.25@1.50	....	....
1¼-in. lump	....	....	1.25@1.40	....	....
Mine-run	1.15@1.25	1.05	1.10	1.10	....
Egg	1.35@1.75	1.35@1.50	1.35	1.40@1.50	1.50@1.75
No.1washed	....	....	..	....	1.60@1.75
No.2washed	....	....	....	....	1.40@1.65
6x3-in. egg	....	....	....	....	....
Nut	....	1.25@1.55	1.15@1.30	1.15@1.25	....
No. 1 nut	1.50@1.75	....	....	....	....
No. 2 nut	1.35@1.50	....	....	....	....
Screenings	0.60@0.75	0.55@0.65	0.60@0.65	0.60@0.75	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.40@1.65	$1.60@2.00	$1.50@2.00	$1.75@2.00	....
1¼-in. lump	....	1.40@1.75	....	....	$1.40@1.60
Lump & egg	...	....	1.50@2.00	....	...
Mine-run	1.10	....	1.40	1.10@1.25	....
Egg	1.35@1.50	1.15@1.60	1.60@1.75	1.75@2.00	....
No. 1 nut	1.40@1.65	...	1.50@1.75	....	....
No. 2 nut	1.25@1.50	....	..	....	....
Screenings	0.65@0.75	....	....	....	....

KANSAS CITY

Wholesale business slow and at slightly lower prices than last year. The market is heavy due to the over-production. Zero weather relieved the tension slightly.

Coal dealers, both wholesale and retail, are hoping that spring will bring a resumption of activities in industrial lines as this is the only thing that will relieve the sluggishness in the Kansas City market. An instance of the curtailed consumption is the closing of half a dozen large cement factories in western Missouri. Several trainloads a day of steam coal are shipped to these plants alone when in operation. Overproduction is reported as a result of a general lessening of the demand.

Shipments to or from Kansas City have been light, with practically no movement of coal Westward. Prices have not declined, but remain at a low level. Steam coal is selling at from 2 to 10c. lower than at this time last year, a margin which is improved slightly over the December record. Extremely cold weather toward the close of January stimulated the domestic demand so that the trade in lump and nut is not so much affected by the over-production.

ST. LOUIS

Coals of all kinds selling at less than cost. Steam grades demoralized. Heavy over production. Curtailment of operations.

Coal from all fields is now going at a figure below the cost of production. The local market is unable to take care of the tonnage offered, and it is impossible to get prices back to where they should be, with the surplus that is continually coming in. Weather conditions are not favorable and the continued business depression has demoralized the steam market.

Only those who have the greater portion of their tonnage under contract are opimistic; shippers in the open market are having an extremely hard time of it and there is nothing in sight to indicate better conditions, unless it is a severe spell of real winter weather. This would bring relief in some quarters, and perhaps better prices.

The over-production is the worst in the Williamson and Franklin County field and it is expected that the coming week will see a curtailment on the part of the larger operators.

A small tonnage of anthracite moved in during the past week or ten days, but there is no general demand for it. Smokeless has dropped out of the market almost entirely.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	....	$2.00	$1.25	....	....
3-in. lump	....	....	1.40	....	....
6-in. lump	$1.30@1.60	....	1.50	$1.15@1.25	$1.25
3x6 egg	1.25@1.45	....	....	1.00@1.10	....
No. 1 nut	1.15@1.30	....	....	0.90@0.95	....
Screenings	0.65@0.70	....	....	0.40@0.45	0.50
Mine-run	1.05@1.10	1.50	....	0.80@0.85	....
No. 1 washed nut	1.65@1.75	2.00	1.60	....	....
No. 2 washed nut	1.30@1.40	....	....	....	....
No. 3 washed nut	1.15@1.20	....	....	....	....
No. 4 washed nut	1.10@1.15	....	....	....	....
No. 5 washed nut	0.40@0.50	....	....	....	....

MILWAUKEE

Summary of situation for the past season. Tonnage falls below the previous year.

Milwaukee experienced a falling off in coal receipts during 1914, but the showing is better than was expected. The receipts aggregated 5,120,543 tons, against 5,551,478 tons in 1913, a loss of 430,965 tons, or 7.8%. Of this loss 183,450 tons must be credited to hard coal and 247,515 to soft the grades. According to the records of the canals at Sault Ste. Marie, Mich., the ports on Lake Superior suffered a decline of 22.4%.

There were two reasons for this falling off in so far as Milwaukee is concerned, and the same is no doubt true of competing ports. The unusually mild winter of 1913-14 left the yards with much larger stocks on hand than is usual at the onset of summer, and the slow outward movement due to the industrial depression throughout the country added to the backwardness of the situation. The loss in receipts was quite evenly distributed throughout the calendar months. All but two months of the season show declines from the records of 1913, July making a gain of 206,807 tons and August 97,676 tons. December receipts were unusually light, because of the fact that all of the yards were loaded to the utmost limit. This lack of storage room checked receiving business at the close. There are a few cargoes afloat in the harbor at present, but not as many as is the case in normal years.

Dealers report a more satisfactory condition of business than was experienced in the fall. The unusually sharp weather during the first few weeks of winter stimulated the movement of anthracite coal for heating purposes, while a noticeable betterment of conditions in manufacturing sections led to increasing sales of steam coal. While the average temperature has not been severe, it is cold enough to call for a steady consumption of fuel. The prospect is that the coming spring will find the various yards in a much more satisfactory condition than they were at the beginning of the receiving season of 1914.

The following table compiled by the Lehigh Valley Coal Sales Co. shows the wholesale prices of coal at Milwaukee during the year 1914:

Mo.	Wyoming and Cross Creek Anthracite, Egg, Stove and Nut		Pocahontas Screened	Cannel Kentucky	Steam Coal Splint	Hock.	Screened Yough.	Pocahontas Mine Run
Jan.	$6.83	$7.08	$5.25	$6.75	$3.55	$3.55	$3.55	$3.50
Feb.	6.83	7.08	5.25	6.75	3.55	3.55	3.55	3.50
Mar.	6.83	7.08	5.25	6.75	3.55	3.55	3.55	3.50
Apr.	6.35	6.60	4.75	6.75	3.55	3.55	3.55	3.50
May	6.45	6.70	4.75	6.75	3.55	3.55	3.55	3.50
June	6.55	6.80	4.75	6.75	3.55	3.55	3.55	3.50
July	6.65	6.90	4.75	6.75	3.55	3.55	3.55	3.50
Aug.	6.76	7.00	4.75	6.75	3.55	3.55	3.55	3.50
Sept.	6.85	7.10	4.75	6.76	3.55	3.55	3.55	3.50
Oct.	6.85	7.10	4.75	6.75	3.55	3.55	3.55	3.50
Nov.	6.85	7.10	4.75	6.75	3.55	3.55	3.55	3.50
Dec.	6.85	7.10	5.00	6.75	3.55	3.55	3.55	3.50

PORTLAND

Steamer "Cricket" arrives with 500 tons of Pennsylvania anthracite. Cool weather moderates and lighter business is expected from now on. Prolonged cold weather helped the situation but the winter business has not been good. Western mines reduce prices.

The American steamer "Cricket" has arrived here with 500 tons of Pennsylvania anthracite for the Independent Coal & Ice Co. The vessel was delayed getting here because of towing another vessel through the Canal.

The cool weather that has prevailed for several weeks is now begining to moderate and it is expected that the domestic demand will fall off. In spite of the cold weather, dealers say that the volume of business this winter was not up to the expectations, consumers having bought sparingly and not more than absolutely necessary.

The Pennsylvania anthracite is selling at $14 per ton retail, and half tons at the same rate, this price being quoted on account of the shipment arriving after the break in the cold weather.

Wholesalers here are getting the benefit of rate cutting between the Utah and Wyoming mines to the extent of 50c. a ton, but as there is no telling how long the reduction will continue the cut has had no effect on retail prices.

SPOKANE

Coal war between Wyoming and Utah operators for the markets of Idaho.

Although a coal war has broken out in southern Idaho in the vicinity of Nampa, coal prices in other parts of this section remain steady. Naturally this trouble is benefiting the consumers there, having reduced the price of coal to a large degree. The fight seems to be between the Wyoming and Utah operators and was brought about through a charge of boycotting the Wyoming coal.

Spokane and vicinity are finding no fluctuation in coal prices and the quality that was prevailing last year has been improved. Unless a decided change in the weather is made, there is no expectation of any change in prices.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for January, 1914-15, and the twelve months of 1914-13, were as follows:

	January		12 Months	
	1915	1914	1914	1913
Phila. & Reading	760,757	1,015,126	11,998,779	12,914,887
Lehigh Valley	954,072	810,588	13,136,759	13,011,370
Cent. R.R. N.J.	608,296	704,491	8,924,936	9,092,433
Del. Lack. & West	575,538	618,938	9,912,578	9,903,541
Del. & Hudson	623,947	586,893	7,313,541	7,094,258
Pennsylvania	451,200	536,118	6,434,937	6,351,756
Erie	577,007	706,303	8,268,585	8,192,352
Ont. & Western	183,718	197,275	2,352,486	2,509,031
Lehigh & New. Eng	96,794	104,912	....	....
Total	4,831,329	5,280,644	68,342,601	69,069,628

Stocks at Tidewater Jan. 31 were 798,125 tons as compared with 669,833 tons Dec. 31.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for December and twelve months of 1913 and 1914, in short tons:

	December		Twelve Months	
	1914	1913	1914	1913
Anthracite	977,929	1,012,125	11,201,150	10,711,335
Bituminous	3,755,675	4,354,729	47,769,227	51,526,267
Coke	621,774	880,962	9,548,354	13,892,825
Total	5,355,378	6,247,316	68,518,731	76,330,427

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during October, November and December of 1914:

	October		November		December	
	1914	1913	1914	1913	1914	1913
Coal	2,662,377	3,250,220	2,324,271	2,939,975	2,227,899	3,005,914
Coke	208,866	388,337	185,466	343,387	232,594	269,998
Total	2,871,243	3,638,557	2,509,737	3,283,362	2,460,493	3,275,912

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for October and the preceding two months of the years 1913 and 1914:

	August		September		October	
State	1913	1914	1913	1914	1913	1914
Missouri	178,949	201,992	250,763	233,195	317,466	280,958
Kansas	451,968	453,675	474,237	569,114	609,827	632,784
Arkansas	178,904	157,803	201,782	160,233	209,693	186,990
Oklahoma	289,949	244,103	297,213	254,973	340,915	319,439
Totals	1,099,770	1,057,573	1,223,995	1,217,515	1,477,901	1,420,171

I. C. C. No. 6464—Crows Nest Pass Coal Co. vs. Great Northern Ry. Co.

Demurrage charges on certain cars of coal at Republic, Wash., found to have been assessed in accordance with tariff provisions and complaint dismissed.

FOREIGN MARKETS

GREAT BRITAIN

Jan. 29—The market is firm for both prompt and forward loading. Quotations are approximately as follows:

Best Welsh steam	$4.92@5.04	Best Monmouthshires	$4.26@4.32
Best seconds	4.56@4.68	Seconds	3.78@3.90
Seconds	4.32@4.44	Best Cardiff smalls	3.42@3.54
Best dry coals	4.56@4.68	Cargo smalls	2.88@3.12

The price for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freight—Rates generally remain at very high levels and are today approximately as follows:

Gibraltar	$6.00	Naples	$7.20	Las Palmas	$5.28
Malta	6.48	Venice, Ancona	9.00	St. Vincent	5.52
Marseille	5.79	Alexandria	7.20	Rio Janeiro	7.08
Algiers	6.17	Port Said	7.20	Monte Video	6.24
Genoa	5.79			River Plate	6.48

CONSULAR NOTES

The American Consular Office has been informed by an agent in one of the Mediterranean countries that he desires the address of American exporters of coal who are prepared to furnish large quantities. It is stated that this man has placed a large trial order with his government. References are given. Delivery is to be made at destination.

FINANCIAL DEPARTMENT

Lackawanna Coal & Lumber Company

President W. L. Connell of this company reports under date of Oct. 1, 1914, as follows:

Summary of Properties—When the improvements and plans now under way are completed, the company will have: (1) Paint Creek Collieries Co. operating eight thoroughly equipped mines. (2) Griffith Collieries Co. operating a large colliery on the Coal River property. (3) Highland Lumber Co., operating one mill at Seth, W. Va., and two mills in Virginia. (4) Merchandise sales of 10 stores and rents of 1200 houses. These operations include only the first of many mines to be opened on the 53,000 acres owned in fee, and take no account of any profits realizable from natural gas. When these additional sources of profit become effective, the net earnings, the management believes, will be sufficient not only to pay its fixed charges, but to provide a surplus for dividends on the stock.

Paint Creek Collieries Co.—This company, whose capital stock is nearly all owned, has under lease 14,235 acres in two tracts on Paint Creek and Brier Creek in Kanawha and Fayette counties, W. Va., including 950 acres recently acquired. It is now operating 8 mines, which it is improving, electrifying and equipping, viz.: (1) Paint Creek Mine, completely operated by electricity, with large modern tipple, 36,000 ft. of track, 2 electric main haulage locomotives, 10 electric gathering locomotives, 10 electric undercutters and 500 mine cars. Except for a retarding conveyor, already ordered, the mine is completely modernized. (2) Banner Mine lies on the opposite side of the mountain from Paint Creek mine and is working the same seams of coal from the opposite direction. (3) Grose Mine, to be modernized for operation electrically on the same general plan as at Paint Creek Mine, with erection of a modern tipple, retarding conveyor, several hundred cars, etc. Contracts for equipment already let. (4) Scranton and Wacomah mines, scheduled for early improvement; new equipment is on the way to increase the capacity. (5) Green Brier mine, now being reopened. With the new tipple completed in November, will add at least 1000 tons per day to production of Paint Creek mines. (6) Detroit mine, also being re-opened; when the tracks are re-laid in Nov. 1914, will provide an additional tonnage of 750 tons per day. (7) Reynolds mine on Brier Creek. Completely re-built and furnished with new coal-handling and screening equipment. When the inside workings are fully developed should produce 1200 tons per day.

Upon the completion of the improvements now under way at the mines of the Paint Creek Collieries Co., and the installation of the electrical appliances in our sub-stations, thereby giving to the various operations their maximum electrical power, there is no reason why the output of the Paint Creek Collieries Co. should not exceed 1,000,000 tons per annum.

Wages—The basis first offered to the employees was refused and the strike of 1912 was called, which lasted for 18 months, the men not only being idle, but some of the tipples destroyed and many improvements laid waste. Finally, a new basis of wages was fixed upon and the company enjoyed peace for a period of 8 months, during which it had to reorganize its working forces and re-establish the market for its coal. In 1914 the Paint Creek Collieries Co. entered upon separate negotiations with the miners, with the result that the scale agreed upon eight months before was re-established, with the exception that the rate paid for mining splint coal, was fixed at 29c. per ton subject to arbitration, and has since been fixed at that figure by decision of five arbitrators. This basis for machine mining upon the Paint Creek Collieries will remain undisturbed for a period of three years. The scale of wages is now as low as that paid by any mining company in the Kanawha district and places the mines upon a fair and profitable basis.

Griffith Collieries Co.—The Chesapeake & Ohio Ry., which now reaches Seth on the Coal River property, has announced its intention to extend its Coal River branch for a considerable distance through our lands to connect with its Cabin Creek branch at Whitesville. This will open up an entirely new section, much of which it is proposed to lease for development on a royalty basis. The first such contracts have been made with the Griffith Collieries Co., a subsidiary of the Lackawanna Coal & Lumber Co., which owns all its capital stock and will receive not only a royalty on the coal mined, but the profits above fixed charges. The Griffith Collieries Co. has leased 2500 acres and will erect at the terminus of the company's own railroad a colliery with a capacity of 4000 tons per day. A tram road 3½ miles long has been graded to bring the coal to the tipple and plans for the tipple and coal-handling equipment are ready. The plans provide for the model mining town of Griffith (all owned by the company), with 300 to 500 houses for mine workers (large boarding-house already completed), and lighted from one of our neighboring gas wells. The Griffith lease contains six veins of coal, four above water level. Veins thick and of high quality.

Highland Lumber Co., Inc.—This subsidiary of the Lackawanna Coal & Lumber Co. has combined all of the latter's lumber operations, and has taken over its locomotives, cars, logging equipment and lumber business generally in West Virginia for a cash consideration and will pay an annual rental for its mill, houses, store and other buildings at Seth and $4 per 1000 ft. for all timber cut from its lands. The ownership of the mill and all the standing timber is still vested in the Lackawanna Coal & Lumber Co., which also owns all the common stock of the Highland Lumber Co., Inc., and will receive all of that company's profits on both the West Virginia and Virginia operations after fixed charges and dividends on such prefered stock as may be issued. The Lumber Co. is preparing to construct a railroad and two mills on its 30,000-acre tract in Virginia The profits per 1000 ft. should be even larger than at Seth, where $108,000 was earned last year.

Company Stores, Etc.—The Paint Creek Collieries Co. is now operating six stores and rents over 600 houses to its mine workers and the Highland Lumber Co. conducts a highly successful store at Seth and rents 50 houses to employees. Eventually, with the town of Griffith fully established, there will be, in all, at least 1200 houses and 10 stores.

Prospecting for Gas and Oil—The prospecting of the properties for gas and oil has met with promising results. One gas well, producing 500,000 cu.ft., has been struck in Nicholas County, and the towns of Swiss and Jody are now supplied therefrom. On the Coal River property in Boone County, 5 gas wells have been developed, having a total capacity of 4,750,000 cu.ft. per day, and the town of Seth is being supplied from one of them. Two other wells are now being drilled on this property. The striking of gas in five widely separated localities in Boone County, it is thought, indicates that at least 10,000 acres of the property is underlaid with natural gas.

BALANCE SHEET OF LACKAWANNA COAL & LUMBER CO.

Assets—	Sept. 1 '14	June 1 '13	Liabilities—	Sept. 1 '14	June 1 '13
Coal in ground	$25,816,970	$25,816,970	Capital stock	$12,000,000	$12,000,000
Lumber stumpage	526,473	600,000	Bonds and tr. notes	12,026,550	9,335,850
Paint Cr.C.Co. stk	*2,522,000	2,250,000	Notes payable and liens	399,961	657,367
Other investments	475,730	....	Accts. payable	64,358	77,787
Lumber in yard, etc	199,116	140,023	Accrued int	338,057	127,444
Saw-mill, RR., etc	259,635	293,884	Surplus	6,036,919	7,370,803
Cash and securities	163,640	197,964	Total	$30,865,845	$29,569,253
Accts. and notes rec	902,281	270,412			
Total	$30,865,845	$29,569,253			

* Paint Creek Collieries Co. stock, $2,522,000, as above, includes common, $1,000,000; preferred, $1,522,000.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 73—Washington, D. C.—Sealed proposals will be received until 11 a.m., Feb. 15, for furnishing and delivering bituminous coal, either at Washington, D. C., or at Alexandria, Va., for the steamer on duty at Fort Washington, Md. (p. 275). Address, J. B. Houston, Depot Quartermaster, Washington, D. C.

Contract No. 81—Philadelphia, Penn.—Sealed proposals will be received until noon, Feb. 17, for furnishing and delivering about 29,000 tons of bituminous coal to the floating plant employed in the Philadelphia Engineer District of the United States Government during the period beginning Mar. 1, 1915, and ending June 30, 1916 (p. 275). Address, Col. Geo. A. Zinn, 815 Witherspoon Building, Philadelphia, Pennsylvania.

Contract No. 84—New York, N. Y.—Sealed bids will be received until 10:30 a.m., Feb. 15, for furnishing and delivering 75 tons of stove coal. A deposit of 1½% of the amount involved must accompany each bid and the contract to be completed during the current year. Address Contract Clk. Lamb, Room 1034, Department of Charities, Municipal Bldg., New York.

Contract No. 85—Baltimore, Md.—Henry Sonneborn & Co., Pratt and Paca Sts., Baltimore, will be in the market about March. 1, for 3500 to 4000 tons of standard mine-run coal. Address Pur. Agt., A. Mainzer, Baltimore, Md.

Contract No. 86—Hinsdale, Ill.—The Municipal Electric Light Plant, at this place, will be in the market about the first of next month for 4000 tons of screenings. The approximate cost is 90c. per ton at the mine and Purity coal is commonly used. The contract is let on a competitive basis. Address, Mgr. H. H. Bristol, Municipal Electric Light Plant, Hinsdale, Ill.

Contract No. 87—New York, N. Y.—Sealed bids will be received until 11 a.m., Feb. 18, for furnishing and delivering anthracite and semi-bituminous coal. The security required will be 30% of the total bid and delivery is to be made as may be directed. Address Comr., Katherine Bement Davis, Department of Correction, Municipal Bldg., New York.

Contract No. 88—Vincennes, Ind.—The City Electric Lighting Co., at this place, contracts for about 5000 tons of mine-run coal and screenings sometime during March. The approximate cost is $1.45 for mine-run and $1.15 for screenings and the business is done on a competitive basis. Address Mgr., A. J. Hetz, The City Electric Lighting Co., Vincennes, Indiana.

Contract No. 89—Washington, D. C.—Telegraphic bids were requested by the Bureau of Supplies and Accounts ,Navy Dept., Washington, until noon, Feb. 10, for either the transportation of coal or coal and transportation, delivery to be made at the naval coaling station at Key West, Fla., and Portsmouth, N. H. About 5000 tons are required at Key West and 12,000 tons at Portland, deliveries to be started before Mar. 1, 1915 and completed by Mar. 20. Bidders were to state dates on which deliveries were to be made. A daily discharge rate of 400 tons at Portsmouth and 350 tons at Key West is guaranteed. Address Paymaster-General of the Navy, Samuel McGowan, Washington, D. C.

Contract No. 90—New York, N. Y.—Sealed bids will be received until 10 a.m., Feb. 17, for furnishing and delivering 350 gross tons, more or less, of anthracite coal. The security required will be 30% of the total bid and a certified check of 5% must accompany each bid. Delivery will be as required and the contract is to be completed before Mar. 1. Address Chn. of the Comn., Alrick H. Man, Board of Trustees of Hunter College, Dept. of Education, Park Ave. and 59th St., New York.

Contract No. 91—Jackson, Ohio—Bids were received on Feb. 1, for furnishing coal to the electric light plant for a period of eleven months ending Dec. 31, 1915. Bids were to specify the kind, grade, quality and cost per ton of 2000 lb., delivered in bins at the electric light plant in such quantities as required. Address Dir. of Pub. Ser., R. L. Lamb, Jackson, Ohio.

Contract No. 92—Kennebunk, Maine—The electric light department, at this place, will be in the market about Mar. 1 for 375 long tons of Georges Creek coal. The usual contracting figure is about $5 per ton. The award is made on a competitive basis. Address Supt. I. H. Wells, Electric Light Dept., Kennebunk, Maine.

Contract No. 93—Jersey City, N. J.—Bids will be received until 10 a.m., Feb. 24, for furnishing and delivering 2500 gross tons of best quality pea coal at the power house. Address, Clk. of the Bd., John C. Sweeney, Boulevard Commissioners, County Court House, Jersey City, N. J.

CONTRACTS AWARDED

Contract No. 47—Batesville, Ark.—This contract (p. 231), which provides for furnishing about 1800 tons of mine-run coal, has been awarded to the McAlister Fuel Co. at $1.75 per ton. Address Supt., W. H. Walkup, Batesville Water & Light Plant, Batesville, Ark.

Contract No. 64—Columbus, Ohio—The bids on this contract (p. 231) which provides for furnishing 725 tons of bituminous lump coal were as follows, per ton: Dublin Avenue Coal Co., $2.472; Homer C. Gill, $2.45; Fletcher-Williams Coal Co., $2.39; M. A. Suydam & Co., $2.34; George J. Igel, $2.34 (awarded contract). Address Dir. of Pub. Safety, B. L. Barger, Columbus, Ohio.

Contract No. 68—Sheridan, Wyo.—This contract (p. 231) which provides for furnishing and delivering screened lump coal within the city, for one year, commencing Feb. 5, has been awarded to Jack Gregg, Sheridan, at $4940. Address, County Clk. James J. Withrow, Sheridan, Wyo.

CONTRACT NOTES

The Townsend Grace Co., Baltimore, Md., consumes about 1400 tons of Ralphton grade coal. Address the Pur. Agt., S. G. Wolf, Townsend Grace Co., Baltimore.

The Celina Electric Light & Water Wks. has awarded a contract to the Kanawha Valley Coal Co., Charleston, W. Va., for furnishing coal at 85c. per ton for Logan mine run. Address Supt., C. W. Howard, Celina Electric Light & Water Wks., Celina, Ohio.

Bernheimer Bros., Baltimore, Md., use about 500 tons of standard mine-run soft coal per month. At present no contract exists. Address, Herman Bernheimer, of Bernheimer Bros., Baltimore.

The Secretary of the Interior, Washington, D. C., has awarded a contract for furnishing 2000 tons of coal for use on the work in connection with the storage unit of the Yakima Irrigation Project, to the Roslyn Fuel Co., North Yakima, Wash., at $2.75 per ton.

The Emerson Tower Bldg., Baltimore, Md., uses about 500 tons of coal annually. Address the Pur. Agt. Parker Cook, Baltimore, Md.

Hamburger Bros. & Co., Baltimore, Md., use from 350 to 400 tons of soft coal per month. In general, this company buys under contract, but at present gets its supply in the spot market. Address the Pur. Agt. Philip Hamburger, 16 South Eutaw St.

The Commission of Paducah, Ky., is having tests made of the pea and slack coal submitted by four companies who are bidding for furnishing the city's coal supply for 1915. The contract provides for about 250 tons of mine-run and 1500 tons of pea and slack coal.

L. Grief & Bro., Eutaw & German St., Baltimore, Md., buy 2000 tons of Georges Creek coal per year. This company usually purchases in the spot market, but will consider bids for furnishing contracts. Address the Pur. Agt., Rose Engle, Baltimore, Md.

COAL AGE

Volume 7, No. 8
Issued Every Saturday
Hill Publishing Company

NEW YORK, FEBRUARY 20, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

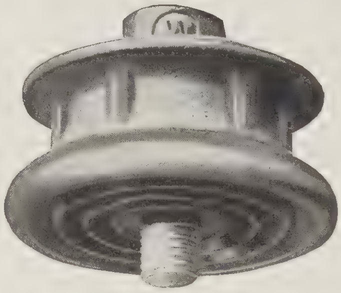
Colorado Fuel & Iron Co.'s Training Schools

Teaching Children First Aid

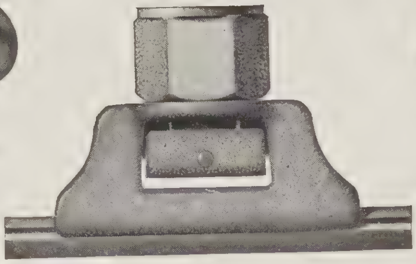
Business Class—Banking Hour

Westinghouse Suspensions and Clamps

All Metal Parts Sherardized



Type BF-1, Suspension Style 207352
Test Voltage = 10,000 Volts
Ult. Strength = 6000 lbs.
Height = $1\frac{7}{16}$ inches
Diamater = $3\frac{1}{4}$ inches



Type RE Mine Clamp, Weight 11 oz.
Average Ult. Holding Power, Vertical Pull, 4/0 grooved wire = 1450 lbs.
Average Ult. Holding Power, Side Pull, 4/0 grooved wire = 1200 lbs.
Height = $2\frac{1}{4}$ inches

Type BL-3, Suspension Style 207353
Test Voltage = 10,000 Volts
Ult. Strength of Supporting Arms, 3500 lbs.
Height = $1\frac{7}{16}$ inches
Diameter = $3\frac{1}{4}$ inches

Strength and Durability are what you want in line material—

THESE qualities are found to the greatest degree in the devices illustrated.

A new and improved insulating compound, **"Westinghouse No. 116,"** is the standard for holding the stud in the body of the suspension. This compound has the greatest mechanical and dielectric strength consistent with reasonable cost. When desired *Bakelite* insulation will be substituted at a slightly increased cost.

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

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Baltimore, Md.
Birmingham, Ala.
Bluefield, W. Va.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, O.
Cleveland, O.
Columbus, O.
*Dallas, Tex.
Dayton, O.
Denver, Col.
Detroit, Mich.
*El Paso, Tex.
*Houston, Tex.
Indianapolis, Ind.
Joplin, Mo.
Kansas City, Mo.
Louisville, Ky.
Los Angeles, Calif.
Memphis, Tenn.
Milwaukee, Wis.
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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,500
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

IT has always been one of my strong beliefs that the readers of a paper should have a lot to say about the *kind* of advertising that is printed in that paper. And there's no reason why they can't if they will only make themselves and their ideas known.

For instance, when you answer an advertisement why don't you tell the advertiser where you saw it, and, if it hasn't given you the information you want, tell him so. He'll be glad to know it, and your suggestion will help to make that advertising more instructive and informative to other readers.

* * *

AN EXAMPLE of the lack of get-together between reader and advertiser came to hand recently in the two letters which I quote here.

The Fairmont Mining Machinery Co., of Fairmont, W. Va., wrote us awhile ago: "Our records on inquiries show that we have received more inquiries from our advertising in Coal Age than in any other paper, although we have no figures relative to the amount of business realized from these inquiries."

And then comes a letter from J. R. Sharp, General Superintendent of the Consolidated Indiana Coal Co. office at Sullivan, Ind., which reads: "I have been a subscriber to Coal Age for the past three years and have read the editorials with a great deal of interest. We see that this paper goes to each of our mine foremen and consider the subscription price a good investment.

"We recently bought some Fairmont mining pumps, which were brought to our notice through an ad in Coal Age."

You see the Fairmont people sold those pumps through their advertising, but they don't know it.

A little closer relations between buyer and seller, through advertising, would be a mighty good thing for both.

* * *

NEXT MONDAY, the 22d, is George Washington's birthday, and it just occurs to me that when we talk about "truth in advertising" perhaps we owe something of the idea to our first President. At least when he confessed his guilt in the cherry tree incident he did more to advertise the truth in America than anyone else has ever been able to do.

And I venture to say that if Washington were alive today, he would be an enthusiastic reader of the ads—because he would want to know the truth about anything he might need to buy.

COAL AGE

Vol. 7 NEW YORK, FEBRUARY 20, 1915 No. 8

"Heat Not a Furnace for Your Foe so Hot that It Do Singe Thyself"

MR. SHAKESPEARE wrote that, and it's pretty good advice. We have just learned of an instance where a "shyster" lawyer suffered a severe singeing in the manner indicated. Sounds too good to be true—does it not?—but it's a fact nevertheless.

A superintendent, who is a friend of ours, received a letter from a certain lawyer reading something like this:—

> "John Doe, an employee of your company, was injured at one of your coal mines last week through the negligence of your company and has just gone through a serious operation at the L——— Hospital. I have just entered suit against your company for him. He has $75.00 due him on your last month's payroll, and I request that you forward that amount to me on Saturday, your regular pay day."

The superintendent investigated and failed to find John Doe on the payroll, and he immediately wrote the lawyer to that effect.

The lawyer replied with:—

> "You are evidently mistaken. The following persons witnessed the accident."
>
> Then followed a list of five names.

Imagine the surprise and joy of the superintendent when his timekeeper reported that not one of the names furnished by the attorney had ever appeared on the company's payroll.

He lost no time in again communicating with the attorney and this time he included a few pertinent questions, as a basis for future correspondence. He hasn't received a reply as yet.

However, in a roundabout way, he learned that a certain ignorant, illiterate darkey had succeeded in getting an advance of $30.00 from the lawyer in question, and the lawyer has not seen fit to prosecute the offender.

The darkey, under another name, had really dug coal at our friend's camp some years before, and thus was able to tell a plausible story to the attorney. He had been slightly injured through his own carelessness while loafing in the city, and had succeeded in gaining admittance to a charity ward of a hospital where the attorney's "ambulance chaser" discovered him.

The case, as described by the darkey, looked good to the attorney, and the $75.00 of (imaginary) wages due certainly justified a $30.00 advance. In fact, he had often made advances when the would-be client suggested that he must have money to live on.

For years, we have been trying through laws and appeals to public opinion to make the shyster trade unprofitable, but so far, to our knowledge, not one shyster have we vanquished.

All honor to the darkey for his victory as well as for his suggestion. We will willingly furnish bond to any of his imitators who land in jail.

Ideas and Suggestions

Blocking Worry, Trouble and Expense

By Alabama

Many men who are entrusted with the business of management pin too much faith in reports and spend too much time in perusing and following them up. The more exhaustive they can be made, the better some of these men seem to like them and the more time they spend on them. Minor officials and heads of departments are forced to give too much of their time to formulating these reports and answering letters about them from the men who think they are indispensable. This goes on month after month and grows more vexatious to all concerned. Some of the letters often sting pretty hard because most men about a coal mine carry their mail in their pockets and to read and think about letters of criticism throughout the hours of work does not tend to raise a man's real practical value to the company that employs him.

It is all right to have reports. They are necessary to the management of any concern. But far too many executives have yet to learn that the purpose which they try to accomplish by too many such voluminous documents can be obtained in an easier, simpler way; and at the same time put an effective block in the way of worry, trouble and expense.

You ask "How can it be done?" Here's the answer:

1—Set up a definite schedule of the requirements (daily, weekly or monthly) of your mine. In the case of labor establish a definite quota of men allowed for each occupation and require your timekeeper to advise you at once when the quota for any given occupation is exceeded. For materials used, provide a schedule showing the quantities of all supplies that you want to keep close track of, which it will be allowable to issue daily, weekly or monthly as you say.

2—On the forms used for various reports provide an extra column for showing labor or material used in excess of requirements. This will show at a glance what the mine appears to be using above what your knowledge and experience has shown to be necessary.

Mine executives who adopt this plan will accomplish two very important things. The first is that of establishing a definite standard for labor and materials necessary to operate normally one or a number of plants. The setting up of such standards will require hard study on the part of the management, but when this is once firmly established and lived up to, there is little doubt that it will result in the elimination of certain expense sustained previously.

Another benefit obtained under this plan is that of eliminating the time and trouble involved in scanning and comparing lengthy reports in an effort to dig out the items appearing too big, etc. In this plan the essential thing in connection with the scrutiny of reports will be to watch carefully the columns showing "Excess of Requirements." In fact after the men all along the line thoroughly understand that anything used in excess of the established schedule requires special approval and complete explanation; they will live pretty close to the line drawn.

The essence of the whole scheme lies in getting away from the practical effects of following the principle that where foremen are allowed to use any number of men or any amount of material, they will usually be able to get by with their explanations; and adopting the better principle that where a definite requirement is set up, men can be taught or made to live up to same.

The plan offers an excellent opportunity for blocking or preventing that waste of money and time which all mine managers are interested in eliminating. It is working on the principle of buying and using only what one needs which nearly always means living within one's means. Men who operate coal mines will certainly be interested in anything which will help to bring this about for them.

Let us hear from any who think the plan is worth trying.

Put Yourself in the Other Fellow's Place

By M. D. Cooper*

In your office, when a foreigner with a command of only a few English words comes in to try to explain that he believes there is a mistake in his statement of earnings and deductions, it will help some if you put yourself in his place. Try to realize the difficulties of his position. He is probably handicapped not only by his limited knowledge of English, but the chances are that his calculations are incorrect while his statement is right as it stands.

How much better it is then to win his loyalty and respect by reasonable explanations, rather than to send him away grumbling and dissatisfied, perhaps with a shouted command ringing in his ears and consigning him to a tropical region. There are offices at mines where the men in those offices do not know or else fail to remember that they hold their jobs because the diggers they are so ready to chastise are there loading coal. Offices are not very generally kept up at mines where no coal is produced.

In dealing with a man whose position is either higher or lower than your own, bear in mind that his perspective differs from yours. If you are a fireboss and you go to your superintendent for a house for your family, you, of course, regard the question of a house as of very considerable importance. The superintendent, however, is probably making changes in housing every day and therefore your application is just one of the regular incidents of his day's work. Do not be surprised then if he seems to fail to attach as much importance to the matter as you do. On the other hand, if you are the superintendent or any other official, it is well to remember that any statement of yours, regardless of its importance to you, may loom up large to one of your subordinates. Make your conversation clear and explicit. If you make no promises, you will have none to break.

---

*Ellsworth, Penn.

Many Pretend to Misunderstand

In the mine you sometimes hear a man say that he does not know what the boss expects him to do on a certain job. Let him put himself in the boss' place, and reason it out. In nine cases out of ten, the apparent failure to understand orders is due to the fact that the thing to be done is a little out of the ordinary or perhaps a little more difficult than usual. The easiest refuge is found in pretending to misunderstand. A successful pit-boss in Pennsylvania makes it a practice to size up a job from the standpoint of the men under him. His men know that he understands them and their work and that he can't be fooled.

In cases of special danger, it is a questionable practice for one in authority to send a man to work in a place where he is unwilling to remain to supervise the work.

Mistakes will always be made. Whether a man be pit-boss or digger, he must realize that the other is sure to make a mistake now and then. But by putting yourself in the other fellow's place, misunderstandings will almost always be avoided. Circumstances will then be found to explain in part at least the reason for mistakes. In any case, it pays to judge a man not on the basis of his separate mistakes, but rather on the relation of these mistakes to the total amount of work or good that he accomplishes, which is the only equitable basis for judgment.

Put yourself in the other fellow's place. It is the surest way to avoid friction and misunderstandings. It promotes respect and good will. Moreover, it pays because it gets the best results without the inevitable loss that always follows in the train of discord of any kind.

A Safety Appliance for Underground Slopes

By William McMahon*

For many years past, we have heard much of the active work going on in and about the mines looking toward the prevention of accidents. It is gratifying to learn that in many cases employers and employees are coöperating in a safety-first campaign. Too much cannot be written about this subject as statistics show that since this movement was actively taken up, the number of accidents has greatly decreased.

A feature which is highly gratifying is the greatly increased number of articles appearing in the technical journals regarding the many safety devices which are being installed in and around the mines. I am sure these articles and the sketches accompanying them will appeal to all those interested in mining, for in nearly every instance someone will be certain to get an idea applicable to the particular case in which he is interested.

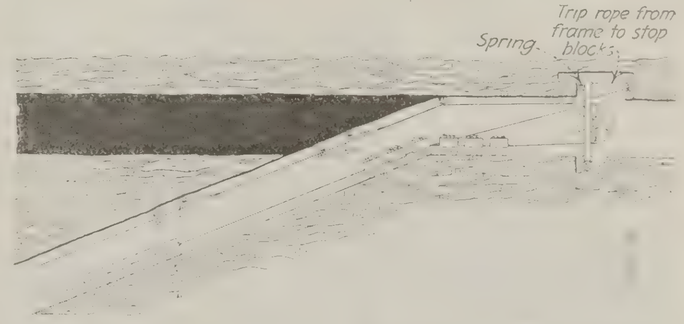
The following description is of a safety device which I installed some few years ago at a mine where I was engaged. At this development the coal bed pitched somewhat, and the coal was gotten to the bottom by gravity, the loaded cars coming down the slope pulling the empties up. Many accidents occurred due to loaded cars breaking their couplings at the top of the slope, or sometimes entire loaded trips would be pushed over the knuckle before the rope was firmly attached to them. This not only caused considerable delay and expense, but, what was vastly worse, endangered the lives of the men who were engaged on the slope.

Stop Blocks Were Installed

The frequency of these accidents was considerably decreased by the installation of this device which consisted of a series of stop blocks placed above the loaded track and operated automatically from the pulley frame at the top of the slope. The principle of operation of this device may be clearly understood by reference to the accompanying drawing.

As may be seen in the drawing, the head sheave was carried upon a frame hinged at its lower end and free to move through a limited vertical arc. The trip-rope governing the blocks over the loaded track is attached to the upper end of this swinging frame, passing over a suitably placed pulley so as to receive a reversal of direction before passing down the slope to the trips, or stop blocks.

Whenever a trip of loaded or empty cars, or both, was upon the slope and exerting a pull upon the head sheave, the tilting frame swung to its foremost position, raising the stop blocks thus allowing the loaded trip of cars to pass down the incline. Should a trip break away, however, the pressure on the head sheave would be released, and the stop blocks would have sufficient weight to draw the tilting sheave frame backward, the blocks meanwhile descending and stopping the trip of loaded cars.



Arrangement of Cable, Trip Rope and Safety Blocks

It was found in some cases, however, that when a loaded trip had been pushed over the knuckle that the stop blocks were raised to their proper position, but the jerk on the car couplings sometimes caused a breakage in the middle of the trip, releasing three or four cars. The weight of the remainder of the trip was sufficient to hold the stop blocks up out of the way so that the runaway cars could pass down the slope to the landing at the bottom, tieing up the entire entry.

The addition of the springs shown in the drawing, when properly adjusted, entirely eliminated this sort of trouble. If, for instance, three or four cars break away when pushed over the knuckle, the springs, although compressed fully by the first shock when relieved of the weight of the cars which broke away, immediately expand, lowering the stop blocks if not to their proper position at least enough to intercept and stop the passage of the runaways.

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*Taber, Alberta, Canada.

Reopening the Grayson Mine in Illinois

By E. C. Lee*

SYNOPSIS—A dangerous mine fire was extinguished by sealing up the shafts. Rescue corps succeeded in opening up the workings without any serious mishaps. Methods of gas analysis. Permissible explosives adopted.

The No. 6 Mine of the Saline County Coal Co., which was sealed up on Nov. 11, 1914, in order to extinguish a fire in the face of the 1st and 2d West Stub Entries off the 3d and 4th South West, was opened on Dec. 26, 1914, by helmetmen from the Illinois Mine Rescue Stations and from the Saline County Coal Company.

This mine is located on the Louisville & Nashville R.R., at Grayson, about 2½ miles out of Eldorado and was acquired by the Saline County Coal Co. about two years ago. The seam worked is the No. 5 of the Illinois Geological Survey Correlation, which in this mine is from 5 to 7 ft. thick. The mining is done by machines of the Morgan-Gardner type, and the coal is shot down by the use of black powder. The following is the proximate analysis of coal from this bed in this vicinity, as made by the Illinois Coal-Mining Investigations. The first analysis of the coal is "as received," with total moisture; the second analysis is "dry," or moisture free.[1]

No. 6 Mine of Saline County Coal Co., Grayson, Ill.

No. of Analysis	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur	B.t.u.	Unit Coal B.t.u.
1	6.75	35.49	48.72	9.04	2.92	12,276	
2	Dry	38.06	52.25	9.69	3.13	13,165	14,812

"The roof of the No. 5 bed in this district is a shale varying from light gray to black, and locally may be laminated and interbedded with bone and stringers of coal for a distance of 3 ft. above the seam. The roof usually contains also many concretions of iron pyrites called 'nigger-heads.' These have more cohesion with the rest of the roof material than do the nigger-heads of the Danville district.

"The floor is fireclay which in places contains much sand and heaves badly when wet. The bed does not lie as flat as the No. 6, but contains many hills and rolls causing grades as high as 15 per cent. in the entries of some mines. The coal is not pinched out at these hills, but follows their contours with undiminished thickness."[2]

The Mine Was Gassy

The output of No. 6 mine is about 1200 tons per day, about 225 men being employed. No firing of shots is done while the men are at work, shotfirers being employed for this purpose, and firerunners following them to extinguish any fires which may be caused by the shots. Some sections of the workings generate much marsh gas, but soon after the mine was acquired by the Saline County Coal Co., the fan was enlarged and the airways cleaned up so as to produce an adequate supply of air for diluting and removing this gas. The fan is 16 ft. in diameter and of Crawford & McCrimmon type, with 4-ft. blades, producing 100,000 cu.ft. of air per minute at 84 revolutions per minute.

On the night of Nov. 10, the firerunner discovered a fire in the face of the 2d West off the 4th South West, and, after attempting to extinguish it himself, went out for assistance. The fire was fought by the employees of the mine for several hours, when it was discovered that the face of the 1st West was also afire, the fire extending back of the inside crosscut. Assistance was sent from the No. 3 mine of the company, at Harrisburg, the men being accompanied by Supt. George W. Morris, Geo. Bagwell, formerly superintendent of the O'Gara Coal Co., John Wunderlick, assistant mine manager, Saline Co. Mine No. 2, and Walter Scott, superintendent of the Benton mine-rescue car, who was in Harrisburg on his vacation.

It was known that the roof at the face was in very bad condition, and it was decided that the proper thing to do was to seal off the two entries and smother the fire. Accordingly, a canvas stopping was built across the 2d West between rooms 8 and 9, so as to shut off from the fire the main ventilating current, which in these entries is ordinarily about 12,000 cu.ft. of air per minute.

The men then went through the door marked "D1" on the map, and began the erection of a stopping on the 1st West between rooms 8 and 9. These two stoppings, with one in the crosscut between rooms 8 and 9, would have sealed off the face of the entries, but as the men were finishing the second stopping, a slight explosion, probably of gas produced by the fire, drove them from the work. A glance at the map will show that, on account of the way in which rooms were broken through to the entries above, the erection of seals enough to cut off the fire area would have been a task calling for weeks of work, rather than a few hours; and, recognizing this fact and being unwilling to have the men work any longer in a dangerous place, Superintendent Morris decided that the only thing left was the sealing up of the entire mine, by closing both the hoisting and the fan shafts. The men were accordingly withdrawn and the shafts sealed at the surface.

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*Instructor, Illinois Miners and Mechanics Institutes, Herrin, Ill.

[1] Bulletin 6 of the Illinois Coal-Mining Investigations, page 6.

[2] Bulletin 6 of the Illinois Coal-Mining Investigations, page 10.

HOW THE SHAFTS WERE SEALED

The seals over all the shafts were constructed in the same way, mine rails being first laid across the shaft to provide a foundation for the other material. Across these was laid a single course of 3-in. planks, covered with a double thickness of heavy canvas or brattice cloth. A box was then built around the shaft, extending past its edge 2 ft. on each side, and the entire box filled with sand to a depth of about 2 ft. The box was then braced by packing a wall of clay tightly around the outside.

The fan drift was also sealed, but necessarily in a somewhat different manner. Nearest the shaft was built a wall of ship-lath, faced with wood fiber. Eight inches from this was another wall of boards, the space between being filled with sand. Next to the boards was 10 in. of clay, this being supported by another wall of ship-lath, faced with wood fiber. In order to insure a tight joint, the walls of the fan drift were finally covered with cement.

On Dec. 11, just a month after the shafts had been sealed, I accompanied Engineer H. I. Smith, of the U. S. Bureau of Mines, on a visit to the mine for the purpose of investigating the conditions. Several samples of the gaseous mixture inside the mine were taken, using both vacuum and citrate-of-magnesia bottles. The pneumatic signal tube in the hoisting-engine room was opened, a ¾-in. cap being obtained on a Koehler safety lamp held near the opening. The time of the visit was fortunately during a period when the barometric reading was comparatively low, and the samples were obtained without much difficulty. Samples were taken at both the hoisting and fan shafts, the latter being obtained by unscrewing the pressure gage. Mr. Smith and I a little later ran an analysis of these gases, using for the purpose an Orsat gas analysis cabinet owned by the Illinois Miners' and Mechanics' Institute, finding the following mixture:

Carbon dioxide	1.63
Oxygen	6.25
Methane	11.14
Nitrogen	79.10
	98.12

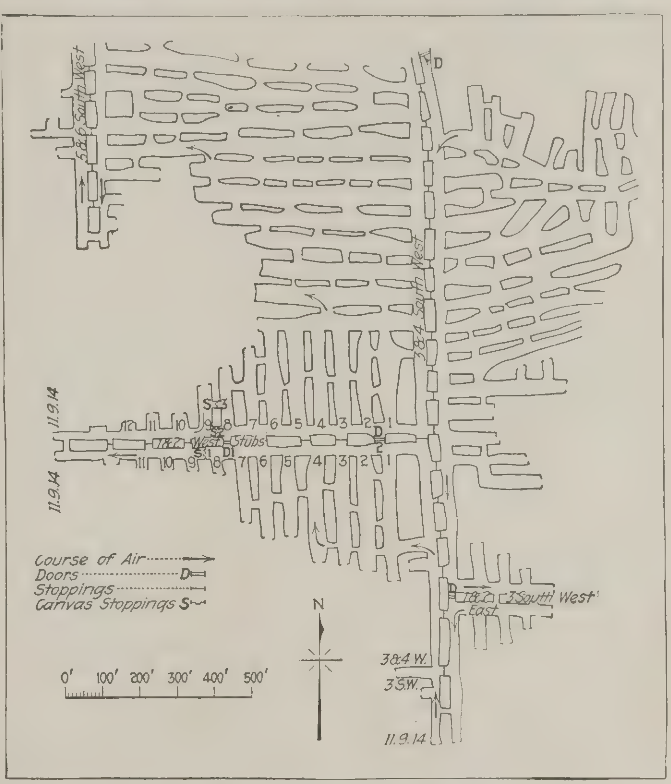
It will be noted that these proportions are not absolutely correct, but they are sufficiently accurate to be used as a guide in determining the condition of the air in the mine. The fact that these results were later checked by the Bureau of Mines leads me to the belief that a description of the simple apparatus used in making the analysis might be of benefit in a paper like this.

METHOD EMPLOYED IN ANALYZING THE GASES

The Orsat belonging to the Miners' and Mechanics' Institute is one made by the Central Scientific Co., and consists of a burette and three pipettes, connected by a train. The burette has a capacity of 100 c.c., and is finely graduated. It is inclosed in a larger tube, which is filled with water, so as to keep the temperature approximately uniform during the analysis. The first pipette contains potassium hydroxide solution, for the removal of the carbon dioxide in the gas; the second contains an alkaline solution of pyrogallic acid, for absorbing the oxygen; and the third is filled with an ammoniacal solution of copper chloride, for the absorption of carbon monoxide.

A second cabinet accompanies this, used for the determination of methane. The pipette in this cabinet contains a small platinum wire, which is connected up to an electric current and heated up, so as to burn the methane. The remaining gas is then run through the first pipette again, and the carbon dioxide formed by the burning of the methane is removed. The sample is then returned to the burette and the contraction in volume due to this absorption of carbon dioxide is recorded. Bulletin 42 of the Bureau of Mines gives an excellent description of this apparatus and the method of operating it.

At the time the samples were taken, readings of some of the charts from the pressure gage were taken. A chart made during the time the fan was in operation showed a minimum reading of 0.9 from 6 p.m. to 7 a.m., and a maximum reading of 1.2 from 9 a.m. to 4:15 p.m. on Oct. 29. The chart made on Dec. 10, the day before the samples were taken, showed the following readings: —0.1 from 7 a.m. to 8:45 a.m.; —0.05 to 2:30 p.m.; 0.0 to 4:15 p.m.; —0.1 to 7:15 p.m.; and 0.0 to 7 a.m. During the time of taking the samples, from 2:45 p.m. to 4:15 p.m. on Dec. 11, the gage varied from 0.3 to —0.2.



MAP OF THE GRAYSON MINE

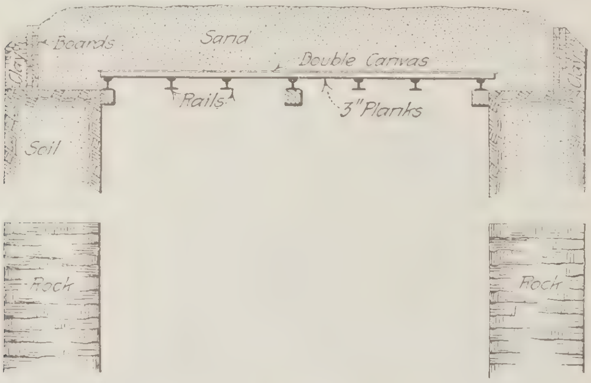
After these analyses were run, Superintendent Morris, taking into consideration the experience of other operators in the southern Illinois field, decided to reopen the mine on Dec. 26, and go into the fire area; if the fire was then found to be out, the fan might then be started. Accordingly a request for help was made to the Illinois Mine-Rescue Commission, and Superintendent Towal, of the Benton station, and Superintendent Scott, of the Herrin substation, went to the mine.

Two types of apparatus were used, the Draeger and the Fleuss, the Draegers being the property of the company, and the Fleuss coming from the rescue stations. During the work some little trouble was experienced with the privately owned apparatus, but in justice to the manufacturers it should be recognized that the apparatus belonging to a coal company, where there is but little use for them, do not generally receive the same attention that is given to those from the rescue stations.

The work of opening the mine was directed by Superintendent Morris, Mining Engineer Reuben Williams, H. I. Smith of the U. S. Bureau of Mines, James Walker, county inspector of mining, and John Winterbottom, mine manager; to whom each corps reported on their return to the surface and from whom each new corps received definite instructions before entering the mine.

The Shaft Was Unsealed

The seal was removed from the top of the hoisting shaft at about 11 a.m. Dec. 26. The air shaft was not opened. The first team wearing breathing apparatus entered the mine at 1 p.m. This team consisted of Walter Scott; John Hopkins, assistant mine manager; and Bertram Peak. It should be remembered that when the shafts were sealed, the first stopping had been built, and as the men withdrew, Mr. Scott opened the door just outside the stopping, so as to partially short-circuit the air, if there should be any circulating. The men also opened the door between the air shaft and the hoisting shaft to short-circuit the air, in an attempt to establish a base for their operations at the foot of the shaft. It was found, however, that to establish such a base at the shaft bottom would necessitate the construction of several stoppings, and the attempt was therefore abandoned and all operations conducted from the surface. A little trouble was experienced with one of the apparatus, and the party returned to the top, having been under about an hour.



Method of Sealing Shaft

The second party, consisting of James Towal, Walter Scott, John Hopkins, James Pepper and Bertram Peak, entered the mine at 3 p.m., the first three equipped with state apparatus and the other two wearing those belonging to the company. These men explored the haulageway up to the fall on the fire and examined the stoppings and other conditions. They estimated the temperature in the neighborhood of the fall as being 100 deg. F. or greater. This party returned at 4:50 p.m., having worn the apparatus one hour and fifty minutes.

The Air Shaft Is Next Uncovered

The cover was removed from the top of the air shaft at about 5:30 p.m. Upon the removal of the first board under the canvas, four men were caught in the released gases, and ten more were overcome in trying to rescue them. The fan was started immediately to blow fresh air over them, and at the same time the oxygen apparatus were sent for. Before the apparatus had been obtained the men had been rescued. They recovered quickly, but that night became very nervous and shook violently. Their sleep was accompanied by horrible dreams. After the men were recovered the fan was stopped, and the seal removed by men wearing oxygen apparatus.

The third party consisted of Scott, Pepper, Peak, Hopkins and Watson, the first three wearing Fleuss and the last two Draegers. They entered the mine at 8 p.m., and returned at 8:40 p.m. because the last two men had trouble with their apparatus. Operations were then suspended until four more rescue apparatuses were obtained from the Benton station. These arrived at about 3 p.m. Sunday, Dec. 27, and the fourth party, consisting of Scott, Watson, Law, Pepper and Peak, entered the mine at 3:30 p.m. They returned at 4:45 p.m., having lost their route and failed to reach the fire area. The temperature on the parting outbye the 4th South West was reported by them as 78 deg. Fahrenheit.

The Fire Area Is Reached

The fifth party, Towal, Cathcart, Futrell, Biggs and Hopkins, entered the mine at 6:30 p.m. and explored the 4th South West entries and rooms. They selected places for stoppings, dug five holes through the fall, set four props, and returned to the top at 8:10 p.m. The sixth party entered the mine at 9:30 p.m., traveled to the fire area and tightened the fifth prop, nailed on the canvas and carried props into the crosscut in the inside room, returning to the top at 11:10 p.m.

The seventh party, under Towal, entered at 12 midnight, traveled to the fire area, a distance of 2700 ft., set four props, in the crosscut between rooms 8 and 9, put in two side braces, and returned to the top at 1:15. The apparatus used by this party was not fully charged when they started. The eighth party, under Scott, entered at 2:35 a.m. They nailed on the canvas, closed the doors left open to short-circuit the air and returned to the top at 3:30 a.m. The temperature in Room 9 off the 4th South West was 82.5 deg. F. The fan was started at 4:05 a.m., and the men left the mine at 8 a.m., leaving everything in a satisfactory condition.

Because of the size of the fall in the faces of the two entries where the fire was, these entries will be sealed off for some time yet, so as to insure that the fire is extinguished. After the ventilation had been restored, the temporary stoppings built by the helmetmen were reinforced by stoppings of a more permanent character. The mine was inspected by County Inspector James Walker on Saturday, Jan. 2, and found in good condition. Hoisting of coal was resumed on Monday, Jan. 4.

Adopt Precautionary Measures

In order to prevent a recurrence of such a fire, the use of permissible explosives has been introduced in the mine, and a demonstrator has been giving instructions to the miners on the proper use of the explosives. A further precaution adopted by the company is that of having the firerunners follow the shotfirers at an interval of about a half-hour, whereas formerly the firerunners did not begin their work until after the shotfirers had finished theirs. The firerunners work in pairs until they have covered the entire mine, after which they separate, and return over different courses, to insure that no fires will be missed.

Drying Washed Coal

By F. E. Butcher*

SYNOPSIS—Giving capacities of centrifugal driers installed at Mine No. 8, of the Tennessee Coal, Iron & R.R. Co., near Birmingham, Ala. Comparative economy in the use of the drier in coal-washing plants. Saving effected in fine coal that otherwise is lost. This recovery amounts to several hundred tons a month. Tabulated results in the washing of coal.

Last spring we completed the building of a coal-washing plant for the Tennessee Coal, Iron & R.R. Co., at their No. 8 mine, just outside of Birmingham, Ala. Included in that plant were two of our centrifugal driers. The nominal capacity of the plant was 100 tons per hour, or 50 tons per hour for each of the two driers.

The writer has just seen a letter written by Mr. Robert Hamilton, consulting engineer of the T. C., I. & R.R. Co. to one of our friends, advising that the driers have given no trouble and that the moisture in the coal coming from the driers is reduced to about 7½ per cent. The letter states further that, with both machines running, an output of 1100 tons has easily been handled in ten hours; and with only one machine in operation they have handled 750 tons in 10 hours. In other words, they have demonstrated a number of times that it is entirely feasible to operate these machines at the rate of 75 tons per hour.

This plant is so designed that the washed coal coming from the jigs flows directly into the driers together with a large amount of water. There is at least as much water as there is coal; and the coal is delivered constantly with the moisture content already noted above. This 7½ per cent. of moisture content includes about 2 per cent. internal moisture, so that the surface moisture is reduced to approximately 5 per cent.

So far as the cost of doing this drying is concerned, it is a little difficult to give any definite data, because we have all been carefully feeling our way, in this matter, and are hardly prepared to make a definite statement about this feature. There is one thing certain, however, and that is that this system is very much cheaper than any previously known system. As all are undoubtedly aware it has been customary either to drain the coal slowly, by a system of drainage bins, or to build large drainage pits and allow the coal to stand in these bins or pits for from 24 to 60 hr.; and then the coal would have to be rehandled from these bins or pits to the cars or loading bins.

The expense of installing either bins or pits is, of course, much larger than the original investment in centrifugal driers. The driers, however, possess the further advantage that they get rid of a lot of dewatering elevator equipment, which is expensive both to install and to maintain. Without a question of a doubt, the coal-washing plant at the T. C., I. & R.R. mine No. 8 is the simplest plant in the world, so far as its flow-sheet and operation are concerned; and Mr. Hamilton, and also the executive officers of the T. C., I. & R.R. Co., have assured us that, in their opinion, it is the best coal-washing plant in the world, from the standpoint of results accomplished.

There is nothing to wear out about the centrifugal drier, except the fine perforated screens, and the renewal of these screens is an inexpensive matter. The total cost of drying coal, at the rate noted above, is the power consumption, which amounts to from 20 to 25 hp. It would take almost that much power to drive a properly designed dewatering elevator capable of handling an output of 75 tons per hour; and such a dewatering elevator would deliver coal having from 15 to 25 per cent. moisture. On the other hand, the drier delivers coal with the moisture content previously mentioned.

There is a further important advantage in the use of a centrifugal drier. The water from the drier contains some solid matter in the form of extremely fine coal. This fine coal amounts, according to carefully conducted experiments, to about 1½ per cent. of the total material handled through the drier. In some cases, the amount of this fine material going through the drier screens is larger. All of this water coming from the drier with the finely divided coal that it contains goes to a central sump, from which it is elevated, by a centrifugal pump, to a cone settling tank about 40 ft. in diameter and nearly 70 ft. high. This cone settling tank delivers the fine coal, from a valve at the bottom of the tank, directly to the driers where it is again entrained with the coarse coal coming from the jigs, and thus provides an additional recovery for the plant. The overflow water from the large settling tank goes back to the jigs again as feed water.

This additional recovery of extremely fine coal, which is of course the highest-grade coal about the plant, amounts to several hundred tons each month and is consequently an economy that is not possible in the ordinary coal-washing plant where dewatering elevators are used. Mr. Hamilton also states, in his letter, that this large tank has operated continuously since early in July, without any attention, repairs or changes of any kind being necessary. Owing to unusual demands this washery has been operated most of the time on double-shift.

I believe that the following memoranda showing some recent results in the operation of this washery will be of interest to readers of Coal Age. Note that the washed coal carries an ash content of only 4.71 per cent. and, further, that this ash content in the washed coal has not varied more than 0.3 of 1 per cent., at any time during the past five months. This emphasizes the close and accurate control that is possible in these machines. Four of these driers are installed in the plant of the Pennsylvania Steel Co., Steelton, Penn., but we are not in a position to give as intelligent an idea of what this plant is doing, because we have received as yet no data from them.

ANALYSIS OF COAL FOR WEEK ENDING OCT. 24, 1914

	Volatile Matter	Fixed Carbon	Ash	Sulphur
Raw coal	31.31	58.06	10.63	1.88
Washed coal	32.60	62.69	4.71	1.47
Boiler coal	26.53	48.53	23.94	3.17

PERCENTAGE OF REFUSE (SPECIFIC GRAVITY 1.37)

Float	6.4	Yielding ash	4.71	Sul.	1.59
Sink	93.6	Yielding ash	68.55	Sul.	4.95

SEPTEMBER RECORD

Raw coal	100.0
Washed coal	87.3
Boiler coal	6.4
Refuse	6.3

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*General manager, The American Concentrator Co., Springfield, Ohio.

Electric Arc Welding in Mine Repair Shops

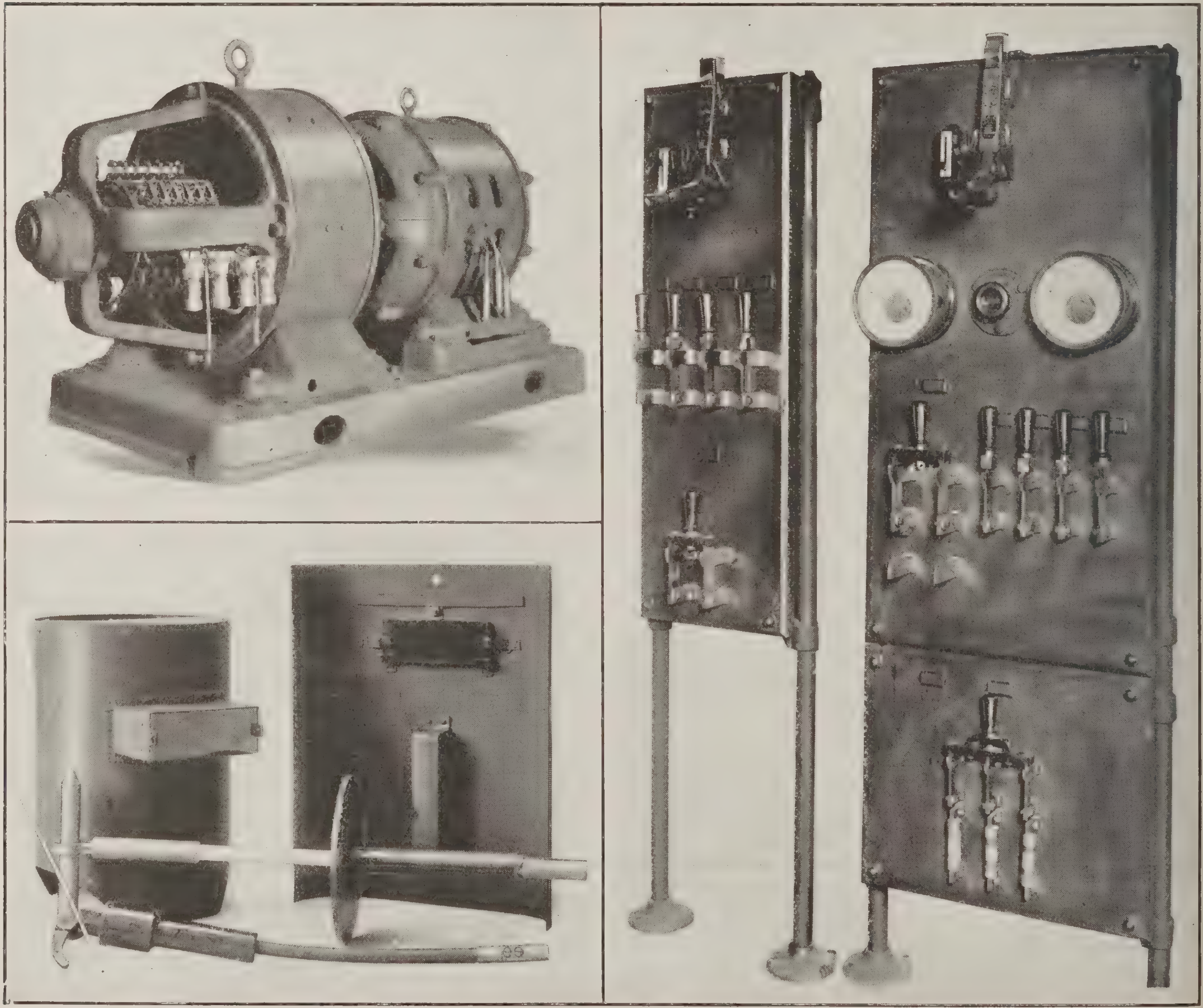
By E. S. Zuck*

SYNOPSIS—The apparatus required, as well as the possibilities of this process of repair, are here enumerated. An inspection of the scrap heap at any coal mine will reveal the opportunities for saving which this process possesses.

The application of the electric arc process of welding has been growing rapidly in recent years, and it is now used extensively in foundries, machine shops and railway repair shops, both electric and steam. In the latter, it has been found specially efficient in repairing worn or broken parts of locomotives and cars, and in many cases the savings made in two or three months' operation have equaled the original cost of the welding apparatus. The mining industry, being a large user of machinery of one kind or another, should also be able to realize large savings by using arc welding in repair shops.

Arc welding may be described as the utilization of the heat of the electric arc to melt and fuse together the two materials to be welded. Two processes are in common use today, known respectively as the carbon and the metallic electrode processes. In both cases, one side of an electric circuit is connected to the article to be welded, while to the other side is attached an electrode, which consists in one instance of a carbon or graphite rod and in the other of an iron or steel rod.

The process of welding includes three distinct operations, viz., preparation of the work, striking the arc, manipulation of the electrode, filling material and the article being welded.



Figs. 1, 3 and 4. Showing Low-Voltage Motor-Generator Set, Switchboard and Tools Used in Electric Welding

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*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn.

Preparation of the Work

It is absolutely essential that the article to be welded be free from dirt, grease, scale and other foreign matter. Failure to observe this rule carefully is without question responsible for 90 per cent. of the failures in arc welding. It is necessary in many cases to resort to chipping so that the weld may be started on bright metal. A good stiff wire brush is also useful in cleaning the work.

Having thoroughly cleaned the work, the next step is to prepare the spot to be welded by shaping it to receive the weld. If a crack in a plate or bar is to be repaired, it should be chipped out with cold chisel and hammer so that a V-shaped groove is formed. If a broken casting is to be repaired, temporary supports for the broken member will be required. Projections such as lugs or lifting bails may have to be built up, and molding blocks of iron, carbon or fireclay will be required. Occasionally it will be advisable to preheat the metal before welding, so as to avoid cooling stresses and insure even contraction. A furnace for preheating will therefore be required. This may be constructed of ordinary firebrick, a gas flame being preferably used to bring the metal up to a cherry-red heat.

Striking the Arc

The operation of cleaning the article and preparing it for welding having been completed, one side of the welding circuit should be connected to the work. If the piece is small, this is most conveniently accomplished by having an iron table on which to place the article, the table being permanently connected to one side of the welding circuit. Where the article is large, the current conductor can be fastened to it with a clamp or simply hooked on without clamping. If the carbon electrode is used, filling material should be within easy reach. The operator then touches the electrode to the work and instantly withdraws it, thus striking the arc.

The carbon electrode should be withdrawn to a distance of two or more inches from the work. Little difficulty will be experienced in striking the carbon arc. With the metallic arc, the electrode has a tendency to stick and will frequently "freeze" to the work. Moreover, the arc is quite short, and in fact can seldom be operated longer than $\frac{3}{16}$ in. The operator must feed the electrode down into the weld at about the same rate as that at which it melts off, and the electrode must be held perfectly steady or the arc will be broken. A good plan for a beginner is to start with the carbon arc, and as skill is acquired, he can progress to the more difficult metallic arc process. It will often assist materially in the latter if the operator provides himself with a steady rest for his arm.

Manipulation of the Arc and Weld

After the arc is struck it is allowed to play on the piece, and if the carbon electrode is used, this is given a rotary motion by hand. With the metallic process the electrode is itself both the heating element and filling material, and the arc is allowed to play on the exact spot where it is desired to deposit the metal. With the carbon electrode, the filling material should be added a little at a time, the arc, of course, being continued meanwhile until the metal is thoroughly melted and the weld made.

As soon as the metal commences to cool it should be hammered thoroughly in order to prevent sponginess and to give it a finer grain. Hammering the weld also tends to work out any scale or slag which may have formed during the welding stage. Skillful operators endeavor to perform the entire welding operation with a minimum number of applications of the arc, avoiding interruption and breaking of the arc as much as possible.

Direct current is most suitable for welding, and in fact must be used for the metallic electrode process. The carbon process requires a current of from 300 to 400 amp., and the drop across the arc will vary from 30 to 40 volts, depending on the amount of current and the length of the arc. On the other hand, the metallic electrode rarely requires more than 130 amp. with a drop across the arc of from 20 to 25 volts.

Since the drop across the arc is quite low, it follows that arc welding is inherently a low-voltage application of power, and consequently, where specially designed welding outfits are installed, a low-voltage generator operating at from 70 to 75 volts is universally employed. On account of the difficulty of maintaining a constant current across the arc, and on account of the manner in which the arc must be struck, it is not possible to operate it directly on the generator voltage. It is, therefore, necessary to connect in series with the arc a resistance which is used to steady it, and to limit the current which will flow when the electrode is touched to the work. This is often called the "ballast resistance" and as such is a common feature of all direct-current arc lamps.

Welding can be done from high-potential circuits, such as 125, 250 and 500 volts. This practice cannot be recommended, however, where much work is done, as it is wasteful of power, especially on 250- and 500-volt circuits. The usual practice is to install a motor generator, such as is shown in Fig. 1, the generator being a direct-current compound-wound machine, delivering 70 to 75 volts, while the motor is of suitable characteristics for the local power circuit.

If electric power is not available, a steam or gas engine may be used to drive the generator. Machines having commutating poles should be used, as severe overloads may occur quite frequently.

For work in connection with mine repair shops it is best to install low-voltage generators in the locality where most of the welding will be done. At the outlying points where it may be desirable to do occasional welding, rheostats may be used in connection with the direct-current haulage circuit, the potential being reduced to the 30 or 40 volts required at the arc. An excellent size of generator to employ is one having a capacity of 300 amp., as this size permits the use of both processes.

As mentioned above, it is not possible to operate the arc directly from the generator or other electric circuit. Resistance must be placed in series in order to steady the arc and limit the current which will flow at the instant of striking, and also to furnish the means whereby the current and voltage of the arc may be regulated. To regulate the current a simple arrangement of switches and resistance is shown schematically in Fig. 2. This plan of connections can be used either with a low-voltage welding generator or with higher potential circuits, such as 250 and 500 volts. The only difference is in the ohmic value of the resistance which, of course, must be higher for the 250- and 500-volt circuits.

The manipulation of this control scheme is so simple as to require little explanation. The operator closes the circuit-breaker and the two-pole knife-switch in succession, and then by closing one or more of the single-pole switches adjusts the resistance to give the current required. The current depends, of course, on the work and whether the carbon or metallic process is used. Fig. 3 shows a view of typical control panels for welding, the outlet panel being used when it is desired to have several operators work simultaneously.

Before leaving this scheme of control, particular attention is called to the polarity, the electrode being marked negative. There are several reasons for this. First, the positive pole provides nearly 75 per cent. of the total heat of the arc, and if the work being welded is positive, the heat is where it is most required. In the second place, there is a tendency, when the carbon electrode is used, for particles of carbon to be carried into the molten metal from the electrode, and since carbon hardens steel, the weld will be so hard that it will be impossible to machine or work it with tools. If, however, the electrode is made the negative, then the flow of current is from the weld to the electrode. This has been found to restrict the amount of carbon carried into the weld by the arc to a very small amount, so that little hardening of the material results. Hardening of the weld can also be further prevented by using a long arc—not less than 3 in. in length.

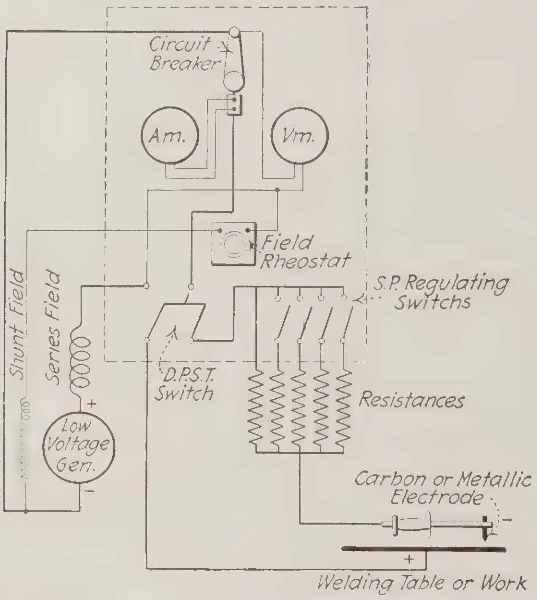


FIG. 2. DIAGRAM OF CONNECTIONS FOR ELECTRIC WELDING

This matter of polarity is also of importance in cases where it is desirable to do welding from the mine haulage circuit, one side of which is grounded. It is usually the case that the trolley wire is positive. It will not do, therefore, to connect the positive wire to the article to be welded without insulating the latter from the ground, otherwise a short-circuit would take place. If the article to be welded is placed on wooden supports, which will insulate it from the ground, then no trouble will occur, and if much welding is to be done it may be found best to make the trolley wire the negative, because with this arrangement no insulating supports will be required for the work. The operator, however, should stand on an insulated platform or mat when working with the welding electrode on the ungrounded side.

In addition to the welding generator and its control equipment, protective coverings for the operator, and electrode holders are required. The electric arc makes a brilliant light, which is highly actinic. If the body is exposed to the bare arc a burn takes place which is quite similar to severe sun-burn. The skin reddens and finally peels off.

It is necessary, therefore, that the entire body of the operator be covered. Ordinary clothing is sufficient protection for the trunk and limbs, while the hands should be protected by gloves, and the operator should not work with his sleeves rolled up or shirt front open. Special protection must be provided for the head, two forms of which are shown in Fig. 4. The hood or helmet, shown to the left, entirely covers the head, and is provided with a colored-glass window through which the workman observes the welding operation. The glass in this window is specially selected to cut off the rays which are harmful to the eyes, and also to reduce the brilliancy of the arc to a degree comfortable to them.

The hood must be used when carbon welding is being done, as this process requires that filling material be added to the weld from time to time, so that both hands must be free. The shield shown to the right in Fig. 4 is used for metallic electrode welding, and is simply held in front of the face, thus affording sufficient protection, since the metallic arc is not so powerful as the carbon arc.

Fig. 4 also shows the two types of electrode holders. The electrode for carbon welding is a hard, solid graphite rod about 8 in. long and ¾ in. in diameter. Although occasionally broken, it does not wear away rapidly, and consequently does not require frequent renewal. The best metallic electrode material is Swedish or Norway iron wire about ⅛ or $\frac{3}{16}$ in. diameter, cut in lengths about 12 in. long. These are consumed quite rapidly, about one per minute, and the holder is designed so that new electrodes can be quickly and easily inserted.

The application of electric arc welding to the repair of machinery, no matter of what type, can be classified under three heads—building up; filling in; welding together.

BUILDING UP

Machinery of all kinds is subject to wear which manifests itself in various ways. The kind of wear which can be repaired most efficiently by the arc welding process is that where friction has gradually ground or worn away the metal. Means are provided in all well designed apparatus to take up some of this wear, but there are limits beyond which it is necessary to replace the worn part. Repair of such parts is, therefore, a "building-up" process, by which it is restored to its original form and dimensions.

There are many examples of this application. Fig. 6 shows a case where the threads on the end of an armature shaft had become so badly worn that they would no longer hold the nut. New metal was welded onto the shaft and the lower view shows the appearance of the rough weld. The upper view shows the same shaft after it was turned and new threads cut. The complete operation in this case cost 65c. and saved more than a new shaft, because this armature was of an old design and not arranged so that the shaft could be pressed out and a new one substituted without disturbing the windings.

Other examples of this class of welding are found in the building up of keyways in shafts, gears and pinions which have become worn and battered so that they no

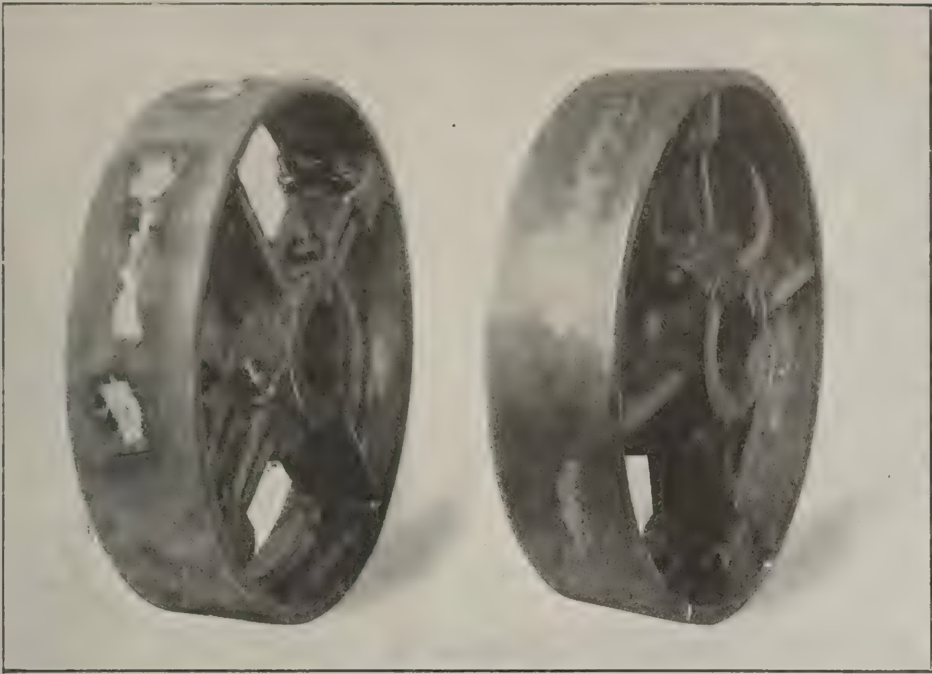


FIG. 5. BLOW-HOLES IN A PULLEY REPAIRED BY ELECTRIC WELDING BEFORE FINAL FINISHING WAS COMPLETE

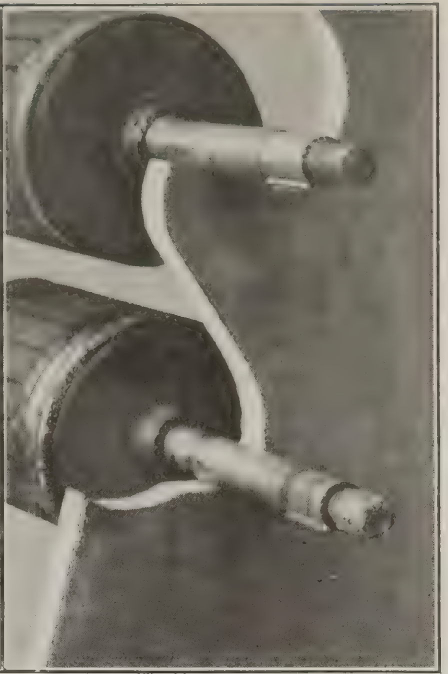


FIG. 6. REPAIR OF A WORNOUT THREAD ON ARMATURE SHAFT

longer afford a tight fit for the key. It is simply necessary to fill them up by the metallic electrode process, after which new keyways can be cut in the same place. Brake rods and the like connected at the ends by pins are apt to have the holes therefor worn elliptical, thus causing lost motion and perhaps failure to operate properly. These elliptical holes can be easily filled up and new ones drilled.

A striking example of this class of repair work is found in steam railroad shops in the case of flat spots on locomotive drivers. When these develop it was formerly necessary to remove the drive wheels and turn the entire rim down to the same diameter in the wheel lathe. This operation was expensive, and also required considerable time during which the locomotive was idle. The new way is to weld fresh metal onto these flat spots by the electric arc, and then grind or file them down to a smooth surface. These operations can both be performed without removing the drivers from the locomotive, and the net saving in money often amounts to over $200.

FILLING IN

Although filling in may appear to be the same as the first process mentioned, nevertheless it is applied to a somewhat different class of work. The filling-in process is peculiarly applicable in repairing steel castings defective by reason of blow-holes, sand-holes etc. The distinction is that the defects have not been caused by wear. This application is common in foundries and machine shops. An example is shown in Fig. 5. The face of a cast-steel brake wheel developed bad blow-holes when partly machined. These have been filled up by the electric arc process, after which the machining has been completed.

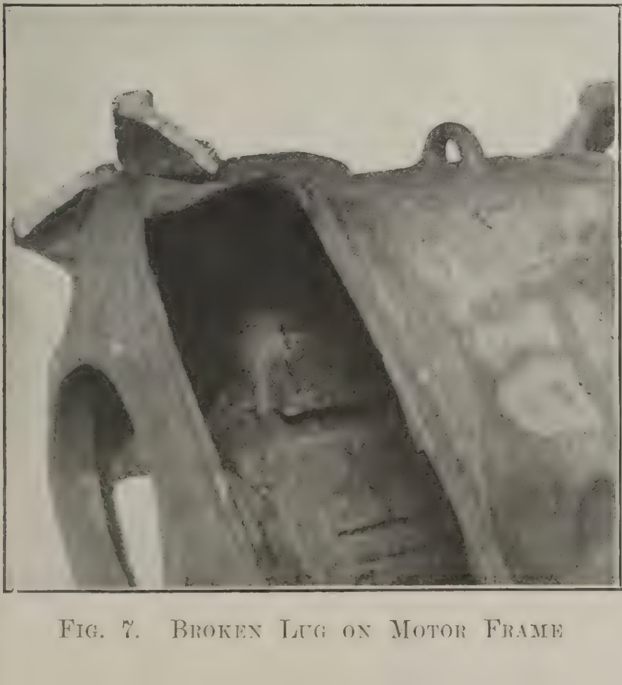


FIG. 7. BROKEN LUG ON MOTOR FRAME

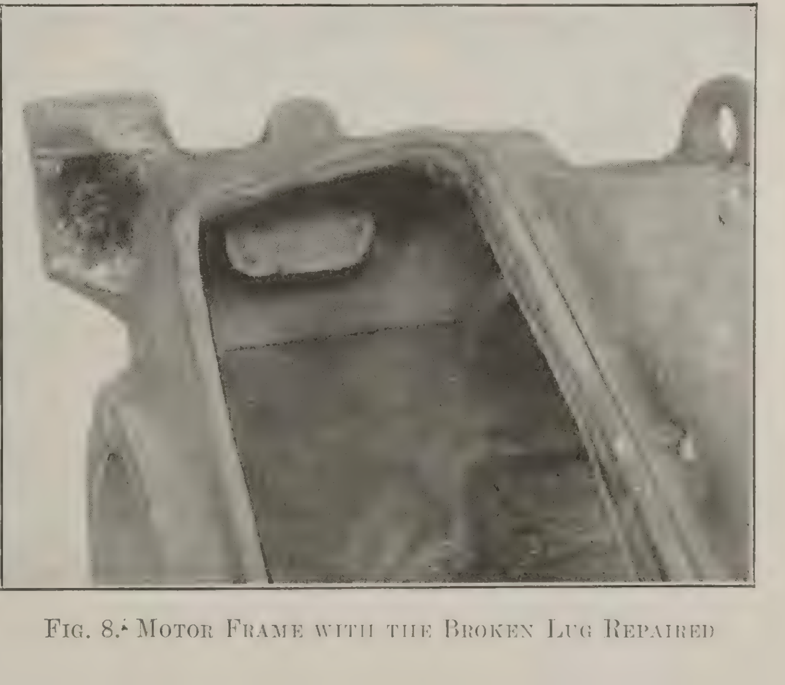


FIG. 8. MOTOR FRAME WITH THE BROKEN LUG REPAIRED

Welding Together

As the name implies, this operation consists in welding together the broken parts of machinery and equipment. This demands considerable care and skill, because the strength of the weld is usually of prime importance in such repairs. A most ingenious application is shown in Fig. 10. Six cast-steel motor frames were received from the foundry lacking the supports for the axle-bearing brackets. This was truly a serious defect, and the case looked hopeless. Arc welding came to the rescue, however, saving the frames and a considerable amount of money as well. Steel bars of suitable dimensions were prepared, and as shown in the picture were securely welded in place. One of the welds is seen plainly at the lower left corner of the motor frame. These welded supports have given entire satisfaction, apparently being as strong as those in a perfect casting.

Another example of this type of repair is shown in Fig. 7. This shows a cast-steel motor frame with a corner broken off. In Fig. 8 the broken piece has been securely welded in place and so skillfully has the work been done, that it is difficult to distinguish the weld.

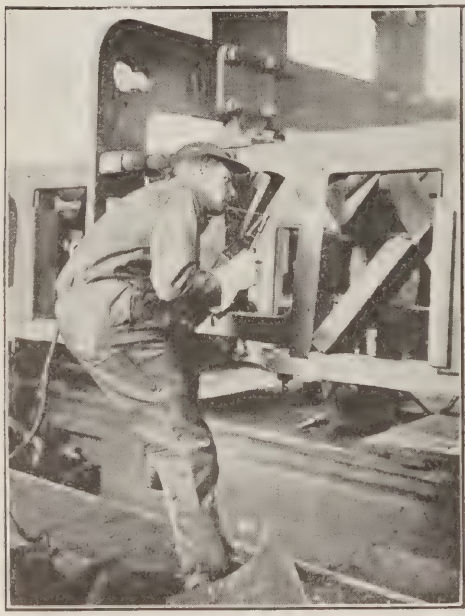


Fig. 9. Welding a Locomotive Frame

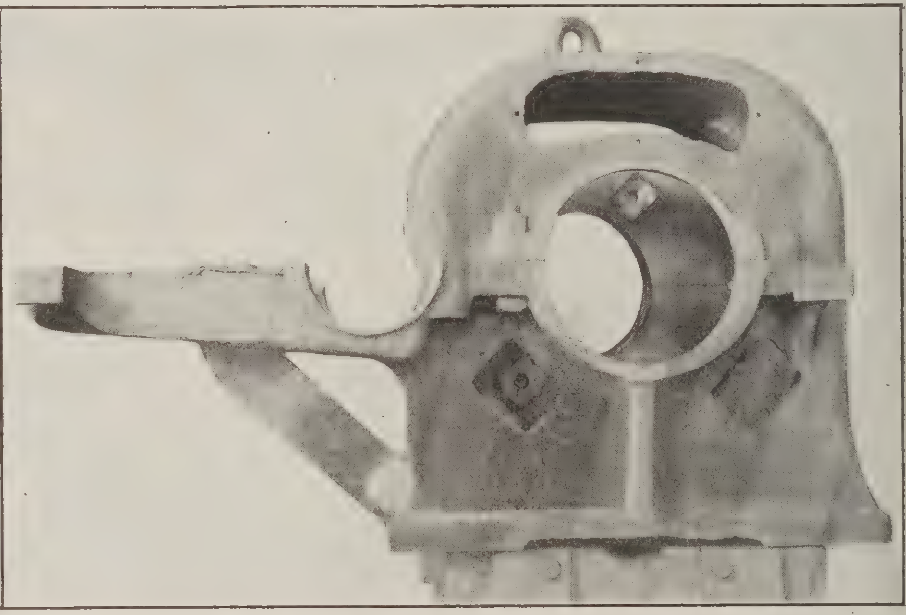


Fig. 10. A Brace Welded to the Bearing Bracket of a Motor Casing

A railroad-shop application is shown in Fig. 9, where a broken frame of a steam locomotive has been repaired by electric welding. The operator has used the metallic electrode process—the arc is not in use and the weld is shown in white. Note how the crack was first notched or V'd out so as to receive the weld properly. In the same manner a broken mine-locomotive frame of the cast-steel bar type could be easily repaired without loss of strength in the frame. The cost of welding the steam-locomotive frame shown in Fig. 9 was $3.29.

The question often arises as to what materials are suited for repairing by electric arc welding. Cast steel, rolled steel, wrought iron and malleable iron can all be welded successfully with uniform results in the hands of experienced workmen. Malleable iron does not weld quite so easily, however, as the other materials mentioned. Cast iron, on the other hand, is not as suitable for welding as steel and wrought iron. It is crystalline rather than fibrous in structure, and furthermore has the peculiarity that it passes abruptly from a solid to a liquid condition, there being no intermediate stage during which it is more or less plastic. The principal difficulty seems to lie in controlling the hardness of the weld, which is usually so hard that machining is impossible despite all precautions.

Probably the best method of procedure is to heat the casting before welding to a white-hot condition and then weld, using the metallic electrode process.

After welding the piece should be thoroughly annealed. If, however, it is not necessary to machine the weld, the above method may not be necessary, although the results of welding are apt to be unreliable and uncertain no matter how skillfully the work be done. If a weld in cast iron will save the day, by all means try it, but do not be disappointed if the results are unsatisfactory.

There are many applications of arc welding in mine repair shops which could be mentioned. Only a thorough examination of the scrap pile can reveal its possibilities, and even then, when once facilities for welding have been provided, new applications will be constantly appearing. It is not experimental in any sense of the term, and should be included in the equipment of every shop engaged in the repair and maintenance of any considerable amount of equipment.

* * *

Canadian Mining Institute will hold its seventeenth annual meeting in Toronto, Can., Wednesday, Thursday and Friday, Mar. 3, 4 and 5. Headquarters will be at the King Edward Hotel. The Eastern Canadian Passenger Association has conceded special transportation privileges to members and their friends attending the meeting, based on the lowest first-class fare for the round trip on certificate plan. The conditions under which these are granted are as follows: (1) A single first-class ticket must be purchased not more than three days (Sunday not to be counted) prior to the opening of the meeting. (2) A standard certificate of such purchase must be obtained from the ticket agent issuing the transportation. (3) The certificate must be indorsed by the secretary of the institute and stamped by a representative of the railways, who will be in attendance at the secretary's office, The King Edward Hotel. (4) A fee of 25c. is charged for the validation of the certificate. Secretary S. Mortimor Lamb, Ritz-Carlton Hotel, Montreal, Que.

The Hampton Roads Coals--III

By F. R. Wadleigh*

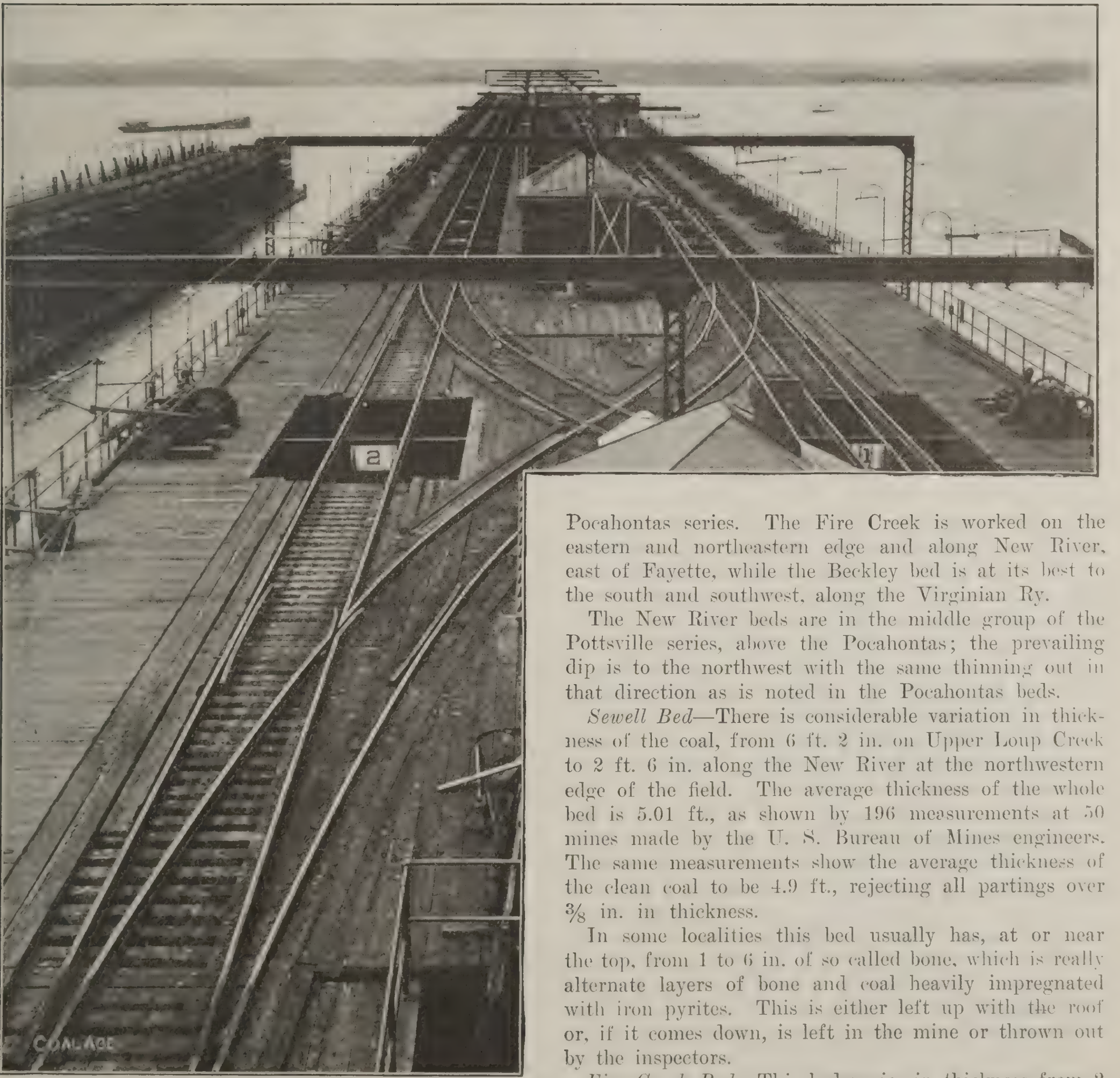
SYNOPSIS—This third installment of this series takes up the New River and Kanawha district coals in the same detail as the other districts have been treated. The fourth and concluding installment will appear in an early issue.

In 1873, the first New River coal was shipped to the East; and 10 years later, when the first shipment of Pocahontas coal was made, the output of New River district was 405,000 tons per annum. From that date to the end of 1913, 104,531,000 tons of New River coal have been shipped. From the Chesapeake & Ohio New River field comes about 63 per cent. of the total output of New River coal.

Coal Beds

The beds mined are the Sewell, Fire Creek and Beckley. The coal from each bed is of the same character, structure and appearance, but with some variation in content, as shown later on; the greatest development is in the Sewell bed, which also covers the most territory. It is worthy of note that at no locality yet developed are more than two of these beds of workable thickness.

The Sewell bed underlies the whole New River area and is correlated with one of the upper beds in the Pocahontas series. The Fire Creek is worked on the eastern and northeastern edge and along New River, east of Fayette, while the Beckley bed is at its best to the south and southwest, along the Virginian Ry.



THE N. & W. RY. CO.'S NEW NO. 4 PIER

The New River beds are in the middle group of the Pottsville series, above the Pocahontas; the prevailing dip is to the northwest with the same thinning out in that direction as is noted in the Pocahontas beds.

Sewell Bed—There is considerable variation in thickness of the coal, from 6 ft. 2 in. on Upper Loup Creek to 2 ft. 6 in. along the New River at the northwestern edge of the field. The average thickness of the whole bed is 5.01 ft., as shown by 196 measurements at 50 mines made by the U. S. Bureau of Mines engineers. The same measurements show the average thickness of the clean coal to be 4.9 ft., rejecting all partings over 3/8 in. in thickness.

In some localities this bed usually has, at or near the top, from 1 to 6 in. of so called bone, which is really alternate layers of bone and coal heavily impregnated with iron pyrites. This is either left up with the roof or, if it comes down, is left in the mine or thrown out by the inspectors.

Fire Creek Bed—This bed varies in thickness from 2 ft. 6 in. on Piney Creek at the east to 6 ft. 11 in. about four miles west of Thurmond. The average thickness is 4.14 ft., as shown by 68 measurements in 20 mines made by the U. S. Bureau of Mines engineers. The average thickness of the clean coal, rejecting partings over ⅜ in. in thickness, is 4.05 ft.

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*Consulting engineer, 426 Real Estate Trust Bldg., Philadelphia.

Beckley Bed—This bed shows greater local difference of thickness owing to rolls and the variations in the bone or slate partings; where the total thickness is greatest, the partings are also the largest. As high as 11 ft. has been measured, varying down to 4½ ft. in the same mine.

The average thickness as shown by the Bureau of Mines measurements at 35 places in 10 mines is 5.33 ft., the average for the clean coal being 4.94 ft. Measurements by the West Virginia Survey in 22 mines show an average of 5.3 ft.

The slate or bone partings in all these beds vary both in thickness and relative position. In the Sewell and Fire Creek beds, where they thin down to 3 or 3½ ft., the coal is often clean from roof to floor.

Description of Coal

In 1878 a report was issued by the Bureau of Steam Engineering, U. S. Navy, on trials of New River coal, comparing it with anthracite and Georges Creek. This report says:

> New River coal is a first-class steam-producing fuel, 9 per cent. better than anthracite and 5 per cent. better than Georges Creek. Moderately coking, it burned freely, swelled slightly and coked properly, proving a first-class steam coal, well suited for steamship use. It was partly in lump and partly in dust, the latter at once cohering in the fire by coking. This coal requires but little labor in the furnace to work it.

This description applies equally well to the New River coal shipped today. It is of similar structure and appearance to Pocahontas coal, will average lower in ash, slightly higher in volatile and sulphur and has about the same variation in fusing temperature of the ash. It also averages somewhat higher in heat value. Like Pocahontas, it is a strong coking coal, burning with a short white flame and intense heat.

ANALYSES OF CARGO SHIPMENTS FROM HAMPTON ROADS DURING THE PAST THREE YEARS

	12 Cargoes		17 Cargoes		18 Cargoes		48 Cargoes		Slack
	Avr.	Best	Avr.	Best	Avr.	Best	Avr.	Best	
Moisture, dry coal	.....	.....	2.66	.....	0.80	0.80	.....	.....	.....
Volatile matter	20.65	21.50	20.22	21.00	20.58	22.19	21.63	19.2	19.92
Fixed carbon	73.54	73.06	72.58	74.40	74.15	73.53	72.99	77.9	74.64
Ash	.....	5.44	5.62	4.60	4.48	4.28	5.24	2.9	5.00
Sulphur	0.94	0.94	0.91	0.92	0.87	0.80	0.93	0.65	0.83
B.t.u.	.....	.....	14,815	14,942	14,900	15,314	.....	.....	15,018

Supplemental Notes—Average of 51 cargoes as delivered showed 2.49 per cent. moisture. Highest B.t.u. value in 70 cargoes (dry coal) was 15,260, the ash content being 2.90 per cent.; the average of the 70 cargoes was 14,879 B.t.u. The coal in the 12- and 17-cargo lots was from the Sewell and Fire Creek seams and the cargoes averaged 5000 tons each; these two sets of analyses, and that for the slack coal, were made by the Bureau of Mines, and the balance by Navy Department inspectors at Hampton Roads. The average analyses of 29 cargoes showed: Moisture, 2.81; ash, 5.55; B.t.u., 14,812, the maximum B.t.u. being 15,110 and the ash, 3.94. The slack analysis is given to show the average composition of the small coal.

As regards friability, the two coals may be considered about the same; if there is any difference, the New River coal has a slight advantage, as there are a few small areas in the latter district where the coal is distinctly harder than elsewhere in either field. For instance, there is one small mine in the Sewell bed where the run-of-mine coal will average 60 per cent. over 1½-in. screens by actual weight, as against an average of 30 to 35 per cent. in the rest of the field; at another large mine, the average over 1½ in. will run about 46 per cent. There is also an operation in the Beckley bed where the run-of-mine coal will average 50 to 55 per cent. lump and egg sizes.

A 5000-ton cargo of New River coal sent to the Italian Railways was tested for the percentage of small coal by running a large sample over screens 6 ft. 8 in. long, 3 ft. 3 in. wide and bars ¾ in. apart, inclined at an angle of 45 deg.; 35 per cent. of this coal went over the screens, the coal having been handled five times from the mine car.

The New River coals show an increase in volatile matter from the southeast to the north and northwest, exactly opposite to the Pocahontas coals in this respect. This variation applies, however, as a rule, to the Sewell bed alone, the Fire Creek and Beckley showing comparatively little change.

There is also a variation in the sulphur content of the New River coals, which applies almost entirely to the Sewell bed. This variation cannot be placed geographically and follows no direction, although it is most evident in one particular area, near the center of the field.

The variations in volatile and sulphur are as follows, according to the Bureau of Mines analysis, composite samples:

	Volatile			Sulphur		
Bed	From	To	Avr.	From	To	Avr.
Sewell	13.50	25.50	20.07	1.71	0.51	0.82
Fire Creek	14.54	19.42	16.98	0.97	0.47	0.66
Beckley	12.57	17.50	14.79	1.12	0.56	0.77

The ash content shows but little variation in all of the New River coals. Of the three beds, the Fire Creek is slightly higher in ash. The amount of oxygen in these coals also shows small variations and is remarkably low, which fact, with the small amount of ash, explains to a large extent their high heating value.

The ash-fusing temperature of the New River coals shows similar variations to the Pocahontas, from as low as 2200 to over 2600 deg. F. in the coal *as shipped;* some of this variation is doubtless due to difference in the preparation or cleaning.

In 1909, the U. S. Geol. Survey inspectors took samples from nearly all of the mines in the New River and Pocahontas coal fields. In the accompanying table the average analyses are figured from those as given in Bulletin No. 22, Bureau of Mines. In obtaining the averages given, the analysis of the composite sample from each mine was used.

MINE SAMPLES OF NEW RIVER COALS BY THE U. S. GEOL. SURVEY

	Sewell Bed[1]			Fire Creek Bed[2]			Beckley Bed[3]		All Beds[4]
	Avr.	High	Low	Avr.	High	Low	Avr.	High	
Moisture, dry coal	3.43	5.24	2.57	3.24	4.17	2.63	3.52	4.71	3.40
Volatile matter	20.07	25.5	16.00	16.98	19.57	14.65	14.79	16.5	18.48
Fixed carbon	76.43	80.71	71.10	77.72	81.20	75.47	77.42	82.19	77.42
Ash	3.48	5.32	2.31	5.28	8.54	2.56	4.09	6.16	4.09
Sulphur	0.82	1.36	0.51	0.66	0.97	0.47	0.78	1.12	0.78
Hydrogen	4.81	5.02	4.58	4.68	4.92	4.08	4.75	4.87	4.75
Carbon	86.06	87.95	83.95	84.94	87.66	82.35	85.78	87.46	85.78
Nitrogen	1.55	1.66	1.33	1.50	1.64	1.36	1.52	1.60	1.52
Oxygen	3.36	5.41	2.05	2.85	3.45	2.01	3.11	3.63	3.11
B.t.u.	15,130	15,404	14,827	14,898	15,400	14,425	15,121	15,302	15,121

[1] 51 analyses. [2] 20 analyses. [3] 14 analyses. [4] 85 analyses.

Kanawha District Coals

The higher-volatile coals from the Chesapeake & Ohio district, a considerable tonnage of which is now being shipped from Hampton Roads, are generally known as Kanawha splint and Kanawha gas coals, rather a misleading classification. "Splints" refers to the laminated fracture of the coal and its supposed resemblance to the Scotch splint coals in that particular. The term Kanawha gas is applied indiscriminately to coals coming mainly from the No. 2 Gas, Eagle and Powellton beds running from 30 to 36 per cent. volatile and used for many purposes. All of these coals come from the Kanawha district, in which there are six beds mined.

In ascending the series of beds, the coal changes, the lower ones containing some hard, splinty layers which increase in thickness until in the upper beds the coal is nearly all hard and of laminated structure, mining out in cubical or oblong blocks; it also has an increased percentage of volatile, and as a rule is somewhat lower in sulphur and with a higher ash-fusing temperature than the gas coals. In fact, many of the Kanawha splint coals may be considered as practically nonclinkering, the ash-fusing temperature showing over 2900 deg. F. in some instances.

The coals in this field were mined a number of years previous to the opening of the New River field. As far back as 1840 they were used at the salt works near Charleston, W. Va., and previous to the Civil War they were shipped by water to the Ohio markets, as they still are to some extent.

TABLE OF ANALYSES OF KANAWHA DISTRICT COALS COMPILED FROM VARIOUS SOURCES

	Eagle		No. 2 Gas		Winifrede				Powellton			Cedar Grove		Coalburg		S.-B.	No. 5 Block	
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18
Moisture	0.81	Dry	1.18	Dry	1.55	1.66	Dry	1.00	0.82	Dry	Dry	Dry	1.05	1.27	Dry	1.51	1.58	1.30
Volatile matter	31.01	31.17	33.52	32.64	36.48	36.27	33.99	31.61	31.18	29.83	31.95	35.44	35.35	33.62	36.31	33.41	34.44	34.22
Fixed carbon	63.09	64.52	59.78	59.88	56.85	57.10	60.92	61.72	64.79	63.31	61.44	56.29	58.19	58.84	56.21	59.01	55.83	61.43
Ash	5.09	4.32	5.52	7.48	5.12	4.97	5.09	5.67	3.21	6.86	8.91	8.27	5.41	6.28	7.48	6.07	8.15	3.05
Sulphur	0.86	0.61	1.29	0.94	0.85	0.81	0.70	0.78	0.64	0.80	0.60	1.38	0.95	0.70	0.61	0.86	1.23	0.76
Hydrogen	5.30	.....	5.01	5.07	....	....	....	5.01	5.00	4.98	....	4.95	5.10	5.19	....	5.52	4.69	4.81
Carbon	79.96	.....	78.92	80.03	....	....	....	79.93	82.36	80.16	....	77.14	78.09	78.09	....	76.41	75.06	80.93
Nitrogen	1.17	.....	1.14	1.40	....	....	....	1.24	1.11	1.65	....	1.21	1.19	1.14	....	1.19	1.11	1.23
Oxygen	7.62	.....	8.12	5.08	....	....	....	7.67	7.68	5.55	....	7.05	9.63	8.66	....	10.03	9.76	9.22
B.t.u.	14,709	14,909	14,277	14,384	14,345	14,371	14,470	14,358	14,931	14,517	14,460	13,995	14,217	14,133	14,086	13,868	13,418	14,397

Eagle—Analysis No. 1 is the average of samples of air dried coal from 15 different mines, according to the W. Va. Geol. Surv. Analysis No. 2 is the average of 6 samples from one mine where the coal was 7 ft. thick at its best.

No. 2 Gas—Analysis No. 3 is of an average sample from 34 mines, according to the W. Va. Geol. Surv. Analysis No. 4 is of a shipment of mine-run coal, according to the U. S. Bureau Mines Bull. No. 22.

Winifrede—Analyses Nos. 5 and 6 are shipment samples of 1½-in. coal, according to a private report of the Fuel Testing Co. Analysis No. 7 is the same of 2-in. slack and nut. Analysis No. 8 is the average of samples from five mines, according to the W. Va. Geol. Surv., Bull. No. 2. The ash-fusing temperature of the sample used in analysis No. 7 was 2910 deg. F.

Powellton—Analysis No. 9 is of mine samples, according to the W. Va. Geol. Surv., Bull. No. 2. Analysis No. 10 is of a shipment sample, according to the U. S. Bureau of Mines, Bull. No. 22. Analysis No. 11 is of a shipment of 13 cars sampled and analyzed by the U. S. Geol. Surv.

Cedar Grove—Analysis No. 12 is of shipment samples, according to the U. S. Bureau of Mines, Bull. No. 22. Analysis No. 13 is the average of mine samples from five different mines, according to the W. Va. Geol. Surv., Bull. No. 2.

Coalburg—Analysis No. 14 is the average of air dried samples from 13 mines on the C. & O. Ry., according to the W. Va. Geol. Surv. Analysis No. 15 is a shipment sample of 1½-in. lump, according to a private report of the Fuel Testing Company.

Stockton-Belmont—Analysis No. 16 is an average from five mines, according to the W. Va. Geol. Surv., Bull. No. 2.

No. 5 Block—Analysis No. 17 is an average from ten mines, according to the W. Va. Geol. Surv., Bull. No. 2. Analysis No. 18 is the best obtained when making the analysis of No. 17.

There is no doubt that these coals will meet with an increasing demand at tidewater, as they are sold at a cheaper f.o.b. price than the New River Pocahontas coals and, for some purposes, give almost as good results, especially as locomotive fuel.

Typical analyses of the coal from each of these beds are given herewith, beginning with the lowest.

As in the Norfolk & Western fields, these coals are in the Kanawha series, the lower (gas) coals being softer, of columnar structure and lower volatile, and the upper beds containing the so called splint coals.

KANAWHA SPLINT COALS

Nearly all of the splint coals are shipped to the West, where they are largely used by railroads, at power plants, gas works, in the manufacture of malleable iron and for domestic heating. Large shipments are also made to storage plants on the Great Lakes, as these coals stock well and are comparatively free from liability to spontaneous combustion.

The name "splint coals" refers solely to their fracture and not to their appearance, as they are clean and lumpy, but break in layers across the seam instead of breaking with the vertical fracture of the New River and Pocahontas coals. While the latter fuels will average about 35 to 40 per cent. lump at the mines, the splint grades will run 70 to 75 per cent., the coal coming out in large blocks, which stand severe handling. For this reason, these coals are in great demand for use where a lumpy fuel is required, as on locomotives.

It will be seen from the analyses that all of these coals are low in sulphur, comparing favorably in this respect with the New River Pocahontas coals; and what is of more importance, the ash of the splints, while higher than in the other coals mentioned, is practically nonfusible and makes little or no clinkers.

These coals are very easy to fire, ignite readily, burn a long flame and give little waste of unconsumed fuel in the ash. In addition to the high percentage of lumps, they will get up steam quickly, are capable of giving high rates of combustion and a high evaporation per square foot of heating surface (the latter points being desirable features in locomotive operation) and throw comparatively few sparks, requiring also little slicing or raking of the fires.

For metallurgical purposes, especially in the making of malleable iron, these coals give excellent results, as they are low in sulphur and burn with a long flame and no clinkers. They also give good results in either gas-producers or in direct heating.

Owing to these many excellent properties, these fuels are readily sold in the Middle West. For many purposes they are also given preference over the semi-bituminous coals of higher theoretical heating value, such as New River and Pocahontas, especially with various types of overfeed stokers.

For domestic use the Kanawha splints always bring good prices and are in great demand, as they ignite readily, make a beautiful fire and do not injure the grates and heating surfaces.

In general, these coals are adapted for almost every use. They are among the best locomotive fuels in the country, good steam coals, either for hand firing or in stokers, and are excellent coking coals; they are largely used for the manufacture of illuminating gas, and are well suited for producer-gas work.

KANAWHA GAS COALS

It is worthy of mention that a coal from the No. 2 Gas bed gave the highest results of all coals tested, both in evaporation under boilers and in gas-producers, at the St. Louis testing plant of the U. S. Geol. Survey.

Eagle Bed Coal—This bed is correlated with the War

Eagle coals on the Norfolk & Western. It is an excellent steam coal and one of the best coking coals, especially for byproduct ovens. The bed varies in thickness from 4 to 7 feet.

No. 2 Gas Coal Bed—The greatest developments in the Kanawha field are in this bed, as it covers the largest area and varies from five to over ten feet in thickness. It is a good coking coal, an excellent all-around steam fuel, one of the best locomotive fuels in the country and suitable for gas-producer plants and heating furnaces; it is also largely used for the manufacture of illuminating gas and is much in demand for use in automatic stokers.

As might be expected, there is some variation in the constituents of this coal in different localities. As regards heat value, it is at its best near the eastern and southern edge, along the Virginian Ry. territory. There is also quite a little variation in the structure and hardness of the coal in this bed; in some localities it is all rather soft and of columnar structure, while at all other places there is a more or less thick section of a hard splinty coal in the bed.

This coal, as well as that from the Eagle bed, is now extensively used at byproduct coke ovens, mixed with a certain percentage of the lower-volatile New River-Pocahontas coals. The resultant mixture gives about 25 per cent. volatile, which insures a high yield of both coke and byproducts as well as a better product structurally.

Winifrede Bed—This bed covers a large area and considerable new development is now going on, as it is one of the best splint coals in the region. There is a certain amount of the softer "gas" coal in this bed, making it a good all around steam, furnace and domestic fuel, and there is no better coal of its class in the country. The new developments toward the southwest are showing even better than the original openings along the Kanawha River, the volatile matter and ash decreasing and the heat value increasing.

Powellton Bed—This bed underlies a comparatively limited area, with only eight mines opened. It is, however, superior to most of the Kanawha coals for steam or coke making; it is a soft, friable coal of columnar structure, resembling the New River product. The thickness of the bed varies from 4½ to 6 feet.

Cedar Grove Bed—This is the lowest of the splint coal beds. It is largely used for domestic purposes, but is also good steam fuel. It is rather softer than the higher splint coals and the thickness of the bed varies from 2 ft. 10 in. to 3 ft. 6 inches.

Coalburg Bed—This bed has the greatest development of any of the splint coals, covering a large area and varying from 4 to 8 ft. in thickness. Like the Winifrede bed, it contains layers of softer "gas" coal and at one mine a 6- to 8-in. layer of cannel coal. It is interesting to note that these two beds are never both found of workable thickness in the same locality. What has already been said about the splint coals generally applies also to this bed.

Stockton-Belmont Bed—This is another of the splint coal beds, the coal from which is largely used for domestic purposes. It covers a wide territory, the thickness of the bed running from 4 to 12 ft., with partings.

No. 5 Block Bed—This bed in the Alleghany series is identical with the Lower Kittanning of Pennsylvania and the Roaring Creek of northern West Virginia, where, however, it is a semibituminous coal. In the Kanawha field it is a hard, splinty fuel, high in volatile, with layers of softer coal. It is a good steam and domestic coal.

KENTUCKY FIELD

It is probable that some of the coals from this field may come to Hampton Roads in the future, but owing to the freight rate differential, they are of no importance at this time and will not be included in this description, except to say that they are bituminous coking and gas coals.

(*To be concluded*)

Extracts from a Superintendent's Diary

We men have a way of assuming that the weight of the world is entirely upon our shoulders, and we take ourselves seriously in consequence; in fact, if any of our women graciously offer to share the burden with us, we are apt to become quite disconcerted and grave.

But now and then our well meant importance suffers a shock and before our equilibrium is entirely restored we are treated to a little surprise.

For more than a year now I have been giving ear to any suggestion that seemed to offer possibilities toward building up the moral atmosphere of our village; sanitary requirements, housing conditions, street improvements, amusements; in fact, any suggestion was welcomed and an investigation followed. In spite of my desires and best efforts, results have not been satisfactory, and last night I remarked to my wife that it seemed to me that some of the women of our camp were inspiration proof.

My wife put down the embroidery, on which she had been working, deliberately, and in a very impressive manner said: "Say that again, and don't choke on the word women."

I obeyed instructions.

"And now," continued my wife, "will you please recall for my benefit some of the impressive conversations you have had with these women from which they might be expected to absorb inspiration?"

I hesitated; he who hesitates is lost.

My wife followed up the advantage and became eloquent. She always waxes eloquent when she realizes her superiority.

"You men, what do you know about inspiring women? Isn't it about time that you learned that the only way to build up the morals of a community is to listen to the women of the community, instead of attempting to instruct them? What do men know about morals, anyway?"

When my wife addresses me as "men" I do not attempt to interrupt her conversation; experience has taught me that it is not wise, and so I allowed her to continue.

"You build houses that are intended for homes to be ruled over by women, and yet you never discuss the plans with a woman for comment or approval. You decide on sanitary regulations that are to make these homes habitable and you tell the men that they must carry them out. And yet all of the regulations must be carried out by the women if they are carried out at all.

"You decide that you will insist on a certain moral standard for your citizens, and the next day you men appoint a company physician who will eventually drive every woman who craves motherhood out of your camp. A moral atmosphere and no mothers! We lived in such a town in New Mexico."

Fortunately, one of my mine foremen came by for a little conference just then and I was allowed to retire peacefully from my wife's presence.

"Mack," I said to the foreman after we had concluded the business which had brought him to our house, "what do you think would happen if we made an effort to take all of the women in the camp into our confidence whenever matters of social and moral welfare were under discussion?"

"But how would we go about it?" ventured Mack.

"Personal interviews, of course," I replied.

Mack gave me a searching look to see if I were in dead earnest, and then he began to grin.

"Say, Mr. Thompson," he said, "my wife has a jealous streak in her; how about Mrs. Thompson?"

Mack didn't expect a reply, so I didn't disappoint him.

The Labor Situation

SYNOPSIS—Attempts to settle the eastern Ohio dispute fail. The conciliators concede the operators' argument. Trouble in Oklahoma ordered at an end by national union officials.

Failure again marked the efforts of the miners and operators in the eastern Ohio field to arrive at a wage agreement. The conferences which had been held in Columbus, continuing for more than two weeks, were adjourned sine die last week without any tangible results. The miners' representatives finally and conclusively refused the plan of arbitration suggested and Secretary-Treasurer Green announced after a conference of miners' officials that no plan of arbitration would be accepted. Thus all the talking went for naught and the mines are still idle.

The federal investigators Daniel J. Keefe and Hywel Davies completed their work and left for Washington, D. C., to submit it to the Department of Labor. A partial report was given out before leaving which will undoubtedly be included in the complete summary, and some of this we quote as follows:

The Federal Conciliators Support the Operators

It has been said by the miners that the present mining price in the state of Ohio is the equivalent of the price paid under the old contract. The miners say that their equivalent to the mining price is based on the screening percentage of the whole state. But the operators contend that the Policy Committee of the United Mine Workers of America, approved by referendum vote, instructed that each district, sub-district or group of districts was to renew its old contract, except where the method of mining coal has been changed by law or otherwise. In such places the price to be paid for mine run would be the equivalent of the price paid per ton for screened coal.

It has been said that percentages in the Hocking Valley district were 72 lump and 28 screenings, and that the equivalent of the price in that district would be 49.64c.; while in the Cambridge field the percentages were 68 and 32, and the price for that would be 47c.; while in the eastern Ohio field the percentages are 64 and 36 and the price for mine run should be 44.61c. If this is true, it would show that the Hocking Valley district has received a reduction of 2.64c. on the equivalent price they paid under the old contract; and that the price for the Cambridge district of 47c. per ton is equivalent to the price paid last year. So that if the miners and operators should conclude a contract on any price less than the price paid or established in the state of Ohio, the operators in the Hocking Valley could not make serious objection to it, because they have already received a reduction of 2.64c. on the last year's price. And if the percentage is correct for the Cambridge field, the operators there could not advance any argument why their scale should be lowered.

The eastern Ohio district includes Harrison, Belmont and Jefferson Counties and a small portion of Monroe. But the northwestern part of Jefferson County belongs to the Bergholz district, and a small part of Harrison is also not included as part of the eastern Ohio area.

The Freight Question

A protest was filed recently with Governor Willis against the rates on coal from Hocking Valley points destined for Lake Erie. These are alleged to be discriminatory in favor of West Virginia coal, by the United Mine Workers of Ohio. John Moore, president of the Ohio miners, told Governor Willis that there is no truth in reports that eastern Ohio miners will support the Gallagher senate bill, which seeks to amend the mine-run law by permitting miners and operators to sign a contract on another basis than the mine-run system. The governor was told by the committee that railroads charge 75c. a ton for hauling Ohio-mined coal from Armitage, Athens County, Ohio, to Toledo, while they haul West Virginia coal from the same point for 35 cents.

The Work of Starting a Pump Too Heavy for a Mine Foreman

Three representatives of the International body of the United Mine Workers were obliged to make a trip to Spadra, Okla., recently to restore discipline among 150 striking miners, who had refused to recognize their contracts with two of the mines at that place, and who remained idle against the orders of their district managers. The miners disregarded a telegram from President White, instructing them to resume work and submit their grievance to the district board of the union and operators, as provided in their contract.

Upon learning this, Mr. White sent Vice-President William McLaughlin, District President Edward Cunningham, and International Organizer Rube Fern to Spadra as his personal representatives. Not until their arrival did the miners return to work. The mines in which the trouble occurred are those of the Spadra Creek Coal & Mining Co. and the Eureka Mining Co.

The miners went on strike first in the early part of January, but returned to work at the direction of their district managers. The sole grievance was their objection to the custom in the Eureka company's mine of having the mine foreman start and stop the electric pump and attend to oiling it. The miners demanded that a pumpman be hired for that duty.

They did not submit the question to the board for arbitration, and under the terms of the contract, the operators assessed the stipulated penalty for failure to do so. The men protested against this penalty, and a second time quit work, still without the consent of their district managers. President White's agents persuaded them to submit their grievance in the proper way, and the question of hiring a pumpman is now pending before the district board of operators and miners.

The President's Colorado Coal Commission

The commission appointed by President Wilson, consisting of Seth Low, Charles W. Mills and Patrick Gilday, on Jan. 19 wrote to the "open-shop" operators of Colorado, drawing attention to the arrangement of the Colorado Fuel & Iron Co., by which the men have formed a species of union to confer with the employing company on the conditions of employment and other matters of concern. The commission points out "that any plan under existing conditions is likely to be received more cordially and be acted upon more successfully if it reaches its final form in coöperation with the President's commission, and that it would be likely to be better received by the public."

In reply 71 operators, having in their employ 7546 men and producing 5,024,193 tons in 1914, declare that they watch the action of the "Fuel company" with interest, but are skeptical as to its success. They declare that the laws requiring them to recognize union labor are unconstitutional, and that checkweighman have always been conceded to the miners. They call attention to the fact that the Colorado legislature, now in session, is about to provide a board of mediation, so that one like that in the anthracite region is unnecessary.

The National Elections of United Mine Workers' Union

The national election of officers for the United Mine Workers' Union is now reported closed, with John P. White, president, receiving 153,389 votes; Frank J. Hayes, vice-president, 150,558 votes; William Green, secretary, 122,768 votes. John P. White and Frank J. Hayes were unopposed, but William Green had an opponent in J. L. Sims, who received 45,378 votes.

It is creditable to the union that White, who has had nothing but defeats to his credit, with the exception of the victory in the West Virginia strike, and who, faced by bad times, has not raised wages appreciably anywhere, has been returned to office. It shows that the miners are not fickle, and are willing to follow a leader of character even if success does not fall to his lot.

Hand Firing of Boilers

"Hand Firing Soft Coal Under Power-Plant Boilers," is the title of Technical Paper 80, just issued by the United States Bureau of Mines, as an aid to the firemen employed in manufacturing establishments throughout the United States.

The paper, which contains descriptions of methods of firing soft coal under power-plant boilers and of methods of handling fire so as to make the least smoke and to get the most heat from the fuel, seeks to meet the needs of the men, many without a technical education, who are employed in small plants of 1000 to 2000 hp. capacity. For this reason the language used is plain and simple, and technical terms have been avoided as far as possible.

The publication under "General Directions on Firing Soft Coal," makes the following statements:

The Fire Should Be Uniformly Thin

When burning bituminous coal under power-plant boilers the best results are obtained if the fires are kept level and rather thin. The best thickness of the fires is 4 to 10 in., depending on the character of the coal and the strength of the draft. The coal should be fired in small quantities and at short intervals. The fuel bed should be kept level and in good condition by spreading the fresh coal only over the thin places where the coal tends to burn away and leave the grate bare.

Leveling or disturbing the fuel bed in any way should be avoided as much as possible; it means more work for the fireman and is apt to cause the formation of troublesome clinker. Furthermore, while the fireman is leveling the fires a large excess of air enters the furnace, and this excess impairs efficiency.

The ash-pit door should be kept open. A large accumulation of refuse anywhere under the grates should be avoided, as it may cause an uneven distribution of air. Whenever a coal shows a tendency to clinker, water should be kept in the ash pit. All regulation of draft should be done with the damper and not with the ash-pit doors.

Making the Charge Even

In firing, the fireman should place the coal on the thin spots of the fuel bed. Thin and thick spots will occur even with the most careful firing, because the coal never burns at a uniform rate over the entire grate area. In places where the air flows freely through the fuel bed the coal burns faster than in places where the flow of air is less. The cause of this variation in the flow of air through the different parts of the fuel bed may be differences in the size of the coal, accumulations of clinker, or the fusing of the coal to a hard crust. Where the coal burns rapidly, the thin places form.

Before throwing the fresh coal into the furnace the fireman should take a quick look at the fuel bed and note the thin spots. In a well-kept fire these spots can usually be recognized by the bright, hot flame. The thick places have either a sluggish smoky flame or none at all. In order to place the coal over the thin places the fireman should take a rather small quantity of coal on his scoop, for it is much easier to place the coal where it is needed with small shovelfuls than with large ones.

Coal Does Not Burn in High Places

The coal should be placed on the thin places in rather thin layers. If the fireman attempts to fill up the deep hollows in the fuel bed at one firing, the freshly fired coal may fuse into a hard crust thus choking the flow of air, causing the fuel to burn slowly and starting new high places. If the high places in the fuel bed are missed on one or two firings the hard crust at the surface will gradually burn through or crack, thus allowing more air to flow through, and the place will get back to its normal condition.

Of course, if the high place in the fuel bed is caused by clinker the flow of air will not be free until the clinker is removed with the fire tool. Whatever may be the cause of the high places in the fuel bed, the fireman should remember that they are places where the coal does not burn. There is no use in placing coal on such a place.

When Firings Are Infrequent

If the firings are too far apart the coal in the thin spots may burn out entirely, allowing a large excess of air to enter the furnace in streams. If those streams of air are not properly mixed with the gases from the coal, only a small percentage of the air is used for combustion, and most of it passes out of the furnace, depriving the boiler of considerable heat.

If, for instance, air enters the furnace at atmospheric temperature, say 75 deg. F., and leaves the boiler at about 575 deg. F., it carries away the heat that was absorbed in raising its temperature 500 deg. F. This heat is lost to the boiler. Another loss of heat occurs when holes form in the fuel bed, because pieces of unburned coal fall through the grate when the fireman attempts to cover the holes with fresh coal. Therefore, in order to avoid the formation of holes, firings should be made at short intervals, particularly if, for any reason, the fuel bed must be kept thin.

Copies of Technical Paper 80 may be obtained by addressing the Director of the Bureau of Mines, Washington, D. C.

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A Portable Dead-Weight Tester

The accompanying illustrations represent a new portable device for testing pressure gages by dead weight. Differential pistons have been utilized to create a hydraulic multiplication, and friction between the parts has been minimized, says *Power* for Nov. 3. The gage to be tested need not be removed from its working position after putting in a tee below the gage. This instrument may be used with or without tubing and tripod to reach an elevated gage or as a bench machine without a tripod. The oil used to transmit pressure to the gage also serves to keep the working parts lubricated.

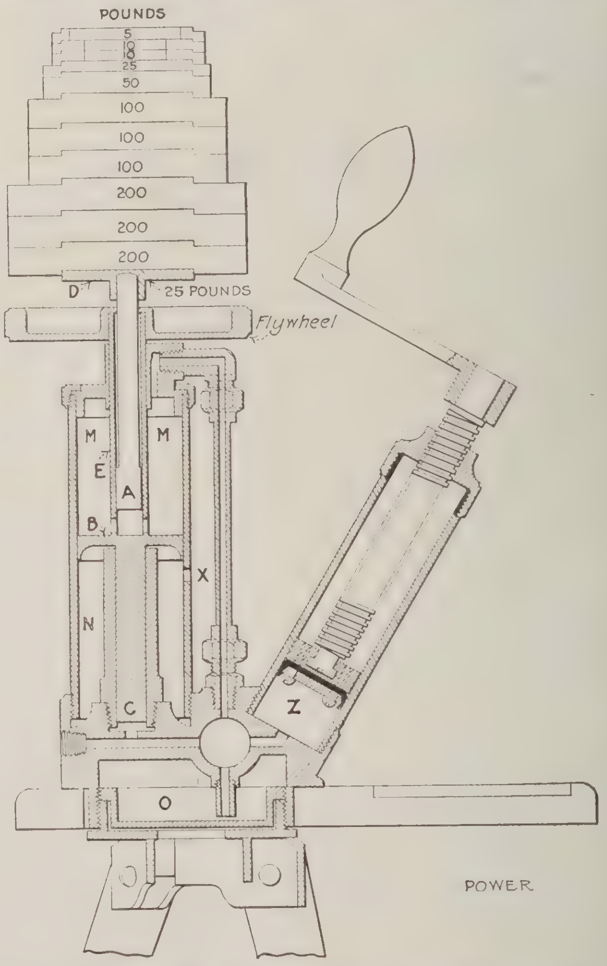

Fig. 1. Section through Portable Dead-Weight Tester

The design is based on the fact that the pressure applied to the surface of a fluid is transmitted to every part of it. Referring to Fig. 1, the area *B* is an exact multiple of the area A. If the area B, for example, is 20 times that of A, and a one-pound weight is placed on the tray of the piston D, its pressure is transmitted undiminished to each surface unit of area B. In other words, the area B is exerting a pressure of 20 lb. on the area C. For example, let the area C be ⅕ sq.in. Hence the weight registered by the gage is 20 × 1 × 5 or 100 lb. per sq.in. In the same way the proportions of the plungers have been worked out to read pressure in kilograms per square centimeter. Decreasing either or both of the areas A and C, B remaining constant (for manufacturing purposes), the gage reading increases. If A and C increase, the pressure under C decreases.

As the weight employed is multiplied from 1 to 500 times, according to the capacity of the machine, so likewise the retarding effect of the friction would be multiplied. This serious obstacle has been overcome by the attachment of the flywheel to the piston E. The inertia of the floating weights allows the piston E to rotate around the piston D free from the effect of friction. The flywheel, carrying with it the piston E, eliminates the effect of friction within the cylinder, thus allowing the weights employed to give their true multiplied weight. The weight of the pistons is regulated in different instruments to give a reading of an even five on the gage for convenience. This is known as the initial constant and in high-capacity instruments is 25 lb. Therefore, when the weights, 1000 lb., are placed on the tray, the gage, if correct, should read 1025 lb. If it fails to register according to the weights used plus the initial, the error is at once evident. The constant value of a dead-weight test makes it the only true test.

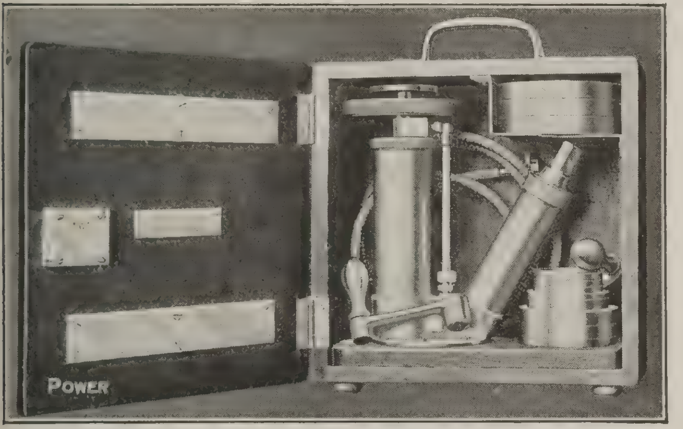

FIG. 2. TESTER IN CASE

This instrument is initially filled by immersing the tube in a vessel of oil and unscrewing the handle shown at the left of Fig. 1. This fills the oil cylinder Z, after which it is conveyed to the gage when attached and below the areas A and C. The direction of flow is controlled by the three-way cock. When the test has been made, the oil is stored for the next test in the reservoirs N and O, which are connected by a duct, and to the reservoir M, if desired. Air compression below the area B is eliminated by the hole X.

This equipment may be packed in a case, Fig. 2, its weight being but 17 lb. for tests from 1000 to 5000 lb. and as low as 13 lb. for tests to 500 lb. Heretofore, 200 lb. dead weight has been necessary on the ordinary ⅕-sq.in. tester to make a test to only 1000 lb.

This instrument was invented by Richard C. Cox, Cambridge, Mass., and is manufactured by the Simplex Tester Co., Brattle Building, Harvard Square, Cambridge, Mass.

Recent Legal Decisions

Damages Recoverable for Conversion of Coal—When a railway company converts to its own use coal entrusted to it for transportation, the damages recoverable by the owner are measurable by the reasonable market value of the fuel at the place where the appropriation occurs. (Texas Court of Civil Appeals; Campbell vs. Q., A. & P. Ry. Co.; 170 Southwestern Reporter, 859.)

Place Where Coal Company May Be Sued—A coal company organized under the laws of Maryland, operating mines in Pennsylvania, and authorized to do business in New York, may be sued in any one of the states for injury to a miner sustained in Pennsylvania. (United States District Court, Northern District of New York; Teti vs. Consolidated Coal Co.; 217 Federal Reporter, 443.)

Surrender of Leases—The mere fact that a lessee of coal lands indicates a purpose in the future to surrender his lease, and make no further payments to the lessor, and his subsequent failure to make payments, does not establish a surrender. The president of a corporation, as such, has no implied authority to surrender a lease belonging to the company. The release must be evidenced by corporate action the same as a conveyance of property. (West Virginia Supreme Court of Appeals; Laing vs. Price; 83 Southeastern Reporter, 497.)

Assumption of Risk by Miner—Where a miner was required to sound the roof of his working place and set props after blasting, he assumed the risk of being injured through a fall of slate where he started to remove coal without conforming to that custom. And this is so although he was only 20 years old, it appearing that he had worked in the mine more than a year and understood the nature of his work as well as if he had been an adult. (Kentucky Court of Appeals; Music's Administrator vs. Northeast Coal Co.; 170 Southwestern Reporter, 971.)

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The Efficiency Expert

The devil opened the furnace door
And heaved in a shovel of coal,
When out there popped on the scorching floor
A truculent, half-baked soul.
"Look here, good devil," it said, "I pray
You will pardon my seeming haste,
I am—you must listen to what I say—
Appalled at your awful waste!

"Two-thirds of your heat goes up the flue,
Your coal is but half consumed;
If a modern plant should compete with you
This business were surely doomed.
Your times and motions I've studied well,
As you hustle the sinners in,
And I find you have here but a third-rate hell
For the way it is run is a sin!"

The devil grabbed up that critic then
With an angry shake and a flirt,
And said, "Go back to the world of men,
You efficiency expert!
If you stay down here you will get my job,"
(Here he uttered a dismal groan),
"But if you go" (here he gave a sob),
"You will fix up a hell of your own!"

—*Chicago News.*

Editorials

The Rockefeller Foundation

Among the illustrious personages who testified before the Industrial Relations Committee was one George W. Kirchwey, professor of law in Columbia University. We cannot help quoting his testimony, for it points out a real danger existing in the Rockefeller Foundation, which it is to be hoped we shall escape, but which, in all true Americanism, we feel assured of meeting even if we do not escape it.

Mr. Kirchwey is said to have made the following remarks. We presume they have not been glossed over, and we make somewhat broadly the assertion that we think we understand a part of them, just as we comprehend a small part of the publications of many other of our college professors who are writing on economics, not always with conspicuous clarity.

> I should say that there was grave doubt as to whether the court would interfere with the Rockefeller Foundation by dissolution or otherwise if it undertook to use its funds in an educational campaign against workmen's compensation acts and against widows' compensation.
>
> That it might furnish publicity agents to the Colorado Fuel & Iron Co. is a possible contingency that I have considered.
>
> I should say that was extremely doubtful because of the fact that it is promoting a specific business enterprise there, and it would, I think, be very hard for it to persuade a respectable court that was not wholly under the influence, let us say, of the Colorado Fuel & Iron Co., but that there is a proper use of the corporation's funds.
>
> I believe it could hire strikebreakers in the present state of public judicial opinion. Perhaps 10 years from now, no. It depends upon the progress of public opinion in the meantime.

Now there *is* and we will not deny it, a distinct danger that the Rockefeller Foundation may be put to bad uses. It may, for instance, engage such men as George W. Kirchwey, Scott Nearing, formerly instructor in economics at Swarthmore College, Pennsylvania, Richard Theodore Ely, professor of political economics at the University of Wisconsin, Henry Rogers Seager, professor of political economy at Columbia University, and even James Henry Brewster of the University of Colorado. With such men leading public opinion it might strive to bind capital with the cords of labor so seriously as to strangle the one and starve the other.

The men we have mentioned have already been appointed to positions largely paid, at least in most cases, out of foundations created by rich men like John D. Rockefeller, Sr. Their conclusions are probably wholly opposed to those of the men who donated their money to found the professorships and to build the colleges in which their lectures are delivered. In the sense, however, that their income is derived from the donations of rich men and that increased influence can be secured only by further contributions from the same source, these men are themselves the "hirelings of capital." We do not see that this fact has restrained their liberty.

All we do see is that Mr. Kirchwey desires to restrict the liberties of others. He does not believe in free speech for any one who disagrees with himself. Liberty to his narrow mind is permission to live on the benefactions of capital and spurn the hand that bestows it. He would muzzle all other men who do not agree with him but have an idea that a liberal man is to be honored no matter how rich he may be, if his actions are honorable.

He is afraid that the Rockefeller Foundation, being, as he believes, a stepchild of the Colorado Fuel & Iron Co., will be opposed to pensions. We deny the relationship between the two, but if the coal company has commanding influence over the foundation it is quite likely that the latter will *advocate* pensions, seeing that the former has already established them.

In a degree we are afraid of the foundation until the legislature puts a clause in the constitution of that body excluding Mr. Kirchwey and all like him from participating in its affairs. But we are confident that it can do little harm, no matter into whose hands it may fall. We are not afraid of discussion, for we do not fear that the good judgment of the public will be much swayed by specious arguments.

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Coastwise Freights

No subject has been more discussed in the coastwise trade since the first of the year than the spectacular advance in ocean freight rates. There has been a worldwide shortage of ocean freighters since the war began, but it took five months for it to cause any advance in rates on the Atlantic seaboard. As far back as September the first steam colliers were withdrawn from their usual service between Hampton Roads and New England to take grain to Europe, but the bituminous trade was so depressed that this loss of available ships did not greatly handicap coal shippers. Even when the number increased and sailing vessels began to be chartered for South America their absence was hardly felt.

It remained for the prolonged bad weather to bring forcibly to the coal trade that there was an actual shortage of boats coastwise and a few urgent orders were enough to send freights from 65 to 70c. up to $1 to $1.10, all within three or four days. There the flurry stopped; pressing requirements were supplied, enough bottoms were found for the business offering, but rates have been held firm on the $1 basis.

Meanwhile a few more coal steamers had been chartered on terms up to $45,000 per month for a 7500-ton ship, some fore-and-aft schooners had closed at $3500 to $5000 per month for the Mediterranean, all to take cotton, and today there is no disputing the fact that there is only enough tonnage for a very modest movement of bituminous coastwise during the current season. The bottoms that can be brought from off the lakes are few in number and ill-suited for the trade, and the coal interests face a situation as complex as it is unusual.

The agencies that have transportation of their own have only enough ships to care for their requirements for such a year as 1914; they are hardly in position to undertake more. On the other hand, the shippers who are dependent on bottoms in the open market have so far been unable to cover their requirements for the year at less than the current rate, and this in a market that insists on a delivered price.

The shippers *with* transportation set out to collect a premium for it, but general conditions were not encouraging enough to induce buyers to enter the market, except at a very slight advance over last year. These shippers therefore have sacrificed most of their extra profit. It is true they have some contracts, and those without bottoms have not, but consumers who have bought will draw from the same sources as last year and those who have not bought are more than likely to wait for propositions from those supplying them between now and Apr. 1. In other words, there is a stalemate; the one shipper wants to realize an extra profit on his transportation and can do so to only a small degree; the other wants to get transportation that will allow him to compete, and cannot. The results will be very much restricted shipments, at least for a while, after the 1914-1915 arrangements have expired.

The problem is, will present freights hold? If they do, then either those who own transportation will profit largely or the shippers without will be forced to net back a much smaller return to the mines in order to compete.

The Water Problem in the Anthracite Region

The amount of water to be handled in the anthracite region has probably reached a maximum, though greater depth will probably make the pumping of it year by year more difficult.

It is generally thought that the amount pumped should increase proportionately with the tonnage, but where the area over which operation takes place is but little increased this may not happen. The water enters the mines and is pumped out, and the rainfall is a better criterion of the water to be discharged than the tonnage mined. Of course much of the water in the anthracite regions is removed by tunnels. One long series of connected ditches connects the Forest City mines of the Hillside Coal & Iron Co. with the Coal Brook mine of the Delaware & Hudson Co., at Carbondale, and thence the water runs by gravity to the surface.

The Lausanne tunnel has a series of passages 13 miles long draining 14 collieries in the Panther Creek basin between Mauch Chunk and Tamaqua. The tunnel, 7500 ft. long, and its various connections took some few years to construct, so that the effect of its driving cannot be definitely traced to any one year. Connections were made between 1910 and 1913.

The first Oneida tunnel in Schuylkill County, 5600 ft. long, was driven about the same time. It relieved 5 large mine pumps. Later in 1913 another Oneida tunnel was driven 7030 ft. long which laid off 20 large pumping units, one of which was lifting water 500 ft.

It is largely to these changes that the reduction in water pumped is due. Still, unwatering the mines is an extremely heavy burden, far greater than that which troubles bituminous mines anywhere. A Welsh mine records as an exceptionally heavy inflow 8 tons per ton mined. The average rate in the anthracite field of this country is seen to be much heavier despite all that has been done to convey to the surface all waters entering the mine above drainage level and to prevent the inflow of surface waters.

The billions of tons pumped per annum seem almost unbelievable and lay a heavy burden on the cost of producing anthracite. The table we publish below will be found extremely interesting from this point of view. Unfortunately we learn that the water raised by skips is not included as water pumped.

CAPACITY OF PUMPS AND WATER PUMPED IN GALLONS PER MINUTE, TONS PER YEAR AND TONS PER TON OF COAL PRODUCED FROM 1903 TO 1913

Year	Capacity of Pumps Lifting Water to Surface, Gal. per Min.	Capacity of Pumps Lifting Water to Surface, Tons per Year	Capacity in Tons per Ton of Coal Produced	Gal. of Water Pumped per Min.	Tons of Water Pumped per Year	Tons of Water Pumped per Ton of Coal Produced
1903	745,690	1,634,179,635	21.7	447,351	980,369,716	13.0
1904	770,286	1,692,703,485	23.0	446,120	980,348,700	13.3
1905	791,994	1,735,654,851	22.1	439,707	963,617,890	12.3
1906	851,154	1,865,303,991	25.9	446,872	979,319,988	13.6
1907	902,216	1,977,206,364	23.0	454,855	996,814,732	11.6
1908	956,390	2,101,667,025	25.2	482,802	1,060,957,395	12.7
1909	961,240	2,106,557,460	26.3	465,119	1,019,308,288	12.7
1910	1,014,069	2,222,332,213	26.6	496,055	1,087,104,532	13.0
1911	929,248	2,036,446,992	22.4	490,201	1,074,275,491	11.8
1912	1,024,186	2,250,648,735	26.7	494,964	1,087,683,390	12.9
1913	1,037,009	2,272,605,223	24.8	489,600	1,072,358,400	11.7

Destination vs. Delivered Weights

There is a disposition on the part of prominent Indiana and Illinois operators to get together on certain features of contract business which have tended to materially reduce revenue in past years. One example in particular is the elimination of destination weights, and a disinclination to sell coal on a delivered basis.

Some of the consumers of steam coal, more especially public service corporations, contend that they should buy coal not only at destination weights but on a delivered basis. The competition for their tonnage, which is of considerable volume, has been so keen that this point has usually been conceded. The loss on shipments sold in this way has been found to approximate from 3c. to 6c. per ton because the operator is obliged to not only absorb the shrinkage in transit but assume the responsibility for pilferage, or any claims for loss or damage which arise before delivery to consignee.

The larger producers are discussing these questions with more frequency lately. Inasmuch as they are obliged to pay the miners for every ton of coal loaded at the pit mouth, they feel that all sales should be made at the same weights.

Looking Ahead

The next issue of COAL AGE will contain a valuable article describing a longwall conveyor and loader for use in thin seams. This machine can be moved forward as fast as the face advances. Actual results covering its use in Canadian mines are given. Another article next week will cover in detail the equipment and operations of a new mine in Utah. The mine is worked on the three-entry plan, the pit cars being weighed by an automatic recording machine. Coal dust is burned as fuel under the boilers. Other articles in this same number will deal with "Our Export Opportunities," "A Serious Accident Due to Flooding in a Canadian Mine," "Practical Rules for Cutting Mine Timber," "Facts the Consumer Should Know When Purchasing Coal," "A New Electric Mine Lamp." The March 6 issue of COAL AGE will be devoted exclusively to "hoisting and hauling," and will contain seven of the most valuable articles on these subjects that have ever been published.

Sociological Department

Kindergartens of the Colorado Fuel & Iron Co.

SYNOPSIS—The Colorado Fuel & Iron Co. has probably the only kindergartens to be found in the coal-mine villages of the United States. These have been established for many years and are quite popular among the employees.

We read a few weeks ago in the papers the statements of the union leaders about the illiteracy in the coal-mining camps of the Colorado Fuel & Iron Co., and as even we are prone to believe just what our union friends tell us, we were disposed to concede that the company had probably shown no particular energy in school work and had settled itself down to accept pioneer conditions with illiteracy and poor schools as part of the natural drawbacks.

But receiving a copy of the medical and sociological reports of the company for 1913-1914 we were led to ask Dr. R. W. Corwin for copies of earlier bulletins, and, after getting all he could supply, we importuned J. F. Welborn for more, and so we find that the Colorado Fuel & Iron Co., far from being a laggard in educational matters, was a leader in 1903 and still is unexcelled by any other coal operators in 1915.

CHARGE OF ILLITERACY IN COLORADO FUEL & IRON CO. CAMPS

If there is any illiteracy in the Colorado Fuel & Iron Co.'s camps the discredit of that fact must be laid principally to the individuals themselves or to the lack of fostering care of their native countries. If the leaders of these men in their revolts against order had done one-hundredth part as much for them as their employers, they might with much better grace condemn the company for the illiteracy of their followers.

But it is of kindergartens we would speak today, and first we would quote from the "Annual Report of the Sociological Department of the Colorado Fuel & Iron Co., 1903-1904." The summary of the welfare work of the company was made by Dr. R. W. Corwin, who was both chief surgeon of the Minnequa hospital and superintendent of the sociological department. He is now general manager of the work, and the Rev. E. S. Gaddis is superintendent. And, since 1906, a new president of the company rules instead of F. J. Hearne, namely J. F. Welborn. But the sociological department and the kindergartens are still active, and therefore we need no apology for quoting extensively from the report above mentioned. Please remember, however, that it was written in 1904, over ten years ago.

A REPORT MADE TEN YEARS AGO

The spread of the kindergarten movement during the last twenty or thirty years has been a significant fact in the educational life of America. From the first kindergarten started by Elizabeth Peabody and a few other women, who firmly believed in Froebel and his principles, they have come to be a part of the incorporated school systems in most of our large cities. But kindergartens in a mining community and supported entirely by a mining corporation are, as far as we know, unknown outside the camps of the Colorado Fuel & Iron Co.

The aim of the kindergarten is to develop the three-fold nature of the child—his physical, mental and spiritual self—and his creative self activity. The kindergarten is but the first step in the process of education; it is the stepping stone between the home and the school.

THIRTEEN VILLAGE KINDERGARTENS

The company is now supporting kindergartens in each of the following camps: Sopris, Rouse, Starkville, Engleville, El Moro, Pictou, Primero, Segundo, Tercio, Berwind-Tabasco, Redstone and Crested Butte, while a new one is to be opened Sept. 1 at Walsen mine, thus making a total of 13 in all. Within the last 12 months the school boards at Berwind-Tabasco, Primero, Segundo and Tercio have been paying the salaries of their kindergarten teachers or have been issuing certificates of indebtedness covering advances made by the company for this purpose. In all the other camps except Redstone, the company assumes not only the operating expenses but the teachers' salaries as well.

COLORADO FUEL & IRON COMPANY-PUEBLO-COLORADO
FREE KINDERGARTENS IN MINING CAMPS

AWARD IN 1904 FOR FREE KINDERGARTENS

PECULARITIES OF WORK IN THIS FIELD

Our constituency makes necessary a few noteworthy differences in methods from those of the ordinary kindergarten. Many of the children come to us with no knowledge of English. This makes the first work with them difficult, but it is astonishing how soon they learn to speak and sing. Because of the deficiency in language a greater degree of occupation and construction work is given, since the children can imitate the teacher's work long before they can understand or follow language. An extensive use is made of pictures and objects.

The kindergartner is obliged to employ more than the usual amount of rhythm work and physical culture as the little bodies are often stiff and untrained. Many more than the usual number of games are played, and here again the progress is remarkable. Much time has been devoted to nature study, illustrated by construction work, which is in many cases exceptionally good considering the little hands that made it. Fairy stories, patriotism, courage, kindness and gentleness have been illustrated in this way and also by freehand cutting, drawing and water-coloring.

Books were made of the children's work, illustrating the Thanksgiving, Christmas and Easter thoughts, and these were carried home. Some of the homes are decorated with the children's work.

The strike disturbances have made surprisingly little difference in the attendance, for even where the strikers were compelled to keep off company ground it was no uncommon sight to see the mothers bring the children to the picket line and pass them through to the school, thus showing their confidence in the kindergarten teacher and the company that made her work possible.

Crested Butte

Special reference should here be made to the new kindergarten opened June 1, 1904, at Crested Butte, for it has the distinction of being the youngest in the system, the largest in enrollment and the greatest in elevation, being a mile and a half above sea level.

A new kindergarten is also to be opened at Walsen mine Sept. 1, 1904, and the school house is being enlarged and moved to a more central location in order to accommodate the little ones.

Christmas in the Kindergartens

Although the strike was at its height at the holiday season it was not allowed to interfere with the happiness of the children. In keeping with the universal custom, the kindergartens made much of the joyous time and celebrated it with elaborate Christmas entertainments. The trees were decorated with bright and attractive ornaments of the children's own making, and fathers' and mothers' faces lit up as they received the simple gifts on which their own little ones' fingers had been busy for days beforehand.

Gifts for the little ones themselves were provided by the company in the form of a varied assortment of toys, so that each child received a substantial reminder of Santa Claus. The Colorado Supply Co., as usual, donated a generous supply of candy and oranges and in addition a box of fine French mixed candies for each teacher. The unburdening of the tree was preceded by simple exercises performed by the children, in several instances in conjunction with the public-school demonstrations.

Gold Medal for Kindergartens

While we have no kindergarten at Lime, Colo., there are many children of kindergarten age, and they were included this year in the Christmas remembrance. This seemed fitting as they had just dedicated a new schoolhouse at that place, and the tree and little gifts gave the children a pleasant introduction to their new building. About three hundred little ones were thus remembered in the various camps.

Teachers' Houses

The plan of setting apart separate houses for the use of the kindergarten teachers has amply justified itself, for not only are the teachers comfortably housed and sure of a permanent abode during the school year, but the houses have become headquarters and centers for social work. The furnishings of the teachers' rooms are thoroughly practical and sanitary and are intended to serve as a standard of taste from which housekeepers may realize how much may be accomplished with comparatively small expenditure. Teachers' houses are now fitted up in Berwind-Tabasco, Primero, Segundo, Engle, Rouse, Pictou and Crested Butte.

Teachers' Monthly Meetings

On the last Saturday of each month the kindergarten teachers have met regularly in Trinidad under the direction of their superintendent, Mrs. Margaret G. Grabill, for the purpose of conferring about their work and receiving instructions and suggestions.

At each conference some special line of work is taken up, demonstrated and discussed, and not only have the individual teachers been helped in this way but an esprit de corps has been developed that is of great value.

Pueblo State Fair

An exhibit of kindergarten work was made at the Colorado State Fair held in Pueblo in September, 1903, and the diploma to be awarded for the best work was given to our display.

Louisiana Purchase Exposition

A much more complete exhibit of kindergarten work was sent to St. Louis where it is attracting considerable attention because of its unique character and excellent workmanship. Whole mining camps, farmyards, houses and barns, gardens, windmills, kindergarten rooms, four- and five-roomed houses, each room furnished appropriately and all made by the little children, are among the features of the display.

Before the exhibit was sent to St. Louis it was displayed in the large show windows of the Colorado Supply Co. in Trinidad to the great delight of the passers-by. For a week or more there were groups of interested men and women constantly in front of the windows admiring the work and in many instances their delight was enhanced when they recognized the handicraft of their own children.

As will be seen in our illustrations the Colorado Fuel & Iron Co. received, as it richly deserved, a gold medal and a certificate in recognition of its free kindergartens in mining camps. For its kindergarten and the best industrial exhibit, it received another medal. A silver medal was granted for its method of housing employees in mining camps.

On our front cover will be seen how even the kindergarten children are being trained in first aid to the injured. We wish we could show you the pretty classrooms and the beautiful stages where these little "tots" are taught self-expression. We do not wonder at the enthusiasm of Doctor Corwin. Our readers would, we are sure, share it with him.

Anthracite Miners Good Patrons of Movies

The growth of the moving-picture business in the anthracite region of Pennsylvania shows a startling increase in the amount of money devoted to this form of entertainment. Five years ago there were nine motion-picture theaters in Wilkes-Barre with an aggregate seating capacity of about 1800. At the close of 1914 the aggregate seating capacity of the sixteen motion-picture theaters in Wilkes-Barre was over 10,000.

Of these theaters one represents an investment of $200,000, one an investment of $150,000 and a third an investment of $50,000, as compared with the $4000 or $5000 which was the average cost of the little theaters of five years ago. One of these theaters charges from 15c. to 20c. admission, one charges 10c. and the rest 5c. Most of them give performances from 10 in the morning until 11 at night, and prominent film men state that at the extremely moderate estimate of filling the theaters only once a day the aggregate daily receipts are $750, or over $32,000 a year.

There are four film exchanges in Wilkes-Barre, a city of 75,000 inhabitants, an unusual number for a place of this size, but it is in the center of the anthracite region, which is stated to have more moving-picture theaters per square mile and more seating capacity per capita than any other section of the United States except the big cities. Every little hamlet in the region now has two or three theaters.

The population of the anthracite counties, according to the latest census report, is 1,122,361 persons; so if Wilkes-Barre, with a population of 75,000, spends $32,000 a year on moving pictures, the total expenditure throughout the region is probably about $480,000. The anthracite mine workers, their wives and families number 822,960 persons, or 73 per cent. of this population. This means that at least a quarter of a million dollars of their wages are spent annually on moving pictures. The proportionate calculation makes it $350,000.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 32—In a general way, I am familiar with the mining laws of most of the coal-producing states and have followed the present discussion in Coal Age with intense interest. Many important suggestions have been made, the adoption of which would, I believe, result in a material advance toward the goal of safety in mines.

In most mining laws that I have studied, it seems to me that too much is left to the discretion of the mine inspector. In this respect, our law makers have seemingly failed to take into account the human factor, which is always involved when an enactment is made subservient to the judgment of an official. Such a law is, in my opinion, too loosely defined and provides a loophole for its frequent violation.

While the mine inspectors throughout the United States are unquestionably, as a body, well trained and conscientious in the performance of their duties—men endowed with as high ideals of public service as it is possible to expect, it must still be admitted that they are but human and fallible. Among the number, there are, as a matter of course, a few who are incompetent and others who lack judgment, while still others are prone to show partiality in their dealings. For this reason I believe mining standards should be clearly defined by laws that would specify in simple, definite terms the numerous requirements necessary to safety in mining operations. To arrive at a proper standardization in respect to mining, I would suggest the appointment of a board of experts to work under the direction of the Federal Bureau of Mines. The findings of such a board, properly appointed, would not be tinged with the intrigues of state politics.

The duties of the board would be to consider the conditions in the various coal fields of the country, and, after a careful study, to determine the requirements that will provide the greatest degree of safety under existing conditions. Their efforts should be to standardize the requirements in regard to conducting ventilating currents; the construction of stoppings and air bridges; the shooting of coal and the timbering of working places; the best and safest methods of lighting mines; the safeguarding of electric installations in mines; and the foolproofing of mining machines and all mechanical appliances. In fact, the board should endeavor to standardize all mining requirements, methods and construction, as far as these relate to safety.

When the findings of such a board have been submitted to and approved by the several state departments of mining, they should be made the subject of special enactment in each state, in order to bring the mines operated in that state under their requirements.

I know there is a deep-rooted prejudice against a standard way of doing many things in mining. It is argued that each separate case requires individual treatment. However, I believe most intelligent mining men will agree that it would be better to have standard methods and standard requirements that are suited to different conditions of mining and legalized by state enactments so as to wholly eliminate the human factor, which always results in the haphazard, disjointed and widely diversified systems that are now so prevalent in the different coal-mining states.

In closing, permit me to say that I believe that such a standardization as I have suggested would, to a marked degree, relieve the mine foreman from the embarrassment attending his present position, to which frequent reference has been made in this discussion. It would enable him to carry out, in good faith, the orders of both the superintendent and the inspector. It would bring into conformity the orders of a superintendent issued with an eye single to costs, and those of an inspector whose eye is blind to everything but safety.

Flat Top Engineer.

Crumpler, W. Va.

Letter No. 33—The West-Virginia mine-foreman law does not render coal operators in that state immune from liability, generally, for injury to miners resulting from a company's negligence or failure to install and maintain suitable and safe machinery, tools and appliances. This fact is emphasized in a decision just handed down by the West Virginia Supreme Court of Appeals, in the case of Crockett vs. Black Wolf Coal & Coke Co., 83 Southeastern Reporter, 987. The court holds that the immunity of a company is limited to the duties imposed upon the mine foreman by the expressed and implied terms of the law. Accordingly it was decided that the law could not avoid defendant's liability for death of a mine motorman, caused by his coming in contact with an improperly attached trolley wire.

After pointing out that the mine-foreman law should be strictly construed in favor of injured miners, inasmuch as it abridges a long established right to recover for negligent injuries, the court shows that there is no language in the law that is fairly subject to an interpretation that would place upon the official any statutory duty of inspection, oversight, or repair of mining machinery or appliances, such as wires and cars; although said official is bound to "keep a careful watch over the ventilating apparatus" and pumps. "Nowhere," says the court, "does the statute say that the mine foreman shall see that the miners or other employees are provided with safe or suitable tools and appliances."

The decision holds that the jury was warranted in finding that defendant was guilty of negligence in failing to discover and repair the defective condition of the trolley wire, which neglect resulted in the accident, although the defect had existed only 16 or 18 hours.

Under the statutes of Alabama, a miner is not deprived of the right to recover for an injury resulting from a fall of slate, merely because he knew of the defective condition of the roof before the accident occurred, unless it was his duty to prop the roof or it could be shown that some negligence on his part caused the roof to fall. The section of the mining law of that state which requires operators to provide props for use in working places does not absolve the operator from his duty to prop the roof, except where employees are specially directed to perform that duty. (Alabama Court of Appeals, Phillips vs. Lookout Fuel Co., 66 Southern Reporter 946.)

Other instances could be cited where mining laws could be improved so as to more clearly define the duties and obligations imposed.

A. L. H. Street,
Attorney at Law.

St. Paul, Minn.

Letter No. 34—I have followed with much interest the discussion, in Coal Age, of mining laws, and desire to call attention to a few points that I believe have been neglected in previous letters.

The first point is the advisability of making *refuge stations* in mines compulsory by law. In an article entitled "Safety First—the Slogan Cry," Coal Age, Vol. 3, p. 790, I advocated the enactment of a law requiring that refuge stations should be provided in all coal mines where the number of men employed underground exceeds 50; so that in case of an explosion of gas or a mine fire or any serious accident cutting off access to the surface, the workmen might find refuge in such chambers. In that article I tried to demonstrate the blessing such stations would have proved to many of our poor unfortunate brothers who have been entrapped and have lost their lives; but who would have been saved had such refuge chambers been provided in the mine. To prove this, I referred to numerous mining disasters that have occurred both in this country and in Europe, of which the records show that the victims lived, in some cases, several days before finally being overcome by the afterdamp.

I want to say, also, that the use of *naked lights* in mines generating gas should be prohibited by law. The lives that have been sacrificed on the altar of the naked light have been legion. In this list must be included the loss of life in mine fires that have been caused by the ignition of gas or combustible material stored in the mines, by the use of open lights. The accidental ignition of powder or detonating caps by sparks from open lights, which has so often resulted fatally, must be included in the same list. The large number of accidents from this cause should be sufficient testimony to warrant the enactment of a law prohibiting the use of naked lights in mines generating gas.

I am inclined to think that some form of electric light will provide the best means of illumination in coal mines. Electric lamps seem to be giving satisfaction to the companies who have installed them. When safety lamps are used, only a fully approved type of lamp should be adopted. Such lamps should be used in mines showing the least trace of gas, especially where fine dust is produced in greater or less quantity by the operation of the mine. In my opinion, only such types of lamps as are approved by the Bureau of Mines should be employed.

In this connection, I would draw attention, also, to the subject of *mixed lights* in mines. I believe the use of mixed lights should be wholly eliminated in coal mines. Many lives have been sacrificed, simply because the management of the mine permitted the use of naked lights in certain portions of the mine, while one or more sections of the same mine were operated exclusively on safety lamps. An accidental fall of roof or a careless or forgetful employee has, in many such cases, been the cause not only of his own death but that of his fellow workmen.

I wish, in closing, to refer to one other point; namely, the *life of certificates of competency*. In my opinion, all coal-mining officials should be examined at least every five years, until they reach the age of 50, when they might be exempt from further examination. I believe such assistance would be a great stimulus to the efficiency of mine foremen and firebosses, since they would have to keep posted and uptodate on all matters of importance in connection with their work. This would be necessary, as all examinations would naturally keep pace with the improvements and advance made in coal mining. I believe that such periodical examinations should not only be made compulsory by law, but should be advocated by all mining corporations on the ground that such a system would provide naturally for more intelligent and efficient service, and insure, to a greater degree, the safety of men and the security of the mine and property.

J. W. Powell,
General Contractor.

Windham, Mont.

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Stopping Payroll Leaks

Some time ago, Coal Age invited a discussion by readers of the leaks that occur in coal-company accounts. The nature of mining accounts makes it impossible for the heads of operating departments to accurately check the various items of expenditure.

For example, the usual method of paying a contract miner is to have his account kept by an underboss and handed by him to the mine foreman, who in turn sends it to the colliery clerk and it is thus entered upon the payroll. The payroll is always most carefully checked, as to addition and extensions; but the correctness of the time turned in is seldom checked. The only check made at most collieries on a breast miner's account is the final check measurement of his breast when he has completed it, and if he should have a squeeze or any other common accident closing the place it cannot be measured.

There is no question but that the large majority of mine officials trusted with handling the payment of their employers' money are honest and would gladly welcome a check on their work. The check measurements made by the engineers when a place is completed do not begin to tell the complete story of the cost of the work measured. Those measurements show only the total distance driven. The many other items, which run quickly into high figures, are not included and cannot be, without considerably complicating the accounts, and increasing the labors and responsibilities of the mine foreman and his assistants. The nature of the numerous allowances of time, powder, etc., made for the constantly changing conditions that require the setting of timbers, sheet-ironing, driving headings, shooting rock, erecting batteries and platforms and other expenses is such that they go by without a check.

In order to stop the possibility of leaks, in the payment of contract miners, the only course open seems to be some method that will enlist the mining engineers as a vital part of the payroll force, in the way that they will check all items paid to other than company hands. It will of course be impossible to make such checking apply to every payroll at the time it is due; but leaks can be caught, and the dangerous act of a foreman in arranging a price unknown to his superiors, which might afterward return to plague both him and them, will be avoided.

One source of temptation to a payroll clerk inclined to be "crooked" is the fact that the paymaster is not always informed when a man leaves the service of the company at a colliery; and it is possible then for a man to work a portion of a month, at the colliery of a big company and, through the aid of the timekeeper be paid for the whole month. For instance Stiney Balone is an employee of No. 4 colliery and leaves after having worked, say ten days in the month. By connivance with such a one, a dishonest foreman, timekeeper, or payroll clerk may report him as still on the roll and the main office or the paymaster will not know his account should have been closed on the tenth.

Where a company operates one or more than one colliery a man should be compelled to show a record of his former connection with the company if he has any, and if not he should be compelled to at least state the time and place where he was last employed. A form should be furnished every man who transfers from the outside to the inside workings, or who comes from another company; and he should be required to fill out the same with his full name, as it appeared on the payroll of the company who employed him last, together with the date he quit his last place. The foreman or timekeeper should then date and turn this form in the same day, to the office, for entry on the payroll.

A vexing leak is often caused by the ease with which some fellows change their names and leave balances on the companies' books, for supply-house charges. The form just mentioned should be given by an employee when he seeks employment at other collieries of the same company, in the same locality. By requiring this form as the final act to secure employment at another colliery of the same or another firm, or in another department of an individual colliery, the possibility of an employee who is a drifter going from one job to another will be stopped. When a man is discharged he is usually sent to the colliery office and a statement of his time is given him. His record thus comes to the paymaster's notice and he closes the account. But it is the fellows who quit during the month and who, without getting their time statement, secure another job at the same colliery, that give the most trouble, because their names allow manipulation on the part of a timekeeper or clerk; and for these the suggested form would be most useful.

J. Kenvin.

Maryd, Penn.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

The Heavy Hydrocarbon Gases—The heavy hydrocarbons occur in the coal measures as occluded gases, only to a limited extent. Of these, there are but two that are worthy of mention; they are

Olefiant gas, ethene or ethylene, (C_2H_4); sp gr., 0.978;

Ethane, (C_2H_6); sp. gr., 1.0366.

Both of these gases are colorless and odorless; they occur but to a limited extent in association with methane; and their chief importance lies in the fact that they each have a wider explosive range and a lower temperature of ignition than pure methane. The analyses of the gases exuded from coal rarely show any appreciable quantity of olefiant gas (ethene); but ethane (C_2H_6) occurs more frequently as an occluded gas. The following table gives the percentages by volume of the constituents of natural gases obtained from various coals, in different localities.

TABLE SHOWING THE COMPOSITION OF GAS EVOLVED FROM COALS AT 212 DEG. F., IN VACUO.

Locality	CH_4	N_2	CO_2	O_2	C_2H_6	Remarks
South Wales	....	62.78	36.42	0.80	...	Bituminous
South Wales	63.76	29.75	5.44	1.05	...	Bituminous
South Wales	87.30	7.33	5.04	0.33	...	Steam coal
South Wales	93.13	4.25	2.62	...	...	Anthracite
Lancashire	80.69	8.12	6.44	...	4.75	Cannel
Lancashire	77.19	5.96	9.05	...	7.80	Cannel
Westphalia	....	89.91	7.50	2.59	...	Gas coal
Westphalia	34.85	58.48	2.56	4.11	...	Gas coal

The following table gives the composition, by volume, of blower gas in different localities, which shows in a general way a higher percentage of methane, in comparison with that of nitrogen. This may be due, to a large extent, to the higher rate of transpiration of the methane, as compared with nitrogen, which tends to increase its percentage in blower gas over what actually exists in the pores of the coal:

TABLE GIVING COMPOSITION OF BLOWER GAS IN DIFFERENT LOCALITIES

Locality	CH_4	N_2	CO_2	O_2	CO	C_2H_4
Austria	88.9	10.8	1.0	0.3	...	...
Austria	99.1	0.7	0.2	...	...	...
Austria	90.0	9.2	0.2	0.6	...	...
Germany	87.2	11.7	1.1	...	...	...
Germany	77.7	18.5	3.7	0.1	...	...
South Wales	96.7	2.8	0.5	...	...	...
Wallsend, England	92.8	6.9	0.3	...	...	...
Jarrow, England	83.1	14.2	2.1	0.6	...	...
Oakwellgate, England..	98.2	1.3	0.5	...	...	...
Wilkes-Barre, Penn. ..	94.2	3.3	1.1	0.9	0.1	0.4

It is important to remember that the occluded gases of coal are not chemically combined with the constituents of the coal as shown by analysis, and do not form a part of the coal itself, although adding much to its inflammability and heat value.

The Coal Age Pocket Book

Occlusion of Gases—The occlusion of gases in coal or other solid substances is the result of the absorptive power of the substance for that particular gas. For example, platinum, palladium, gold and other metals, as well as coal (carbon), absorb varying quantities of hydrogen, nitrogen, oxygen, hydrocarbon and other gases.

The most common **examples of occlusion** are the absorption of hydrogen by platinum; and of methane, nitrogen, oxygen and carbon dioxide by coal and coal dust. The law that governs this absorption is unknown. The occluded gas is often held very strongly by the substance with which, however, it is not combined.

The occluded gases of coal seams **were probably produced** in the metamorphic processes that formed the coal; and their absorption (occlusion) in the solid formation may have resulted in the oxidation, to a limited extent, of the carbonaceous matter that was being transformed into coal. Such reactions, if taking place in the measures, together with the consolidation that accompanied the formation, would naturally give rise to the observed pressures of occluded gases.

The **pressure of occluded gases** in coal formations is very variable, depending not only on the conditions attending the occlusion; but to an even greater extent on the impermeability of the infolding strata, which has prevented the escape of the gases from the measures where they were formed.

Transpiration, Emission of Gases from Coal—The gases occluded in coal exude from its exposed surface in the same manner as perspiration exudes from the pores of the skin. The term "transpiration" relates to the motion of a gas through a capillary tube and thus describes the emission of gas from coal.

The **velocity of transpiration** is according to a different law from that governing the rate of the diffusion of gases. For the same gas, the rate of transpiration varies directly as its pressure or density, and inversely as the length of the tubes through which it must pass. The velocity of transpiration is independent of the material that forms the tube, but is affected by temperature, being less for a higher temperature, and vice versa.

TABLE GIVING THE RELATIVE VELOCITIES OF TRANSPIRATION OF MINE GASES (AIR = 1)

Gas	Relative Velocity	Gas	Relative Velocity
Hydrogen	2.066	Carbon dioxide	1.237
Olefiant gas	1.788	Carbon monoxide	1.034
Methane	1.639	Nitrogen	1.030
Hydrogen sulphide	1.458	Oxygen	0.903

The above table gives the relative rates or velocities with which the common mine gases transpire, referred to the rate for air as unity. The actual rate of emission of gas from coal, however, will depend chiefly on the pressure of the gas in the coal. Any sudden fall in barometric pressure is always accompanied with an increase in the emission of gas from the coal.

Inquiries of General Interest

Pumping by Compressed Air

I am in charge of a mine that has recently been flooded. The steam pump that we are using makes slow progress in draining the mine. As we have two air compressors that are at present idle and there is a 6-in. borehole that reaches from the surface to the lowest part of the mine, a depth of 180 ft., it occurred to me that we might employ the compressed-air method for unwatering the mine by pumping compressed air through a pipe to the bottom of this hole.

At present, the water stands 100 ft. deep in the hole. The borehole is 1600 ft. from where the air compressors are located. I would like to know the size of pipe necessary to convey the air from the air compressors to the bottom of the borehole, and the pressure that will be required at the compressor to transmit the air through the pipe and raise the water from the mine. I will be glad if you can give me any information that will help me in this matter.

JAMES KILKER.

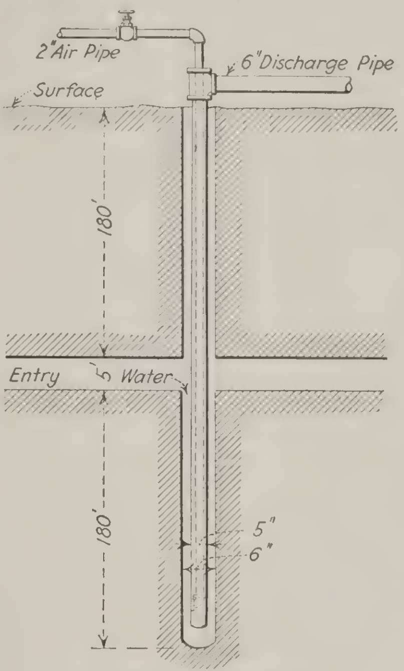
Jessup, Penn.

An article on this subject appeared in COAL AGE, Vol. 5, p. 121. In the same volume, p. 560, was described an improved system that combined pumping with compressed air and the air-lift feature, which could not be applied, however, in the present instance where the problem is one of draining a flooded mine.

Before answering this inquiry, we might suggest that the operation of an ordinary pump by compressed air has the special advantage that the pump can be operated equally well when it is completely submerged. When operating a submerged pump by compressed air, it is first necessary to drive the water out of the air cylinder, which will require an air pressure corresponding to the head of submergence; or (if the exhaust pipe is carried up the shaft) to the vertical distance of the exhaust discharge above the pump. When the air has been expelled from the air cylinder two cases are presented: 1. If the air cylinder exhausts under water, the air pressure must be equal to the entire head of discharge or the entire lift from the pump to the surface. 2. When the air is exhausted through a pipe extended above the level of the water in the shaft, the air pressure required to operate the pump will then be only equal to the head of discharge less the head of submergence, or the vertical height of the point of discharge at the surface above the level of the water in the shaft. This will increase, however, as the water level in the shaft is lowered.

Referring, now, to the case in hand where correspondent suggests the use of compressed air to form an air lift in a borehole 180 ft. deep, it may be stated that such an air lift has been found to work economically only when the head of submergence is practically 50 per cent. of the vertical distance from the surface to the bottom of the hole. Disregarding frictional resistances, the air pressure required is then equal to the head of submergence of the pipe in the hole. To start the flow of water in this column pipe, which is submerged to a depth of 100 ft. will require an air pressure of $100 \times 0.434 = 43.4$ lb. per sq.in. In the present case, however, after the flow is once started the air pressure is required to overcome a head of only $180 - 100 = 80$ ft. The working pressure is therefore $80 \times 0.434 = 34.72$ lb. per sq.in. at first, but increases as the pumping proceeds.

It must be observed that, as the water level in the shaft is lowered, the system will reach its limit of efficiency when the depth of water or the submergence of the pipe is one-half the depth of the shaft, or 90 ft. At this stage, the system will work with less and less efficiency until it ceases to operate. In order to apply the air-lift system effectively, in this case, therefore, it will be necessary to sink the borehole to a total depth of 360 ft., so that the submergence in pumping will never be less than 50 per cent. of the total depth. This will, of course, increase the air pressure required.



DRAINING A MINE BY AIR LIFT

Referring to the accompanying figure, a 5-in. pipe is shown dropped into a 6-in. hole, which has been sunk to a total depth of 360 ft., or double the distance from the surface to the coal seam. The effective working pressure for this depth is $180 \times 0.434 = 78$ lb. per sq.in. Assuming an initial pressure at the compressor plant of, say 85 lb. per sq.in., and using a 2-in. pipe to conduct the air to the borehole, and dropping the same sized pipe (2-in.) down the hole inside of the 5-in. pipe, will give a loss of pressure of 3 lb. per sq.in., which will make the terminal pressure $85 - 3 = 82$ lb. per sq.in. This pressure will be sufficient to overcome the friction and elevate the water to the surface, for the subsequent drainage of the mine under normal working conditions.

When starting the operation of unwatering the mine, in this case, the actual submergence of the pipe is $180 + 100 = 280$ ft. This will require a terminal pressure at the bottom of the hole of $280 \times 0.434 = 121.5$ lb. per sq.in. To obtain this terminal pressure, it will be necessary to maintain a pressure of, say 125 lb. per sq.in. at the beginning of the operation. As the water is lowered in the shaft, this pressure will gradually be reduced to 85 lb. per sq.in., as previously stated.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—What are the general causes of mine fires, and what precautions should be taken to prevent them?

Ans.—The most frequent causes of mine fires are the spontaneous ignition of fine coal and slack mixed with the waste of the mine in abandoned and poorly ventilated places. Other frequent causes are the ignition of gas, either accumulated at the roof or in void places or issuing as feeders from the strata, the gas being ignited by the flame of shots in blasting the coal. Fires are also caused by the careless use of open lights in stables and oil shanties or other places where combustible material is stored. The short-circuiting of electric wires may cause a serious fire.

To prevent such occurrences strict regulations should be enforced in regard to throwing the fine coal and slack back in the waste, instead of loading it out of the mine. Greater care is needed in the inspection of the mine to detect the presence of accumulated gas and to reduce the dangers incident to blasting. Where conditions are particularly dangerous in this regard, every working place should be carefully inspected and competent shotfirers should be employed to charge and fire the holes. Strict regulations should also be enforced in regard to the storing of combustible matter in the mine and the use of open lights, the handling of explosives, etc. A thorough daily inspection should be made of all electric installations underground.

Ques.—What conditions would you take into consideration in reference to the work of removing pillars so as to recover the largest percentage of the seam possible, keeping in view safety and economy?

Ans.—In order to obtain the largest recovery of pillar coal, it is necessary to carefully consider the nature of the roof, floor and coal; the thickness, inclination and depth of the seam; the width of the pillars and length of time they have been standing; and, finally, the means to be employed in removing the pillars, whether this be accomplished by pick or machine. After a careful study of these conditions, a plan of extraction and system of timbering should be adopted that will provide the greatest safety to the workmen and the largest recovery of coal, with the smallest expenditure of time and money.

Ques.—What is the cause of the large number of accidents occurring in mines and what steps should be taken to avoid them?

Ans.—This a many-sided question, and the answer will be modified by the conditions existing in particular cases. In general, however, it may be stated that the chief cause of mining accidents is to be traced to the general disposition of mine workers to assume unnecessary risks and to postpone or neglect to take ordinary precautions for their own safety and that of their fellows. This disposition is largely the result of ignorance of mining conditions, the effect of which is not fully appreciated by men who have neglected to study the principles of mining and who depend too much on their experience as miners. The largest number of accidents in mines occur at the working face and are due to the fall of roof and coal, owing to insufficient timbering.

In order to avoid the occurrence of mine accidents, it is necessary, *first,* to enforce strictly all regulations that tend to insure the safety of the worker; *second,* to maintain a constant and thorough inspection of every working place in the mine; *third,* to encourage the study of mining principles, on the part of all mine workers.

Ques.—In working a dusty mine, where marsh gas is given off, what steps would you take to guard against accidents from explosions?

Ans.—Provide for the thorough ventilation of all working places in the mine, by maintaining an ample supply of air and conducting the same in separate splits throughout the entire mine in such a manner as to cause the air to sweep the coal face in all live workings and prevent the accumulation of gas in cavities in the roof or void places and abandoned workings. Old and abandoned workings should be carefully sealed off and closely watched. Abandoned places not thus sealed should be thoroughly ventilated. The entire mine should be carefully and thoroughly examined by competent firebosses not more than two or three hours before the men go to work, each shift. The mine should be worked exclusively with safety lamps, and no open lights should be permitted to be used, except by drivers working on the main intake airways. All roads and airways in the mine should be regularly and thoroughly cleaned and a proper system for spraying the roads and humidifying the mine air should be installed and maintained in good condition. Only permissible powder should be used in blasting the coal, and all holes should be inspected, charged and fired by competent shotfirers. No more than a specified number of men should be permitted to work on the same air current. All safety lamps used by the men should be owned by the company, and these should be thoroughly inspected and cleaned at the end of each shift.

Ques.—The water gage in a certain mine reads 2 in. when the velocity of the air current is 500 ft. per min. and the length of the air course is 4000 ft. What will be the water-gage reading in this mine when the air course has been extended to 8000 ft. and the velocity of the air current increased to 800 ft. per min.?

Ans.—Assuming a single air current in each case, the pressure or the water-gage reading will vary as the length of the air course and as the square of the velocity of the current. In other words, the water-gage ratio is equal to the product of the length ratio and the square of the velocity ratio. Therefore, calling the required water gage in the second case x,

$$\frac{x}{2} = \frac{8000}{4000}\left(\frac{800}{500}\right)^2 = \frac{2}{1}\left(\frac{8}{5}\right)^2$$

$$= \frac{2 \times 64}{25} = 5.12$$

and $x = 2 \times 5.12 = 10.24$ in.

Coal and Coke News

Washington, D. C.

The House of Representatives has just passed the sundry civil appropriation measure, which carries the provision for the annual expenses of the Bureau of Mines. The detail of the appropriations for the coming year is as follows:

For general expenses, including pay of the director and necessary assistants, clerks and other employees in the office at Washington, D. C., and in the field, to be expended under the direction of the Secretary of the Interior, $70,000;

For investigation as to the causes of mine explosions, methods of mining, especially in relation to the safety of miners, the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the use of explosives and electricity, the prevention of accidents, and other inquiries and technologic investigations pertinent to the mining industry, $347,000;

For investigation of mineral fuels and unfinished mineral products belonging to or for the use of the United States, with a view to their most efficient mining, preparation, treatment, and use, including personal services in the bureau at Washington, D. C., not in excess of the number and total compensation of those so employed during the fiscal year 1913, $135,000;

For inquiries and scientific and technologic investigations concerning the mining, preparation, treatment, and utilization of ores and other mineral substances, with a view to improving health conditions and increasing safety, efficiency, economic development, and conserving resources through the prevention of waste in the mining, quarrying, metallurgical, and other mineral industries; to inquire into the economic conditions affecting these industries: Provided, That no part thereof may be used for investigation in behalf of any private party, nor shall any part thereof be used for work authorized or required by law to be done and that is being done by any other branch of the public service, $100,000;

Not exceeding 20 per cent. of the foregoing sum and not exceeding 10 per cent. of the sum for investigation as to causes of mine explosions may be used during the fiscal year 1916 for personal services in the District of Columbia; and for the fiscal year 1917, and annually thereafter, estimates shall be submitted specifically for all personal services required permanently and entirely in the Bureau of Mines at Washington, D. C., and previously paid from lump-sum or general appropriations;

For inquiries and investigations concerning the mining, preparation, treatment, and utilization of petroleum and natural gas, with a view to economic development, and conserving resources through the prevention of waste; to inquire into the economic conditions affecting the industry, $35,000;

For equipment and extension of mine rescue station at Birmingham, Alabama, $3000;

For repairs to mine rescue station at McAlester, Oklahoma, $500;

Toward dismantling and removal of the plant of the Pittsburgh Mining Experiment Station and installation in the new buildings in Pittsburgh constructed under the authority contained in section 26 of the public buildings act, approved Mar. 4, 1913, including the employment of necessary labor; machinery, appliances, materials and supplies, furniture and office equipment, cases for apparatus, shades, awnings, and all other articles made necessary by such removal to fully equip and furnish these new buildings for laboratory and office purposes, $57,300;

For one mine inspector for duty in Alaska, $3000;

For per diem, subject to such rules and regulations as the Secretary of the Interior may prescribe, in lieu of subsistence at a rate not exceeding $5 when absent on official business from his designated headquarters, and for actual necessary traveling expenses of said inspector, $2500;

For clerk to mine inspector of Alaska, $1500;

For technical and scientific books and publications and books of reference, $1500;

For purchase or lease of necessary land, where and under such conditions as the Secretary of the Interior may direct, for the headquarters of mine rescue cars and construction of necessary railway sidings on the same, $1000: Provided, That the Secretary of the Interior is authorized to accept any suitable land or lands that may be donated for said purpose:

Persons employed during the fiscal year 1916 in field work, outside of the District of Columbia, under the Bureau of Mines, may be detailed temporarily for service in Washington, D. C., for purposes of preparing results of their field work; all persons so detailed shall be paid in addition to their regular compensation only their actual traveling expenses or per diem in lieu of subsistence in going to and returning therefrom: Provided, That nothing herein shall prevent the payment to employees of the Bureau of Mines their necessary expenses or per diem, in lieu of subsistence while on temporary detail in Washington, D. C., for purposes only of consultation or investigations on behalf of the United States.

In all, Bureau of Mines, $757,300.

HARRISBURG, PENN.

The bill (No. 160), introduced on Feb. 8, by Senator Catlin, to put the miners in line for the benefits to be reaped from the proposed workmen's compensation act, was reported out of the mines and mining committee of the Senate on Feb. 9, and by unanimous consent passed first reading. This is the most rapid progress of a mining bill in the Senate in 30 years.

The Catlin measure marks the opening of the fight to secure general remedial legislation for the anthracite miners during the present session of the Legislature.

The bill calls for several important changes in the hard coal mine code of 1891. The suggested changes deal exclusively with the health and safety of the men employed in and about the mines. The miners' lobbyists here say that any operator who has the interest of the employees at stake cannot consistently oppose the bill. They affirm it will give the operators a splendid opportunity to let the public know whether their "Safety First" movement is sincere.

The bill also provides that before any one shall receive a mine foreman's certificate he must have had at least five years' practical experience in an anthracite mine of this Commonwealth as a miner cutting or blasting coal at the face. Several changes in the duties of a mine foreman are also suggested, and the method of hoisting and lowering men is also touched, and the duties of the hoisting engineer and the hours to be worked have been covered. It is also provided that no one shall blast coal or rock unless he possess a miner's certificate, and no machinery operated by steam, gasoline or oil using fire to generate its power shall be operated inside the mine.

Should the bill of Representative Ramsey repealing the anthracite coal tax pass the Legislature, the anthracite operators would probably be enriched by at least $6,000,000.

This bill merely cites the act of 1913 and adds "is hereby repealed." No provision is made for the return to the people of the money collected by the coal dealers. Just how this plan could be worked out in case the act should be repealed, or in case after the pending suit to test the constitutionality of the act it is decided to be unconstitutional, has never been suggested.

Members of the Legislature who have been looking for additional means of increasing state revenues, it is believed, will not favor the repeal of the anthracite tax; rather they favor the imposition of a similar tax on bituminous coal, oil and natural gas. Such a tax would find more popular favor than the proposed tax on real estate.

A general act including all of these natural resources as well as coal, it is said, could not be attacked as unconstitutional with the same plausibility as shown in the litigation over the anthracite coal tax recently heard in the Dauphin County Court. There it was claimed the tax was class legislation.

Governor Brumbaugh declared on Feb. 13, that he did not see any reason why the Rooney Act of 1913, placing the coal tax should be repealed.

"Why should it be repealed? There is every reason why it should not be repealed now that the question of the constitutionality of the act is in the courts" he said. "If the act is held unconstitutional there would be no need of a repeal because that would end it. The act ought to remain until the court has passed upon it. In my address I said that a reasonable tax could be placed on our great natural resources as they flow to the markets and that they should be made to bear their part of the burden. But this act is before the courts so why should it be repealed?"

PENNSYLVANIA

Anthracite

Pittston—An explosion of gas occurred Feb. 8 at the No. 9 Colliery, Pennsylvania Coal Co., resulting in the serious burning of three men. These men were putting up brattice when they ignited a pocket of gas in the Marcy vein near No. 3 Shaft. It is believed that all will recover.

Scranton—The Hyde Park and Brisbin collieries of the Delaware, Lackawanna & Western Coal Co. were recently ordered closed for 10 days during which time repairs will be made. The Hyde Park colliery employs 800 men, and the Brisbin 600 men. It has not yet been decided whether or not steel cages will be put in the shafts during the idle period.

Bituminous

Pittsburgh—The U. S. Bureau of Mines is coöperating with the City of Pittsburgh in an attempt to determine the causes of sewer explosions. Special methods and apparatus have been devised, and samples of sewer air are being tested.

The work is under the supervision of G. A. Burrell, chief gas chemist of the Bureau of Mines, and H. C. Boyd, chemist of the City of Pittsburgh.

Greensburg—The Donohoe Coke Co. and John P. Donohoe & Co., Ltd., are attempting to organize a temperance society among employees and get them to sign a total abstinence pledge for a period of one year. Only employees of the company 18 years of age or over are eligible, and an application for a charter for the Greenwald Temperance Society has been presented to the Common Pleas Court.

Uniontown—Receivers for the Tower Hill Coal & Coke Co., announced recently that Tower Hill No. 1 has been ordered fired up immediately, affording employment to over 300 men. The Republic Iron & Steel Co. at Martin has also started 240 additional ovens.

Connellsville—Orders have been issued by the H. C. Frick Coke Co. for firing 515 additional ovens, making a total of 855 for the past week, and 3355 for two weeks. Orders have also been issued for all plants to run five days per week. Production and shipments throughout the Connellsville region now average over 250,000 tons weekly. With the resumption of work at the coke plants, Mayor Marrietta has given orders to discontinue the bread line at the Connellsville City Hall. Every morning since the first of the year, some 20 to 40 persons have been fed free rolls, soup and hot coffee. It is believed that some have presumed upon the generosity of the municipality.

WEST VIRGINIA

Boomer—Mines at this place will shortly go on full time, as there has been a marked improvement in coal production on Cabin Creek.

Carlisle—Charged with violating the mine laws, William Pilkington, mine foreman, and Firebosses Romeo Campi and John H. Rowley were arrested recently at the instance of Earl Henry, chief of the Department of Mines. The specific charge against Pilkington is that in his official capacity he violated the provision of the statute requiring break-throughs at intervals of 80 ft. The firebosses are alleged to have been negligent in failing to place danger signals on the outside of the mine after discovering gas in the entry where the explosion took place.

Huntington—Coal is already being taken from the new mines of the Pursglove-Maher Coal Co., of Cleveland, Ohio, which began opening mines in Logan County following the strike in eastern Ohio, where the company was working several mines. It is expected that shipments will begin within 60 days, and that developments will be made upon a large scale.

Morgantown—The West Virginia Mining Institute through its newly elected president and vice-presidents is making a vigorous effort to increase the interest of all mining men of the state in its behalf. In their circular letter to this end the officers express themselves as desirous of increasing the membership to 1000 and as an inducement are offering the proceedings of the institute in five volumes from 1908 to 1912 inclusive at the extremely low price of $3 complete.

Charleston—Governor Hatfield is strongly advocating to his legislature which is now in session, the enactment of legislation concerning the conservation of the natural resources of the state. The Governor claims that 200,000 acres of valuable coal lands have been destroyed by prospectors for natural gas and oil, also that 500,000 cu.ft. of gas is going to waste every day.

VIRGINIA

Lynchburg—The Virginia-West Virginia Coal Co., of Charleston, W. Va., has filed suit in the Federal Court here for the possession of 146,000 acres of coal and timber land in Buchanan County, Va., the defendants being the Clinchfield Coal Co., the Big Sandy Fuel Co., the Ritter Lumber Co., the Virginia Mining & Mfg. Co., the Big Sandy & Cumberland Ry. Co., and the Dominion Coal Co. This is the fifth suit filed recently involving Buchanan County lands, and it is understood that others are to follow.

ALABAMA

Montgomery—The movement to take the state convicts from the lease system was started in the Legislature Feb. 13, when Representative Davis introduced a bill in the Lower House prohibiting the working of state and county convicts in any mine, turpentine camp, lumber mill or other private enterprise, and providing penalties for each conviction.

TENNESSEE

Jellico—A coöperative mine rescue station will be instituted at Jellico by the coal operators and the U. S. Bureau of Mines. Apparatus will be loaned from the Knoxville station of the Mine Bureau, and the men who work in the station will be remunerated under a law of the state allowing appropriations for mine rescue work. Operators will be reimbursed for their outlay in the same manner.

KENTUCKY

St. Charles—The Carbondale mines, two miles north of here, have resumed operations after a long shut-down, with 65 negroes and a few of the old employees. These were among the mines which were visited earlier in the winter by "Possum Hunters." On the first visit three white men and one white woman were injured and on the second the negroes were lined up and told to leave the country. One negro boy was killed.

OHIO

Salem—The New Waterford Mining Co., which was recently organized with a capital of $50,000 will soon start a shaft at the northern edge of New Waterford for the purpose of developing a large bed of coal. It is expected that 300 miners will be employed.

Columbus—Arrangements were made for an open hearing Feb. 17 on the bill of Senator Gallagher, pending in the Ohio legislature seeking to amend the Green antiscreen law in Ohio to permit miners and operators to agree upon a wage scale on either the mine-run or the screen basis. The bill was introduced at the instance of eastern Ohio operators, who believe that the passage of the amendment will end the strike which has been going on in that field for more than 10 months. It is said that operators in the Hocking Valley, Cambridge, Massillon and Jackson fields, where the wage agreement has been signed, will oppose the passage of the amendment.

Rendville—An early resumption of operations at the Sunday Creek Coal Co.'s mine No. 268, at this place, is reported to have been decided upon, and the men are anxious to go to work, as they have had only six weeks' work since April of last year.

INDIANA

Indianapolis—The shotfirers' bill which was killed in the Senate of the Legislature in 1913 was introduced again at the present session, and has passed the house without a dissenting vote. It provides that the mine operators shall employ and pay the shotfirers.

A bill has been introduced to establish a department of mining engineering at Purdue and Indiana Universities; also a bill to regulate the use of black powder in coal mines and providing penalties for misbranding black powder to be used in blasting.

Terre Haute—Over 300 miners recently went on strike at the Shirkie mine, one of the most active in the state, because of their contention that the contract required the laying of track in the middle of the room and that it was laid at the side.

Sullivan—The Chicago-Carlisle Coal Co.'s mine at Carlisle has been equipped with electric motors.

ILLINOIS

Belleville—There will be a hearing shortly at Springfield, Ill., before the Public Utilities Commission, on a petition presented by citizens of Belleville and operators in the Standard field, to reduce the freight rate on coal from certain mines in the 5th and 9th districts and within a certain radius of East St. Louis, from 32c. to 20c. per ton. This will doubtless stir up much trouble and confusion, and will likely cause a separation of the operating interests in the field. The intention in the beginning was to ask the Commission to put into effect a rate of 10c. per ton, a nominal switching rate, on coal moving off of what are known as the industrial roads; that is, roads owned and controlled by mining interests and used for the purpose of hauling coal only. Ten cents a ton, it is contended, will pay the transportation on the coal and will prohibit the operators from selling coal at 20c. below the cost of production and losing on the coal what they are enabled to make up on the transportation. It is likely that the Commission will not take any decided steps for some time until the matter has been thoroughly investigated.

Harrisburg—Orders to close for an indefinite time mines 14 and 15 of the O'Gara Coal Co. were recently received here. All tools have been removed. The only reason assigned for the shutdown is the poor market conditions. Over 700 men will be idle from these two mines.

Carterville—Wm. Bauman has filed a petition in bankruptcy with liabilities of $31,500, all unsecured, and assets of $150. Coal-mining ventures that proved failures were given as the cause. The creditors are banks that hold notes.

South Bartonville—An explosion occurred in the mine of the Collier Coal Co. on Feb. 10, resulting in the death of one man and in serious injury to at least one other. Sixty men were working on the night shift, but it is believed that practically all of these escaped uninjured.

FOREIGN NEWS

London, England—A strike of the Yorkshire coal miners which had been feared was avoided when the mine owners conceded the men's demand for an advance in wages until the end of the war. The dispute involved 50,000 men and arose over the interpretation of a minimum wage award.

Essen, Germany—It is reported that coal-mine operators have reached an agreement with the military authorities whereby the former are to be supplied with prisoners of war for the purpose of working the mines.

PERSONALS

Frank L. Speakman, of Wilmington, Del., has been appointed Trustee in Bankruptcy for the Elliott-Chapman Coal & Coke Co., a Delaware corporation doing business in Alabama.

John P. White, Frank J. Hayes, and William Green, president, vice-president, and secretary-treasurer of the United Mine Workers of America, were all recently reëlected for a term of two years.

J. W. Miller, formerly connected with the Central West Coal Co., has taken a position with the Columbus office of the Elk River Lumber & Coal Co. of which C. M. Anderson is Western sales manager.

James R. Caseley, who has been general manager of the Buffalo & Susquehanna Coal Co. for several years, was recently elected president and general manager of the firm as well as to a directorship.

Thomas Moses has been appointed general superintendent of the Bunsen mines as a successor to Clay Lynch, who resigned recently to become vice-president and general superintendent of the H. C. Frick Coke Co. at Pittsburgh.

Col. J. C. Maben, president, and W. H. Goadby, chairman of the board of directors of the Sloss-Sheffield Steel & Iron Co., both of New York, were recently in Birmingham making the semiannual inspection of the physical properties of the company.

Edward R. Clayton, formerly of Grafton, W. Va., and well known as an operator at Fairmount, W. Va., and also in the Eastern part of the country in the coal trade, has joined the Snead & Meguire Coal Co., at Louisville, Ky., as manager of sales.

James Hillhouse, former state mine inspector of Alabama, left Birmingham recently for Rochester, Minn., to undergo treatment by a specialist. Mr. Hillhouse's condition has been apparently fairly good and it is hoped that when he returns home, he will be free from suffering.

E. C. Mahan, of Knoxville, Tenn., treasurer and general manager of the Southern Coal & Coke Co. and of the Southern Mining Co., left recently for a vacation of a month in Florida with his wife and daughter who are there recuperating from serious attacks of typhoid fever.

Frank R. Clark, of the U. S. Geological Survey, has been assigned by the Federal bureau to work in the Cumberland plateau coal field of Tennessee and will begin his work of collecting samples at once, expecting to spend three months or more on the work. The samples will be analyzed at the U. S. Bureau of Mines at Pittsburgh.

J. M. Roan, chief mine inspector and safety superintendent of Ohio, has asked for an appropriation of $3000 to push his safety campaign in Ohio. His plan is to organize the state into districts for the purpose of demonstrating the use of the safety equipment of the rescue car which was purchased by the department last year. The appropriation is to be used to pay the railroads for transporting the car as all other work will be done by the deputy inspectors which are under state pay. He plans to visit all mining camps and show the use of the helmets and demonstrate first aid.

A. B. Saurman, for the past 12 years Pacific Coast manager for the Standard Underground Cable Co., has been appointed Southeastern manager of the company (succeeding the late T. E. Hughes) with headquarters in his native city, Philadelphia, Penn., and will return East in the early spring. He became associated with the company in Philadelphia in 1893 and after two and a half years in the construction department was transferred to the eastern sales department at New York City, leaving the position of assistant manager there in 1900, when he organized, and was manager of, the northeastern sales department with headquarters at Boston, until transferred to San Francisco as manager of the company's interests there in the fall of 1902. John P. Bell will succeed Mr. Saurman as Pacific Coast manager.

OBITUARY

Peter Klitch, 50 years old, outside superintendent of the new Locust Mountain Coal Co., Shenandoah, Penn., was caught in the machinery on Feb. 11, and instantly killed. He was one of the best known mining men of the region, a patentee of note and was formerly with the Lehigh Valley Coal Co. for 20 years. A widow and 10 children survive him.

William Dick, an independent mine owner of Colorado, was shot and killed by two highwaymen, while driving his automobile in the La Veta road, five miles west of Walsenburg, Colo., Feb. 13. Mr. Dick had $10,000 with him, $6500 of which was undiscovered by the highwaymen and left in the machine. The money was to pay off the miners of the Oak View mine. Mr. Dick was interested in many mining projects in Colorado and was president of the Pinon Supply Co. and of the Walsenburg Wholesale Mercantile Co. He leaves a wife and 8 children.

John G. Massie, aged 67, a pioneer coal operator in the southern Illinois field, recently died at St. Elizabeth's Hospital in Belleville, Ill. Until last December he was a resident of Chicago. He was a third descendant of Major Thomas Massie, a member of Gen. Washington's staff during the Revolutionary war. Mr. Massie has been credited with the discovery of the coal seams of Alabama previous to 1879.

Born near Logan Courthouse, Va., in 1847, he enlisted in the Union army at 18 and served throughout the war. He later studied civil engineering, and specialized in mine work. At the request of the British government in 1898 he went to Australia to demonstrate American methods of mine ventilation. He was one of the first to work out the third-entry ventilation system, and had invented and patented over 50 appliances for the mining industry. Besides a widow in Denver, and a brother in Parkersburg, W. Va., seven children survive him. Burial was in Belleville.

CONSTRUCTION NEWS

Barnesboro, Penn.—The Watkins Coal Co. will shortly begin the sinking of a shaft a short distance from Bakerton.

Pineville, Ky.—The Continental Coal Corporation will develop two additional mines on Straight Creek and is reported to have purchased the mines of the Big Hill Coal Co.

Dorchester, Va.—A. H. Hopkins and others have leased a tract of coal land at Fagan, Ky., which they plan to develop. It is the intention to secure a daily production of 1000 tons.

Pittsburgh, Penn.—D. T. Riffle has been awarded a contract to build a fireproof hoisting-engine house and substation for the Pittsburgh Coal Co. at Hill's Station. This contract involves $15,000 and calls for the completion of the work in 90 days.

Harlan, Ky.—Besides the one mile of railroad which will be built up Catron's Creek from the main line of the L. & N. to the operation which Judge Peyton Norville is to develop, there will be three or four miles of road built up Clover Fork and Yocum's Creek as soon as the weather settles. Judge Norville has leased 1056 acres from W. H. H. Smith and W. F. Hall.

Johnstown, Penn.—The Washeries of the Lackawanna Coal & Iron Co. at Wehrum, which were destroyed by fire some time ago, will not be rebuilt, but a heading will be driven to connect Mines No. 3 and 4. When completed the coal from both operations will be taken out of the shaft two miles from the town. No. 3 mine was abandoned some years ago, but a new tipple is being placed at its mouth and the old washer is being repaired.

Arden, Penn.—The Meadowlands Coal Co., whose large wooden tipple was burned during the month of December, has contracted for a new steel tipple and complete equipment. The tipple is to be built and erected by the Penn Bridge Co., and the Fairmount Mining Machinery Co. is to install the equipment complete consisting of a double set of chutes and screens, loading boom, empty-car haul, and ram for pushing the cars on and off of the cages.

Lexington, Ky.—The Himyar Coal Corporation, operating a mine recently opened on the Lexington & Eastern branch of the Louisville & Nashville Ry., at Himyar, Ky., is opening another mine on a tract leased from the Haly Coal Co. on the First Creek Branch of the Lexington & Eastern, now under construction, in Perry County, Ky., in the Hazard field. Louis Des Cognets, of Lexington, Ky., is president of the company and W. L. Carter, of Himyar, Ky., is general superintendent.

Chattanooga, Tenn.—Construction work is progressing rapidly at the plant of the Chattanooga Gas & Coal Products Co. on East End Ave. Three large tanks, one for water, one for coal tar and one for benzol, are rising rapidly, foundations are being laid for the gas reservoirs and the concrete foundations for the ovens are in advanced stages of construction. Some of the first machinery shipments have been received. It is said that probably the Durham Coal & Iron Co.'s entire output of coking coal will be utilized when the ovens are in full operation.

Clarksburg, W. Va.—The Link Belt Co. of Philadelphia has been awarded a contract for equipping the plant of the Marshall Coal Co. at Byron with a retarding conveyor system about 600 ft. in length, which will extend from a point near the pit mouth to the railroad car tracks at the foot of the hill. The contract for the frame and concrete work in connection with this equipment has been awarded to the Consolidation Construction Co. of Shinnston, which will begin work soon. The conveyor system when completed will have a maximum capacity of 2000 tons per day. Excavations and grading for the new equipment have already been completed.

NEW INCORPORATIONS

Woodsfield, Ohio—The Ohio River Western Coal Co. has reduced its capital stock from $3,000,000 to $150,000.

Chattanooga, Tenn.—The Old Virginia Coal Co. has been incorporated with a capital stock of $50,000 to develop coal mines.

Hopkinsville, Ky.—The Southern Coal Co. was recently incorporated with a capital stock of $50,000 for the purpose of developing coal mines.

Harlan, Ky.—The Harlan Gas Coal Co. has been organized and has leased the Harlan Town mines. The incorporators are W. W. Lewis, A. B. Cornett and J. L. Williams, of Harlan.

Cincinnati, Ohio—The E. R. Carter Coal Co. has been organized with a capital of $5000 for the purpose of operating mines and commissaries, and dealing in coal, land, timber and minerals. The incorporators are E. R. Carter, M. Geiger, F. E. Kunkel, Carl Lehmann, and C. B. Jolly.

Charleston, W. Va.—The Gauley Valley Coal & Coke Co. of Summersville was recently incorporated with a capital stock of $500,000. The incorporators are W. L. Camden, of Mountain Lake Park, Md., J. H. Nash, Jr., J. G. Bimting and C. L. Smith of Charleston, and W. G. Reddy of Summersville.

INDUSTRIAL NEWS

Torchlight, Ky.—The Eastern Kentucky Coal Co. has been working full time all winter on coal for domestic purposes, and has just closed a contract for Lake shipments that will keep the mines working full capacity all summer.

Pittsburgh, Penn.—The tow-boats "James Moren" and "Exporter," of the Monongahela River Consolidated Coal & Coke Co., left the Pittsburgh Harbor, Feb. 15, with 22 boats and 16 barges, containing a shipment of coal aggregating 680,000 bushels.

Stonega, Va.—The commissary of the Stonega Coal & Coke Co. recently burned with all its contents. For a time the whole town was threatened. The loss to the coal company is estimated at $75,000, a large part of which is covered by insurance.

Seacoal, Ky.—Seacoal will be the name of the town in Letcher County where the mines of the Southeast Kentucky Coal Co. will be located. Henry La Viers, general manager, is now on the grounds participating in the development work. This company is closely allied with the Northeast Coal Co., of Paintsville, Ky.

Newport News, Va.—A total of 886,435 tons of coal were dumped over the Hampton Roads coal piers at Lambert's Point, Sewall's Point, and Newport News, during the month of January. These figures show an increase of 54,578 tons over the preceding month of December, when dumpings amounted to 831,948 tons.

Scranton, Penn.—Anthracite shipments during January totaled 4,831,329 tons as compared with 5,280,644 tons for the corresponding month in 1914. The Lehigh Valley R.R. led with 954,072 tons. The Reading followed with 750,757 tons. The Delaware & Hudson ranked third with 623,947 tons, and the Jersey Central fourth with 608,296 tons.

Washington, D. C.—It has been learned from the Interstate Commerce Commission that a decision in the so-called anthracite coal case involving rates from anthracite coal districts in Pennsylvania to tidewater would not be settled before the Commission takes its summer recess. It is probable that the decision will not be rendered until some time this fall.

Knoxville, Tenn.—In order to prevent, or at least try to prevent ruinous competition, the Southern Appalachian Coal Operators' Association, comprising a large number of the operators in eastern Kentucky and Tennessee, is preparing to take up with the United States Department of Justice the question of the legality of entering into an arrangement to restrict the output of the mines.

London, England—Among the concessions to the German bankers, in return for the loan to Bulgaria, is the right to exploit the Pernik coal mine, the richest in Bulgaria. The fuel is lignite, possibly of Miocene Age, having about the following composition: Fixed carbon, 40 per cent.; volatile matter, 37 per cent.; ash, 7 per cent. of which 2 per cent. is sulphur. The moisture content is about 16 per cent. There are four beds, one of which is about 11 ft. thick.

Knoxville, Tenn.—The last spike in the Clinchfield Railway extension from Dante, Va., to Elkhorn City, Ky., was recently driven, just north of the Sandy Ridge tunnel, nearly 8000 ft. in length, by George L. Carter, who conceived the Clinchfield route. This road, connecting with the Chesapeake & Ohio at Elkhorn City, forms a direct line between the Ohio Valley and Central West to the South Atlantic States and opens up a rich coal section. Regular service will begin in the near future.

Bluefield, W. Va.—Successful tests have been made of the giant electric locomotives, weighing 270 tons each, and with sufficient power to move a 250-car train on the level, installed on the Elkhorn division of the Norfolk & Western. A pair of these locomotives, one at each end of the test train, moved a train of coal cars aggregating 4000 tons in weight, on a 2 per cent. grade. Tests in braking down the grade were also successful. The section electrified handles from 50,000 to 100,000 tons of coal a day.

Columbus, Ohio—Figures in support of the complaint that the railroads are charging higher rates for the transportation of Ohio coal than for West Virginia coal were submitted to Governor Willis recently by a committee representing the United Mine Workers of Ohio, which has united with Ohio operators to secure the passage of a bill to prevent such alleged discrimination. The figures submitted showed that West Virginia coal is being hauled across the state to Lake ports at 36.9c. per ton, while 75c. is being charged for hauling Ohio coal over the same route. The committee told the chief executive that the railroads charge on an average 103 per cent. more for hauling Ohio coal than for the West Virginia product.

St. Louis, Mo.—Notwithstanding the general business depression during the past fall and early winter, the Broderick & Bascom Rope Co., St. Louis, New York and Seattle, manufacturers of Yellow Strand Powersteel wire rope, arranged matters so that every man and boy on its pay rolls had work. The company decided it was best to employ all its force, even if only part time rather than to work one-half of the force full time. Last spring, the big St. Louis plant was running full force; at least 85 per cent. of its full time. Later in the year, it operated three-fourths time, but kept the entire day and night force. Finally, during part of October and all of November, it ran one-half time—still keeping all the men employed. During December, the plant operated full time, day and night—even though that meant piling up large stocks of wire rope. This resulted in no little expense, increasing stock several million pounds. The mayor of St. Louis and the president of the St. Louis Business Men's League, on Dec. 23, 1914, wrote to all St. Louis manufacturers, urging them to do just what this firm had voluntarily done for months—that is, keep all their employees working, even if only part time.

Coal Trade Reviews

General Review

Anthracite production still heavily curtailed and storage facilities of the companies choked full of coal. Bituminous buyers in control of the market and showing no anxiety regarding supplies. Preliminary forecasts on the Lake trade discouraging. No indications of any improvement in the Middle West.

As a result of the generally mild weather, and the generally curtailed consumption, the storage facilities of the large hard-coalers are choked up with coal, and operations are heavily curtailed. Circular prices are being obtained only on the very best grades, while discounts down to the full April schedule are already being noted. There are superabundant supplies in every direction so that the buyer is generally in control and becoming exceedingly critical as to quality. Old and conservative members of the trade regard the situation as the least favorable for this period of the year in their recollection. There are even rumors that some of the large companies are making concessions on the regular circulars.

The bituminous situation continues as discouraging as ever. With the exception of the movement on contracts, there has been practically nothing doing at all in the coal market, and with the textile and other mills working under heavily curtailed schedules, stocks will last considerably further into the season than usual. Still new high records are being noted on ocean freights, which is confusing the off-shore trade, and it is extremely difficult to interest steamship owners in coal. Buyers are showing no anxiety whatever regarding supplies, and the wide range in bids on recent large government contracts show how uneven the situation is.

The domestic demand in the Pittsburgh district continues fair, and a very slight improvement is noted in railroad orders which, if continued, will stimulate a greater activity all along the line. At the moment prices are still being cut, while buyers are showing no disposition to come into the market, and the situation is as irregular as ever. The outlook for the Lake trade is also discouraging; reports from the head of the Lakes indicate that large tonnages will be carried over, and so far it has not been possible to interest Lake buyers in the market.

The higher temperatures have caused a further slump in the Ohio market, many orders for delivery over the last part of the current month having been canceled. New buying has ceased almost completely, what little there is being generally irregular and confined to small orders. There is considerable distress coal on consignment which can only be moved by forced sales, usually at heavy sacrifices. Steam coals in the Southern market show a slight improvement, though prices continue irregular on all grades with the buyer in full control of the situation; as a result of the uniformly low prices prevailing throughout the past year, operators are anticipating considerable difficulty in renewing the old contracts.

Some of the high-grade operations in the Middle Western field have been forced to suspend operations for the first time this season. The railroads are taking far below their customary tonnage, and the persistent reports of a general industrial revival are contradicted with great positiveness by some of the best informed operators in Illinois and Indiana. Prices on the domestic grades are at the summer level, and the outlook is regarded as discouraging.

ATLANTIC SEABOARD

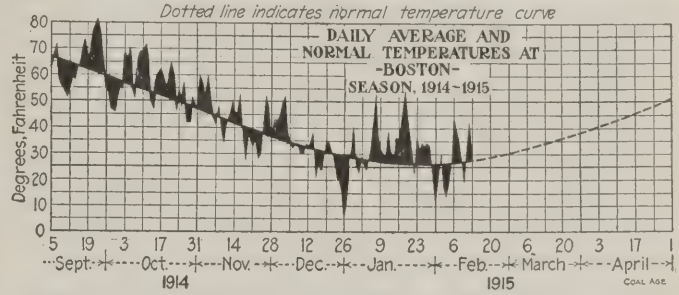
BOSTON

Pocahontas and New River situation makes no special progress. Buyers more disposed to wait. Georges Creek shippers make no move as yet on delivered prices. Pennsylvania grades in somewhat better demand. Anthracite dull.

Bituminous—The week has developed no buying of any consequence aside from the contracts placed earlier in the month and in January. As the latter are almost altogether in the same channels as last year there is practically a deadlock in the Hampton Roads coals in this market. The shippers with transportation under control have taken on about all the business that could be closed at an advance over last year but there are a great many consumers and dealers who now feel they can lose nothing by waiting. They are encouraged in this by those agencies that are dependent on boats in the open market.

The recent bids for supplying the Navy Yard at Portsmouth, N. H., show how uneven are current prices delivered. The bids ranged from $3.65 for New River to $4.15 on Georges Creek, a difference of 50c. on coals that are normally competitive. What contracts have lately been closed either alongside or on cars have been at a very small advance over last year.

The spot market at distributing points has eased off again. Prices are still near to $4 for small lots on cars. The demand for contract requirements is fairly strong. A few plants that would otherwise be forced into the market soon after Apr. 1 are accepting liberal shipments on 1914 arrangements.



There is nothing new on the Georges Creek grades. The shippers are still withholding any announcement of their attitude toward delivered prices. The largest interest in this field has a fleet of its own but is pursuing a waiting policy.

The better grades of Pennsylvania coals are being represented in every open competition. Several of the shippers are making a vigorous canvass of the territory both all-rail and at tide and it is hard to see how they can fail to increase their tonnage.

Water Freights continue at $1, but with plenty of bottoms offering. The number of sailing vessels chartered off-shore has, however, so reduced the amount of available tonnage that owners are in a very independent position. At the same time it is problematical whether there will be any advance from the present level, inquiry is so likely to drag the next three months.

Anthracite shows no relief from the dullness last reported. Individual coals are beginning to appear, notwithstanding the rates asked on barges from New York. Cargoes have even appeared from Philadelphia and, it is generally understood, at prices well down to the usual April circular. The curtailment at the mines is so rigid that spot orders for fresh-mined sizes like pea are accepted only subject to delay.

Wholesale prices on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.75	2.40@2.90	2.92@3.02	
New York*.......	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*.......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.70@2.75
Boston†..........	....	....	....	3.85@3.95
Providence†......	....	....	....	3.68@3.83

* F.o.b. †On cars.

NEW YORK

Embargoes cleared up and inquiries on new contracts are about normal. Prices unchanged. Superabundance of anthracite and the market heavy with prices irregular. Storage facilities crowded.

Bituminous—There is no change of any kind noticeable in the local situation, though perhaps the agencies are becoming more generally reconciled to existing conditions in the belief that they certainly cannot become any worse so that any change must be for the better. One encouraging factor is that the numerous embargoes recently in effect at South Amboy were all removed the early part of the week with the exception of about three. It is also noted that there is about the usual amount of inquiry on contract renewals and the agencies uniformly report that last year's prices have been obtained in every instance where contracts have been closed.

Production of one of the leading bituminous companies for the current month will be about 75%, that for the same month last year, and the output for January was about 60% of January, 1914. The Berwind-White Co. is again reported down to a three-day working schedule; there are rumors that this company has closed a large contract in Baltimore. The Consolidation Co. is said to be moving a large tonnage out of Baltimore which will presumably apply on the Italian business they recently closed.

Though there is practically no business being negotiated in the spot market with the exception of occasional forced sales of demurrage coal, the market is not quotably changed and we continue it as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—With the superabundance of supplies now at tidewater, buyers are becoming more critical as regards quality and frequent rejections are noted. Prices are generally more or less irregular, ranging all the way from the April to the full winter's circular. Because of the uncertain operations at the collieries, the agencies are experiencing some difficulty in meeting the demand for broken coal; the steam sizes are also occasionally reported in short supply, but the domestic grades are plentiful in all directions.

With the exception of possibly one or two favored companies, the storage facilities of all the large hard-coalers are choked up to their full capacity with coal and some of the oldest and conservative members of the local trade consider the situation as the worst for this period of the year in their experience. Mine operations are curtailed to from three to five days per week, and what little business appears in the spot market is being snapped up by the individuals at substantial discounts. Of the domestic grades, egg is probably the strongest while stove is the weakest, though curiously enough it is not being cut so liberally as some of the other sizes.

The New York hard-coal market is quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.90@5.30
Stove	5.35	5.00@5.35	5.30	4.80@5.30
Chestnut	5.60	5.20@5.60	5.55	5.05@5.55
Pea	3.55	3.50@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.80@2.25
Barley	1.80	1.70@1.80	1.75	1.45@1.75

BUFFALO

Some improvement in bituminous. Railroads buying more liberally. Iron orders increasing. Canadian tariff promises to affect business adversely. Anthracite quiet.

Bituminous—There is some report of better business. Dealers say that they get an occasional good day and they look for a further increase shortly. At the same time the volume of sales is not what it should be and it will have to increase considerably before the trade is satisfied. Some shippers report a better demand from the railroads. If this continues it will create a greater activity all along the line. It is generally believed that there will be an improvement before April.

So far nothing has been heard regarding new contracts, either pending or made. One large shipper says that he is trying to come within 5c. of last year's figures, but some of his competitors think he will have to accept something still lower.

Certain Pittsburgh bituminous leaders, who commonly announce a Buffalo price about this time are hesitating over the problem, probably not liking the idea of making a figure that is too low. Next month there will be regular city and other contracts to bid on and figures will have to be made. Canada is preparing to increase its tariffs in a general way and the move is expected to lessen the trade in that direction still further.

Quotations on bituminous remain dull on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley sells at 25 to 30c. lower than Pittsburgh.

Anthracite—The trade is rather quiet, with further reports of inactivity, but shippers are apparently not much disturbed. In the Lake trade there is steady movement. One shipper has loaded more than 150,000 tons into vessels and others will begin loading soon, as most of them have coal that is not needed. There is no complaint of the local trade. The weather has been favorable to handling and the buying has been steady.

PHILADELPHIA

Unseasonable weather conditions continue to retard trade in anthracite. Dealers apparently well stocked. Bituminous retains its sluggish attitude, with no appreciable change.

Anthracite—The erratic weather is playing havoc with the anthracite trade. The production has been curtailed until it is now on about a fifty per cent. basis, and even with this restriction, there is always more or less coal carried over from one week's mining to another; this of course refers to certain sizes. Buckwheat seems to be in the best demand at the present time though broken is also being consumed in about normal quantities. Egg and stove are difficult to move and sales are being made at the April circular or even less, in some cases; in fact about all the domestic sizes are in this same condition. It is rumored that even some of the large individual operators are making substantial concessions. The dealers continue well intrenched in the matter of supplies, and they are making every effort to dispose of these, prior to the first of April but with poor success.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.80@4.90
Stove	5.00	5.00
Chestnut	5.25	5.10

Bituminous—There is nothing new in the bituminous situation. Prices and demand continue on a parity with last week. Contracting still goes on, but slowly, the manufacturers evincing a disposition to delay closing up definitely for their year's supply. Fairly good prices are being secured on contract, compared with current offerings; 90c. to $1 is still the rule for medium grades, with the better qualities 25 to 35c. higher.

OCEAN FREIGHTS

Rates still reaching to new high levels. Few coal charters being made.

The freight market is even higher than a week ago, owing to the increased demand for steamers for export grain and for Cuban sugar, both at advanced rates. The highest rate yet paid on export grain was to the West Coast of Italy, and Cuban sugar freights reached new high levels last week.

Under the circumstances it is extremely difficult to interest steamship owners in export coal, although we are chartering a few boats each week.

To	Rate	To	Rate
Havana	**$2.75**	Guantanamo	**$3.25**
Cardenas or Sagua	3.25@3.50	Demerara	**5.50**
Cienfuegos	**3.25**	Bermuda	3.75@4.25
Port of Spain, Trinidad	3.25@3.50	Vera Cruz	3.25@3.50
St. Lucia	3.00@3.50	Tampico	3.25@3.50
St. Thomas	3.00@3.25	Rio	**9.60**
Barbados	3.25@3.50	Montevideo, Buenos Aires or La Plata	**9.00**
Kingston	**3.25**	Mediterranean	**10.80**
Curacao	**3.00**	Valparaiso	**7.20**
Santiago	**3.25**		

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Auchencrag	British	Baltimore or Virginia	River Plate	2539	$9.60
Singleton Palmer		Norfolk	Rio Janeiro	2357	
John B. Biemiller		Philadelphia	Cienfuegos	858	
Charles K. Schull		Atlantic Range	Porto Rico	827	
Florence Creadick		Norfolk	Key West	657	1.25
Badminton	British	Baltimore	Buenos Ayres	2438	
Allanton	British	Baltimore	Mediterranean	2775	
Claveresk	British	Newport News	Havana	2441	
Chas. A. Campbell		Norfolk	Boston	1493	1.00
Clacique		Atlantic Range	San Francisco	4543	7.50
Thor	Norwegian	Atlantic Range	San Francisco	2889	7.00
Stanley M. Seaman		Atlantic Range	Cienfuegos	953	2.80
Lizzie M. Parsons		Atlantic Range	Cienfuegos	571	
Wm. J. Quillen		Baltimore	Mayport	575	1.05

Note—Steamers are indicated by **bold face** type. all others being schooners.

BALTIMORE

Market stagnant except for contract business. Prices remain weak on soft coal. Warm weather hurts anthracite.

Rains, and temperatures ranging from 40 to 60 deg., have confronted the coal men most of the past week. Except for coal moving on contract obligations, there has been little or nothing doing. In the mining districts the reports are monotonously alike in that respect

Prices remain weak on bituminous coals. The better class of Pennsylvania line fuels were the only ones to show even a fair activity; prices on these grades ranged from $1.20 to $1.30, and good coals were obtainable at from $1 to $1.15, while low-grades were offering at 95 cents.

West Virginia gas-three-quarter was very dull, and what sales were made were at around 85c. Slack remained steady at about 60 to 65c., mainly for the reason that the production is very light. West Virginia and Western Maryland steam coals were offering at from 80 to 90c. outside of the specialized fuels that bring fancy figures at all times.

Export movement is fair. However, charter announcements the past weeek were not as numerous as in the week preceding. Closings included the following:

Steamships "Auchencraig," to the River Plate; "Allatnon," to a Mediterranean port; "Badminton," to Buenos Ayres, and schooner "Charles T. Schull," to Porto Rico.

HAMPTON ROADS

Some improvement in demand. Shipments foreign and coastwise showing some increase.

Dumpings over tidewater piers for the past week have shown some improvement. Large cargoes have gone to New England ports and there has also been some movement Coastwise to Jacksonville and Savannah. Export cargoes have also been fairly large. Schooner tonnage is still being pressed into use for the export trade, several large cargoes having gone to South American and West Indian ports during the week.

The accumulation of coal on the railroad yards is somewhat reduced and with the tonnage now due it will probably be cut down even lower. One of the largest loadings expected for the coming week is the U. S. Collier "Cyclops" which will take in the neighborhood of 13,000 tons cargo and bunkers combined. The number of bunker vessels loaded last week has shown up well. One of the most talked of vessels bunkering was the S.S. "Dacia," formerly under the German flag, but now under American registry.

Vessels clearing from Hampton Roads during the week ending Feb. 12 were as follows:

From Norfolk	To	From Newport News	To
Wagama	Buenos Aires	**Harald**	Bridgetown, Barbadoes
Posilipo	Genoa, Italy	**Antares**	Havana, Cuba
Jacob M. Haskell	Rio de Janeiro, Brazil	Alice B. Phillips	San Domingo, S. D.
Hope Sherwood	Hamilton, Bermuda	**Vinland**	Manzanillo, Cuba
Stephen	Para & Manaos, Brazil	**Leonatus**	Santiago, Cuba
Winderemere	Bridgetown, Barbadoes		
Fannie Palmer	Rio de Janeiro, Brazil		

Note.—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Demand practically unchanged. Mining operations at 55 to 60% of nominal capacity. Lake coal shipping interests show no disposition to buy for season.

Domestic demand for coal has continued fairly good, while there has been a barely perceptible increase in manufacturing demand, the latter almost wholly on regular contracts, so that there is very little demand for free coal and the market remains as irregular as ever. While the usual quotation given as representing the market is $1.15 for mine-run the price is more often cut than not. Mining operations for the district are at the rate of between 55 and 60% of capacity, when figured on a conservative basis. There is no doubt, however, that with an adequate supply of men and cars the district could turn out more than double the tonnage now being mined.

An outstanding feature of the situation, now that the middle of February has been passed, is the reserve exhibited by buyers of Lake coal. There is practically no business being done and operators are correspondingly depressed. The position of stocks in the northwest is presumably responsible for the apathy of the Lake shipping interests. It is understood that the stocks at Duluth and Superior on Dec. 1 were slightly in excess of six million tons and that at the rate they were reduced in December and January there would still be left over three million tons on May 1 at the opening of navigation.

We quote as the market, largely nominal: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

COLUMBUS

Warmer weather of the past week had a bad influence on the trade. Domestic demand fell off and cancellations were numerous. Steam trade continues slow and the tone of the market is unfavorable.

One of the worst slumps of the winter has taken place in the local trade, due to higher temperatures. Buying on the part of retailers ceased almost completely and many orders for delivery the latter part of February were canceled. On the whole the market is now a weather proposition entirely and with sudden warm spells the slumps can be expected at any time. All branches of the industry suffered and operators are now looking anxiously for the opening of the Lake trade to relieve the softness in the market.

Retail stocks are apparently sufficient for the present; buying on the part of consumers is not steady and only small orders are booked. The fancy grades such as Pocahontas and West Virginia splints are in fair demand. Hocking lump is also moving fairly well. Retail prices are rather firm at former levels, but the expected advance has failed to materialize and all hopes for higher prices have been abandoned.

Anthracite is selling fairly well in central Ohio territory and prices are firm at the following levels: Chestnut, $8; egg, $7.75; grate, $7.50.

Steam business is slow all along the line. Manufacturing plants are only buying what they need for the present and are loath to accumulate stocks. Demurrage coal is being offered at very low figures. Quite a few contracts are expiring and some difficulty is experienced in renewing them. In general the steam trade is demoralized and little improvement is expected before the revival of the iron and steel business.

Pomeroy Bend district, which was flooded by high waters in the Ohio, has partially resumed and the output is estimated at 65% of normal. In the Hocking Valley, Crooksville and Jackson the output is below 50% normal.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.50	.....
Inch and a quarter	1.35	1.40	$1.35
Three-quarter inch	1.30	1.30	1.30
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.60	0.65	0.55
Coarse slack	0.50	0.55	0.45

CLEVELAND

The coal market is extremely dull and barely holding to quotations. Retail trade very quiet because of spring-like weather.

Coal receipts over Sunday were in the neighborhood of 250 cars and only about 75 cars were carried over from the week before, yet there was general complaint that there was no market The week of Feb. 8, receipts were very light for this time of the year on account of mines being flooded by the heavy thaw but even with this the demand was no more than equal to receipts.

Of the 157 cars received by the Pennsylvania there were about 30 cars of three-quarter No. 8 coal from West Virginia on consignment; this has been selling at $1.80 to $1.85 a ton on track here or from 20 to 25c. below the nominal market. Slack holds to $1.65 to $1.70 for the better grades, merely because cutting prices would not increase the demand.

Natural gas, which is being produced in enormous quantities in northern Ohio, is cutting more deeply into the coal business than ever. The peak of the load on the Cleveland gas mains during January is reported to have been 150,000,000 cu.ft. a day, with an average of more than 100,000,000 ft. a day. It is estimated that 15,000 ft. of gas is equal to one ton of fine coal and 20,000 ft. to high-grade lump. These figures mean that gas replaced close to 5000 tons of coal a day in Cleveland. More manufacturing plants are using gas today than ever before, and though business is better the coal industry is not getting its full proportion of the improvement.

Some of the railroads are still using coal laid on the ground almost a year ago as a protection against a shortage following the suspension of mining Apr. 1, 1914. The consumption of this coal has also narrowed the market temporarily.

Conditions in Cleveland are as dull as would be expected in mid-summer when business is normal.

The market continues quotable as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.60	......	......	......	......
Lump, 6 in.	......	......	$2.35	......	......
Lump, 1½ in.	......	......	2.20	$1.95	......
Lump, 1¼ in.	......	$2.35	......	......	......
Lump, ¾ in.	......	2.25	2.10	1.90	$2.05
Egg	3.60	......	......	......	......
Egg, 6 in.	......	......	2.00	......	......
Mine run	2.60	2.15	1.90	1.85	1.95
Slack	......	1.80	1.75	1.70	1.75

CINCINNATI

A dragging market and a failure to limit production have thrown much distress coal on the market, very low prices resulting. Only a hand-to-mouth demand in evidence, due to the lateness of the season.

A characteristic early-spring situation prevails if the existing industrial depression be regarded as the normal thing. With the end of the winter rapidly approaching, buying is confined to the smallest possible quantities, to avoid carrying over any surplus. Notwithstanding this, heavy shipments are coming in on consignment, and eventually finding their way to the bargain counter. As low as 75c. for mine-run is reported for this distress coal, and possibly less has been accepted. If reports can be believed, no such concessions are made at the mines, although the normal price of $1 to $1.10 is by no means maintained.

TOLEDO

Trade continues quiet though indications are promising.

There is little activity in the trade and what business there is comes largely as the result of hard work. The domestic trade is slow and mild weather has accentuated the heaviness. Steam business is picking up very slowly and the railroads are not using anything like their usual quota of fuel.

COKE

CONNELLSVILLE

Market stagnant as to new transactions, but increased consumption by steel interests and furnaces already under contract.

The Connellsville coke market continues absolutely stagnant, there being no fresh demand from any quarter. Consumption by the producer-consumer class has increased very materially, as most of the steel works have been blowing in additional furnaces. Shipments on contracts are also increasing. The Youngstown Sheet & Tube Co. will blow in a third stack towards the close of the month, the coke to come on a contract already made for the year. The Alan Wood Iron & Steel Co., Philadelphia, is blowing in one of its furnaces this week, contracts having been made for the coke some time ago. We quote: Prompt furnce, $1.50@1.60; contract furnace, nominal, $1.75; prompt foundry $2@2.35; contract foundry, nominal, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 6 at 256,358 tons, an increase of 13,750 tons, and shipments at 247,847 tons, an increase of 7607 tons. Until the middle of January the tonnages had been running about 210,000 tons a week.

Buffalo—There is report of a better movement of coke at Connellsville, but the increased orders do not appear to have come from this section. The iron trade has not improved to any extent. If the European orders continue to come they alone will do something for the trade. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Columbus, Ohio—Some coke is selling and there appears to be a better demand than formerly.

St. Louis—The local foundry coke situation is extremely weak, with few inquiries.

Chicago—There is still fair buying in domestic coke, and prices are firm. Not much change is to be reported in furnace and foundry coke; some say that conditions are a little better for these grades, but the improvement has not made itself felt in prices. Prices are as follows: Byproduct, $4.60@4.95; Connellsville, $4.65@4.80; Wise County 72-hr. (select), $4.60@4.75; gas coke, $4@4.25.

THE STEEL INDUSTRY

The recent slight improvement well sustained and the trade is optimistic. Spectacular advance in galvanized pipe. Pig iron unchanged but looking up.

Tendencies in the next few weeks in finished-steel prices will have an important bearing on betterment in general. The creeping improvement in volume is being sustained, and in spite of the small part contributed by the railroads, and, in fact, because of it, the trade is optimistic of the future. It seems clear that the higher prices being asked for new orders of steel for the next few months will be strongly held.

The spectacular event has been the rise in prices of galvanized steel and iron pipe of $6 and $4 a ton, respectively, and in galvanized sheets of $5, because of the exceptionally high price of spelter, zinc blende in Missouri having reached a record price. The wage question in some sheet and tinplate plants is not yet settled, and meanwhile these mills are down, but with stocks on hand to take care of the demand for some time.

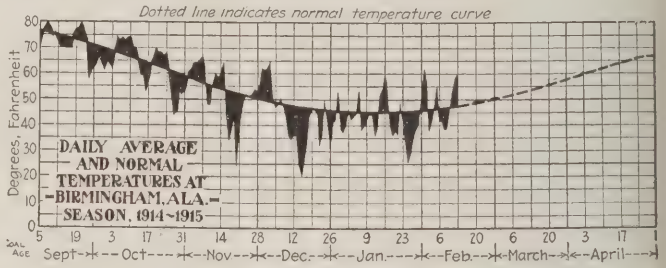
The pig-iron business has not enjoyed any large sales, but it is looking upward and not a little encouragement is taken among merchant furnaces in the decided improvement in machinery-building circles. The last few weeks has seen a growing demand for machinery independent of the larger buying attributable to the war account.—"The Iron Age."

SOUTHERN

BIRMINGHAM

Market on all grades quiet and heavy.

The market is quiet, with no change either way. The weather has turned much warmer, which will probably further curtail shipments of lump coal until the spring movement takes place. Blacksmith coal is normal, though the tonnage being moved may be slightly below normal.



LOUISVILLE

Warm weather curtails the domestic demand still further. Steam coals show some improvement but prices are irregular.

More abnormally warm weather has virtually suspended the domestic demand and accumulations are appearing at the mines and shipping points. The situation with the retailers has not improved and operators are dubious as to whether they can be induced to stock up again this spring.

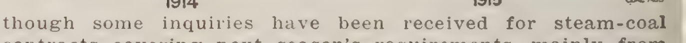
Steam coals are in better demand though not improving rapidly. Prices are irregular on all grades, running from $1.50 on Eastern Kentucky block, down to almost the buyer's own figure. Egg coal is very hard to sell at from $1 to $1.25, while the best grades of nut and slack are bringing from 60 to 70c. and lower grades from 40 and 50c. down.

MIDDLE WESTERN

CHICAGO

Dullness prevails with weakness reflected everywhere. Adverse weather conditions continue. Screenings soft. Anthracite very quiet.

General market conditions show a further relapse due to the mild weather. Suspension of orders and cancellation of shipments have contributed toward a general demoralization. In steam coals there has been no recovery; screenings are softer, and the coarser sizes have seen but little demand, although some inquiries have been received for steam-coal contracts covering next season's requirements, mainly from industrial plants. The recent slump was so abrupt that operators have not yet been able to reduce production in a corresponding ratio.



Reports of an industrial revival have benefited the steam-coal trade, but some of the best informed operators in Indiana and Illinois state with great positiveness that they see no improvement as yet. It is the consensus of opinion that general demand is weak and prices below normal. The steel industries are working very slow and the railroads are not taking the tonnage usual at this time. Sales are being made on basis of summer prices. Local buying from city retail yards is very light.

The Franklin County operators are maintaining prices by coöperative efforts on the part of a majority of the prominent companies in the district.

The movement from the Indiana mines for the current month has been less than in previous years. Domestic coals are sagging and prices generally show no recovery.

The market for Eastern Kentucky coals has been listless, though operators from that section are showing more interest in this market.

Hocking grades are fairly firm, mainly because production has decreased. Some coal was sold this week due to the accrual of demurrage, and in such cases $1.35 was the minimum price.

Smokeless coals are not being bought to any extent. Most of the orders placed are at cut prices.

Splints are in bad shape, and all kinds of prices are being made.

The domestic demand for Springfield coals has been fair compared with other districts. Screenings are about the same as last week.

Anthracite sales are very slow, and few shipments are being made direct to this territory by the mines.

Prices are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.40@1.75	$1.50	$1.40@1.60	$1.40@1.60	$1.50@1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	1.10@1.15	....	....	1.15@1.25
2½-in. lump.	....	....	....	....	....
1¼-in. lump.	....	....	1.25@1.35	....	....
Mine-run...	1.10@1.25	1.00@1.05	1.05@1.15	1.10	....
Egg.......	1.30@1.75	1.35@1.50	1.20@1.45	1.35@1.50	....
No. 1 washed	....	....	....	....	1.50@1.60
No. 2 washed	....	....	....	....	1.50@1.60
6x3-in. egg.	....	1.40@1.50	....	....	1.40@1.60
Nut.......	....	1.25@1.35	1.25@1.35	1.15@1.35	1.25@1.35
No. 1 nut..	1.30@1.75	....	....	....	....
No. 2 nut..	1.30@1.50	....	....	....	....
Screenings..	0.60@0.80	0.55@0.65	0.70@0.80	0.70@0.80	0.55@0.70

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	....	$1.35@1.75	....	....	....
1¼-in. lump.	....	....	....	....	$1.35@1.60
Lump & egg	....	....	$1.75@2.00	$1.50@2.00	....
Mine-run...	....	....	1.05@1.25	1.10@1.25	....
Egg.......	....	1.25@1.60	....	....	....
No. 1 nut..	....	....	....	....	....
No. 2 nut..	....	....	....	....	....
Screenings..	....	....	....	....	....

Knox and Greene County 5-in. lump, $1.40@1.60; 3-in. lump, $1.35; 5-in. egg, $1.30 to $1.40; 3-in. egg, $1.20 to $1.30; mine-run, $1.05 to $1.10; screenings, 75 to 85c.

ST. LOUIS

Summer prices quoted on domestic sizes and some of the high-grade operations have been forced to suspend. Outlook discouraging.

Summer prices were being quoted the past week on domestic sizes, and even with a dropping off of this business, the steam market also went down. Colder weather has stimulated the market to a very small extent, but it is not likely that prices will advance above the cost of production. For the first time this winter some of the better mines in the Williamson-Franklin County field have been obliged to suspend operations on account of no orders.

The washed market has weakened some, and every field has felt the results of the warm period. Anthracite is coming in very slowly, with little demand; for the first time in several months there has been a fairly good demand for smokeless, which was readily taken care of by diverting coal from other markets where there was a surplus. The local situation is not at all encouraging, unless something unexpected develops.

INDIANAPOLIS

Moderate weather follows the prolonged cold spell. Coal demand slackens and mines on about half-time. Operators wait anxiously for the spring revival.

Mining conditions in Indiana show little or no change. The moderating weather is against activity and the mines are making about three days a week. Operators are watching the industrial situation, but its improvement is so slow that it has not yet affected the coal situation. Prices continue unchanged and about on a level with those at the opening of the season. For a short period, advances of 10 to 20c. were obtainable at some of the mines but others seemed glad to be able to operate at the summer price schedule. The hope of the trade now lies in a betterment of factory conditions, with the end of winter. The chief constructive factor of the week has been the reopening of the rail mills at Gary, Ind., after three months' idleness, giving employment to 4500 men.

KANSAS CITY

Coal trade brisker, but prices remain steady.

Kansas City coal trade has experienced a seasonable activity the past few weeks, and retail dealers have disposed of much of the surplus accumulation but are not purchasing heavily due to the nearness of spring. The warm weather has not been seriously deterrent to the coal trade, since Kansas City expects some of the heaviest winter after these spells.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during January and the past four months in short tons:

	October	November	December	January
Pocahontas Field........	1,021,699	837,577	798,182	912,682
Tug River District......	270,651	253,975	227,944	298,766
Thacker District........	264,528	235,080	227,938	257,580
Kenova District.........	112,455	90,772	90,030	98,422
Clinch Valley District....	84,530	237,831	135,362	169,581
Other N. & W. Territory	4,860	3,849	1,686	3,769
Total N. & W. Fields..	1,758,723	1,659,084	1,481,142	1,740,800
Williamson & Pond Creek R.R.................	70,338	62,505	62,271	58,296
All other railroads......	168,778	131,269	97,752	87,842
Grand total...........	1,997,839	1,852,858	1,641,165	1,886,938

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for December and the six months of the fiscal years 1913 and 1914, in short tons:

	December				Six Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater.....	187,931	13	301,113	21	1,797,457	16	1,614,503	17
East..........	227,978	15	224,684	16	1,280,469	12	1,254,609	14
West..........	1,040,097	69	849,714	59	7,325,153	67	5,681,077	62
Total.......	1,456,006		1,375,511		10,403,079		8,550,189	
From Connections								
Bituminous....	45,080	3	62,856	4	588,433	5	624,276	7
Anthracite.....	1,082		681		8,835		8,370	
Total.......	1,502,168	100	1,439,048	100	11,000,347	100	9,182,835	100
Coke..........	11,207		33,079		90,877		180,997	

FOREIGN MARKETS

ENGLAND

Situation much disturbed by difficulties due to the war. Prices are generally high and labor troubles are developing.

Feb. 5—The coal industry remains in a disturbed condition owing to a variety of causes, most of which are traceable to the war directly or indirectly. The signs of labor unrest which are now making their appearance in various directions are adding to the anxieties of the trade, and although it seems probable that the West Yorkshire dispute will be settled before the notices expire on Feb. 20, other questions are now under discussion and complaints are rife that the miners who remain at work are not doing their best to meet the exigencies of the situation. Generally speaking, the demand still exceeds the supply, with the result that prices are very high and still on the up-grade, except in some sections of the export trade where high freights and scarcity of tonnage depress the markets. More shipping seems to be available now, however, and coasting, if not foreign, rates are easier, so that the question of seaborne transport is not quite so acute as it was, but railway congestion is still unrelieved, the consequence being that some markets at a distance from the centers of production, such as London, are comparatively short of supplies.—"Iron and Coal Trades Review," London, England.

Feb. 5—Firmness is in evidence in all branches of the trade. New business is not active owing to the difficulty of arranging prompt supplies, sellers being heavily booked. The question of labor is becoming more serious. Quotations are approximately as follows:

Best Welsh steam.......	$4.92@5.04	Best Monmouthshires....	$4.38@4.44
Best seconds............	4.56@4.80	Seconds................	4.32@4.38
Seconds.................	4.50@4.62	Best Cardiff smalls......	3.60@3.72
Best dry coals..........	4.56@4.68	Cargo smalls...........	3.12@3.36

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is on quiet lines owing to difficulty in arranging loading turns.

Gibraltar.........	$5.52	Naples..........	$7.32	Las Palmas......	$5.04
Malta............	6.00	Venice, Ancona...	9.60	St. Vincent.......	5.28
Marseille........	5.79	Alexandria.......	7.20	Rio Janeiro......	6.72
Algiers...........	6.17	Port Said........	7.20	Monte Video.....	6.12
Genoa...........	7.32			River Plate......	6.36

Note—These quotations are based on an exchange rate of one shilling equals 24 cents.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 81—Philadelphia, Penn.—The bids on this contract (p. 275), which provides for furnishing and delivering 29,000 tons of bituminous coal to the floating plant employed in the Philadelphia Engineer District, were as follows:

Name of Bidder	Class 1	Class 2	Class 3	B.t.u.	Commercial Name
Empire Coal Mining Co.	$3.19	$2.68	$2.85	14,275	Somerset Smokeless
W. H. Bradford	3.02	2.60	2.85	14,400	Victor Smokeless
Sterling Coal Co.	3.27	2.83	2.98	14,600	Powelton
Dexter & Carpenter, Inc.	3.30	2.85	3.05	14,600	Lloydell So. Fork Semi-Bit.
Commercial Coal Mining Co.	3.12	2.70	2.85	14,500	"Star" Miller vein
Coale & Co.	3.12	2.70	2.85	14,500	Georges Creek Tyson
The Consolidation Coal Co., Inc.	3.13	2.63	2.78	14,150	Pine Hill
B. Nicoll & Co.	3.23	2.79	2.94	14,500	Tyson
Hutchinson Coal Co.	3.00	2.50	2.70	14,000	Hutchinson Fairmont Gas Coal
Brothers Valley Coal Co.	2.97	2.47	2.97	14,000	Pen Mar
Hite & Rafetto	3.05	2.70	2.70	14,000	"Bird"
Philadelphia Fuel Co.	2.99	2.54	2.69	14,000	Quemahoning
Rogers-Corr Coal Co.	3.07	2.64	2.84	14,400	Juniata Smokeless So. Fork
John Wills	3.24	2.74	2.89	14,400	Peerless No. 1

Vessels of Class 1, dredges "Delaware" and "Manhattan" and vessels of similar type; coal to be delivered and trimmed into bunkers while vessels are at anchor in midstream or moored alongside of a wharf in Philadelphia Harbor; approximate quantity of coal for this class of vessels, about 23,000 tons.

Vessels of Class 2, deck scows; coal to be delivered on board in carload lots alongside coal piers; approximate quantity of coal for this class of vessels about 4000 tons.

Vessels of Class 3, tugs "Vidette," "Camden" and "Philadelphia" and vessels of similar type; coal to be delivered into bunker holes of tugboats, etc., alongside coal piers; approximate quantity of coal for this class of vessels about 2000 tons.

Address Col. George A. Zinn, 815 Witherspoon Bldg., Philadelphia, Penn.

Contract No. 84—New York, N. Y.—The only bid received on this contract (p. 318), which provides for furnishing and delivering 75 tons of coal, was from Meyer-Denker Sinram Co., at $6.75 per ton. Address Cont. Clk. Lamb, Room 1034, Dept. of Charities, Municipal Bldg., New York.

Contract No. 89—Washington, D. C.—The following bids were received on this contract (p. 318), which provides for furnishing 12,000 tons of navy standard coal at the Naval Coaling Depot, Portsmouth, N. H., and 5000 tons at the Naval Coaling Depot, Key West, Fla.:

Bidder	Delivery at Portsmouth	Delivery at Key West
Pocahontas Fuel Co.	$3.90	$5.00
Castner, Curran & Bullitt	3.65	....
Edward M. Alden Co.	3.60[1]	5.09[2]
Berwind-White Coal Mining Co	....	5.40[3]
Chesapeake & Ohio Coal Agency	3.90	....
Consolidated Coal Co.	4.15[1]	....
Commercial Coal Co.	4.04	5.68
H. N. Hartwell & Son	3.79	....
Dexter & Carpenter	3.97	5.42
Darrow Mann Co.	4.02	6.00
Maryland Coal & Coke Co.	3.79	5.80[2]
Northern Coal Co.	3.88	....
New England Coal & Coke Co.	3.92	....
Smokeless Fuel Co.	....	5.09
C. H. Sprague & Co.	3.88	3.90
Willard Bros.	4.10	....
T. H. Weaver & Co.	3.90	....

[1] For 6000 tons. [2] For 1200 tons. [3] For 5000 tons.

Archibald McNeil & Son Co., George's Creek coal, Portsmouth, $3.80; Key West, $4.90; New River coal, Portsmouth, $3.95; Key West, $5.07. Willett Martin Co., Portsmouth, Lincoln, Nantyglo, Penn., $3.63; Bethel, Holzapfel, Penn., $3.58; Beaver, Beaverdale, Penn., $3.63; Quemahoning, Ralphton, Penn., $3.58; George's Creek, Md., $3.73.

In most cases the bidders on this contract specified from which mines the coal was to be furnished. Address Paymaster-General of the Navy Samuel McGowan, Washington, D. C.

Contract No. 93—Jersey City, N. J.—Bids will be received until 10 a.m., Feb. 24, for furnishing and delivering 2500 gross tons of best quality pea coal at the power house (p. 318). Address, Clk. of the Bd., John C. Sweeney, Boulevard Commissioners, County Court House, Jersey City, N. J.

Contract No. 94—New York, N. Y.—Sealed bids will be received until 10:30 a.m., Feb. 24, for furnishing and delivering bituminous coal for fire companies in the Boroughs of Bronx and Queens. Security required is 30% of the total bid and delivery is to be made as directed before Dec. 31, 1915. Address Fire Comr. Robert Adamson, Municipal Bldg., New York.

Contract No. 95—Baltimore, Md.—Oppenheim & Oberndorf, Hanover and Fayette St., Baltimore, will be in the market during April for a supply of standard mine-run soft coal. This company consumes about 200 tons per month. Address P. W. Tucker, Baltimore, Md.

Contract No. 96—Farmington, Mo.—The Municipal Electric Light & Water Plant, Farmington, will be in the market during April for about 200 tons of 1½ to 2-in. screenings. The usual contract price is $1.90 f.o.b. railroad station, Farmington. Address Supt. C. M. Thomsen, Municipal Electric Light & Water Plant, Farmington.

Contract No. 97—Baltimore, Md.—The Merchants' & Miners' Transportation Co., Baltimore, will contract during April for an annual supply of about 240,000 tons of soft coal. Address Pur. Agt. and Gen. Mgr., W. P. Coria, Merchants' & Miners' Transportation Co., Baltimore.

Contract No. 98—New York, N. Y.—Sealed bids will be received until 10:30 a.m., Feb. 24, for furnishing and delivering anthracite coal as follows: No. 1—For the fire companies in the Borough of Queens, delivery to be completed before May 15, 1915; No. 2—for the fireboats, delivery to be completed before June 30, 1915; No. 3—for companies in Dist. No. 23, Borough of Brooklyn, delivery to be completed before June 30. In each case, the security required is 30% of the total bid. Address Fire Comr. Robert Adamson, Municipal Bldg., New York.

Contract No. 99—Baltimore, Md.—The Baltimore Bargain House, Baltimore and Liberty Sts., will be in the market about Apr. 1 for a supply of coal. This company commonly uses about 500 tons of Ralphton coal per month. Address Pur. Agt., G. E. Smith, Baltimore.

Contract No. 100—Galesburg, Ill.—The Galesburg Artificial Ice Co., Galesburg, will be in the market about Apr. 1 for 11,000 tons of 1¼-in. screenings, the usual contracting price being $1.50. Address W. R. Allensworth, Galesburg Artificial Ice Co., Galesburg, Ill.

Contract No. 101—Middletown, Conn.—The Connecticut Power Co., Middletown Division, will be in the market about Apr. 1 for 5000 tons of George's Creek Cumberland coal, the usual contract figure being $4.40 per ton. Address Mgr. P. N. Golden, Connecticut Power Co., Middletown, Conn.

Contract No. 102—Baltimore, Md.—Strouse & Bro., Lombard & Paca St., Baltimore, will be in the market about Apr. 1 for from 300 to 400 tons of coal per month. Address Pur. Agt., George Nopper, Baltimore, Md.

Contract No. 103—Ottawa Ont., Can.—Bids will be received until 4 p.m., Mar. 1, for furnishing a supply of steam coal for the departmental dredges. R. C. Desrochers is Secretary of the Department of Public Works, Ottawa. Address Dist. Engr. John Sweeney, Winnipeg, Man., Can.

Contract No. 104—Baltimore, Md.—Sharpe & Dohme, of this city, will be in the market about the first of April for a supply of standard mine-run coal. This company uses from 250 to 300 tons per month.

Contract No. 105—Somerville, Mass.—The Board of Education will be in the market about Apr. 1 for 4000 tons of Cumberland and anthracite coal. The contract is made on a test basis. Address the Commissioner of Public Buildings, City Hall, Somerville, Mass.

Contract No. 106—Knoxville, Iowa—The Marion County Electric Co., Knoxville, will be in the market about Apr. 1 for 6400 tons of Iowa steam screenings, the usual contract figure being $1.43 per ton. Address Marion County Electric Co., Knoxville, Iowa.

Contract No. 107—New York, N. Y.—The New York & Baltimore Transportation Co. purchase about 60,000 tons of soft coal per year. This contract will be let during April. Address Pur. Agt. B. R. Roome, Pier 10, East River, New York, N. Y.

Contract No. 108—Bay City, Mich.—The Bay City Electric Light Department will be in the market about Apr. 1 for 14,000 tons of slack coal, the usual contract price being $2 per ton. Address Pur. Agt. E. E. Prohazka, Bay City Electric Light Dept., Bay City, Mich.

Contract No. 109—Indianapolis, Ind.—The Interstate Public Service Co. will be in the market about Apr. 1 for 7800 tons of No. 4 mine-run Indiana coal, the usual contract price being $1.90 per ton, delivered. Address Supt. T. A. Elder, Interstate Public Service Co., 510 Board of Trade, Indianapolis, Ind.

Contract No. 110—Baltimore, Md.—The Maryland Biscuit Co., Baltimore, purchase about 1200 tons of bituminous coal per year. This company lets its contract during April. Address Pur. Agt. W. C. Scott, Maryland Biscuit Co., Baltimore, Md.

Contract No. 111—Watertown, N. Y.—The Board of Education will be in the market about Apr. 1 for 12,000 tons of best Scranton egg and stove coal. The usual contract price is $6.40 per ton. Address Supt. of Schools, Frank S. Elsdale, City Hall, Watertown.

Contract No. 112—Baltimore, Md.—The Coca-Cola Co. will award a contract during the month of April for a supply of good grade steam coal. This company consumes about 100 tons per month, and deliveries are made in carload lots every eight or ten days. Address Pur. Agt. William Martien, 3 Calvert St., Baltimore, Md.

Contract No. 113—New London, Wis.—The Municipal Electric Light & Water Works Plant, New London, will be in the market about Apr. 1 for about 1200 tons of thin vein Youghiogheny lump coal. The usual contract figure is $4.10, in bin. Address Supt. O. H. Pribnow, Municipal Electric Light & Water Works Plant, New London, Wis.

Contract No. 114—Baltimore, Md.—Wise Bros. will soon be in the market for a supply of standard grade mine-run coal, the present contract expiring in April. About 150 tons per month is generally used. Address Pur. Agt. and Supt., L. A. Hazzard, Wise Bros., Baltimore, Md.

Contract No. 115—Mount Pleasant, Iowa—The Municipal Electric Light & Water Works, Mount Pleasant, will be in the market about Apr. 1 for 2000 tons of Illinois egg coal, the usual contract figure being $2.70 per ton. Address Supt. T. W. McMillan, Municipal Electric Light & Water Works, Mount Pleasant, Iowa.

Contract No. 116—Baltimore, Md.—Stewart & Co., of this city, consume about 200 tons of Georges Creek coal per month. The present contract expires in April, and is awarded on a competitive basis. Bids are received by J. Middleton. Address Pur. Agt. Geo. R. Russell, Baltimore, Md.

Contract No. 117—Boston, Mass.—The Stone & Webster Co. will be in the market during April for 50,000 tons of New River and Pocahontas mine-run coal, deliveries to be made in proportionate amounts each month at Tidewater, Boston. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

Contract No. 118—Baltimore, Md.—The Baltimore & Ohio Central Bldg. will be in the market about Apr. 1 for approximately 3000 tons of Somerset soft-grade coal. Address Pur. Agt. E. A. Foos, Baltimore & Ohio Central Bldg., Baltimore, Md.

Contract No. 119—New York, N. Y.—Bids will be received until 2 p.m., Feb. 26, for furnishing and delivering about 4,000,000 lb. of No. 2 buckwheat coal alongside of dock at the asphalt plant, 90th and 91st St., East River, Borough of Manhattan. The security required is 30% of the total bid, and a deposit of 1½% of the total amount must accompany each bid. The contract is to be completed before Dec. 31, 1915. Address Pres. Marcus M. Marks, 21st Floor, Municipal Bldg., New York.

Contract No. 120—Everett, Mass., and Providence, R. I.—The Stone & Webster Co. will be in the market during April for 79,500 tons of mine-run coal to be delivered as follows: 18,000 tons f.o.b. Everett, Mass.; 26,500 tons f.o.b. Providence, R. I., and 35,000 tons at Woonsocket. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

Contract No. 121—Baltimore, Md.—The American Tobacco Co. purchases approximately 3000 tons of Orenda grade coal per year. The present contract expires in April. Address Pur. Agt. J. A. Powell, care of the American Tobacco Co., Baltimore, Md.

Contract No. 122—St. John, N. B., Can.—Sealed tenders will be received until 4 p.m., Mar. 1, for furnishing coal for the Departmental Dredges for Nova Scotia and New Brunswick. Address Supt. of Dredges J. K. Blenkinsop, Dept. of Public Works, St. John, N. B., Can.

Contract No. 123—Baltimore, Md.—The G. B. S. Brewing Co. consumes about 10,000 tons of standard mine-run coal per year. The present contract expires in April. Address M. L. G. Fesenmeier, care of the G. B. S. Brewing Co., Baltimore, Md.

Contract No. 124—Yonkers, N. Y.—The Federal Sugar Refining Co., Yonkers, will be in the market about Apr. 1 for 60,000 tons of bituminous coal. Address Pur. Agt. P. Wooster, 91 Wall St., New York, N. Y.

Contract No. 125—Washington, D. C.—Telegraphic bids were requested by the Bureau of Supplies and Accounts, Navy Dept., until noon, Feb. 19, for either the transportation of coal or coal and transportation, for delivery at the Naval Coaling Depot, Boston, Mass., and Port Royal Disciplinary Barracks, Port Royal, S. C. The quantities desired were approximately 12,000 tons at Boston and 1000 tons at Port Royal, delivery to be as follows: At Boston, 6000 tons not later than Mar. 15, 1915, and 6000 tons not later than May 1, 1915; 1000 tons at Port Royal not later than Mar. 15, 1915. A daily discharge of 600 tons at Boston and 150 tons at Port Royal is guaranteed. Address Paymaster-General of the Navy Samuel McGowan, Washington, D. C.

Contract No. 126—Baltimore, Md.—The Chesapeake & Potomac Telephone Co. purchases about 900 tons of anthracite and bituminous coal per year. The present contract expires in April and bids for renewing the same will be received. Address Ch. Clk. William R. Nelson, care of Chesapeake & Potomac Telephone Co., Baltimore, Md.

Contract No. 127—Boston, Mass.—The Light, Heat & Power Corporation is in the market for 18,000 tons of bituminous steam mine-run coal, weekly deliveries to be made by rail at North Adams, Northampton and Leominster, beginning Apr. 1, 1915. Address H. L. Ogden, 77 Franklin St., Boston, Mass.

Contract No. 128—New York, N. Y.—The National Biscuit Co. will be in the market about Apr. 1 for 10,000 tons of No. 1 buckwheat coal. Address Pur. Agt. R. J. Pforr, 10th Ave. and 15th St., New York, N. Y.

Contract No. 129—Baltimore, Md.—The Equitable Bldg. consumes about 1200 tons of soft coal and will be in the market about Apr. 1 for such a supply. Address Pur. Agt. Franklin G. Lauderman, 663 Calvert Bldg., Baltimore, Md.

Contract No. 130—Lansing, Mich.—The Supply Committee, Board of Education, will call for bids about Apr. 1 for furnishing approximately 1700 tons of Pocahontas mine-run coal, the previous contract figure being $3.73 per ton. Address the Clerk, Supply Committee, City Hall, Lansing, Mich.

Contract No. 131—Rochester, N. Y.—The Board of Education at this place will be in the market during the month of March for about 6000 tons of anthracite and 6000 tons of semi-bituminous coal. Address Secy. J. S. Mullen, Municipal Bldg., Rochester, N. Y.

Contract No. 132—Baltimore, Md.—The Continental Trust Co. will be in the market about Apr. 1 for from 1300 to 1500 tons of soft-grade coal. Address Pur. Agt. W. C. Casey, Continental Trust Co., Baltimore, Md.

Contract No. 133—St. Louis, Mo.—Bids will be received by the government engineers here until noon, Mar. 15, for furnishing 25,200 tons of coal in barges. Address Maj. Clarke S. Smith, Mississippi River Commission, International Life Bldg., St. Louis, Mo.

Contract No. 134—Cambridgeport, Mass.—The National Biscuit Co. at this place will be in the market about Apr. 1 for 1000 tons of bituminous coal. Address Pur. Agt. R. J. Pforr, 10th Ave. and 15th St., New York, N. Y.

Contract No. 135—Baltimore, Md.—Henry Sonneborn & Co., at this place, purchase an annual supply of from 3500 to 4000 tons of standard mine-run soft coal. In general the contract is let during March. Address Pur. Agt. A. Mainzer, Pratt and Paca St., Baltimore, Md.

Contract No. 136—Sandusky, Ohio—Sealed bids will be received by the city government until noon, Mar. 1, for furnishing about 3000 tons of bituminous mine-run coal. Address Dir. of Pub. Ser. John J. Molter, Sandusky, Ohio.

Contract No. 137—Ellensburg, Wash.—Bids will be received up to 8 a.m., Mar. 1, for furnishing steam coal for Kittitas County at the following places: Heating plant at county jail, at Shoskins and Holmes Spur and at such places in Ellensburg as required. Delivery is to be made in carload lots. Address County Audr. W. G. Damerow, Ellensburg, Wash.

Contract No. 138—Baltimore, Md.—The Calvert Bldg. contracts for an annual supply of 5000 tons of standard mine-run soft coal. This contract is usually let during March. Address Pur. Agt. Franklin G. Lauderman, Calvert Bldg., Baltimore, Md.

Contract No. 139—Orangeburg, N. Y.—The Rockland Light & Power Co. will receive bids until Feb. 21 for furnishing about 4500 gross tons of slack coal. Quotations should be f.o.b. cars, Orangeburg, via Erie or West Shore railroads, and deliveries are to be made in equal monthly consignments. Address Pur. Agt. F. P. Mooney, care of Charles H. Tenney & Co., 201 Devonshire St., Boston, Mass.

Contract No. 140—Hillburn, N. Y.—The Rockland Light & Power Co. will receive bids until Feb. 23 for furnishing 4000 gross tons of slack coal; quotations should be f.o.b. Hillburn, via Erie R.R., and deliveries are to be made in equal monthly consignments. Address F. P. Mooney, care of Charles H. Tenney & Co., 201 Devonshire St., Boston, Mass.

Contract No. 141—Boston, Mass.—Stone & Webster Co. is in the market for 50,000 tons of New River Pocahontas mine-run coal, deliveries to be made at Tidewater, Boston, in equal monthly proportions, beginning Apr. 1. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

Contract No. 142—Poughkeepsie, N. Y.—Bids will be received until 10 a.m., Mar. 2, for furnishing one year's supply of anthracite coal for the Hudson River State Hospital. Specifications may be obtained on application. Address the Purchasing Committee, Capitol Bldg., Albany, N. Y.

Contract No. 143—Buffalo, N. Y.—Bids will be received until Mar. 3 for furnishing the annual supply of anthracite and bituminous coal for the schools and other public buildings of the city. Deliveries are to be made in such quantities and at such times as specified. Each bid must be accompanied by a check for 10% of the total bid, and bonds for 50% will be required. Address Comr. Francis G. Ward, Dept. of Public Works, Buffalo, N. Y.

Contract No. 144—Oswego, N. Y.—The Board of Education will be in the market during the latter part of March for about 600 tons of anthracite coal in egg, stove, nut and pea sizes. Address Chief Clerk, Dept. of Education, City Hall, Oswego, N. Y.

Contract No. 145—Malden, Mass.—Bids will be received until Feb. 23 for furnishing the Malden Electric Co. with 16,000 gross tons of mine-run coal and 16,000 gross tons of slack coal. Quotations should be made f.o.b. cars either at Mystic Wharf, Boston, or at Edgeworth, Mass., or by team at the plant, Malden, Mass., and deliveries are to be daily and in equal monthly proportions. Address Pur. Agt. F. P. Mooney, care of Charles H. Tenney & Co., Managers, 201 Devonshire St., Boston, Mass.

Contract No. 146—Haverhill, Mass.—Bids will be received until Feb. 23 for furnishing the Haverhill Electric Co. with 12,000 gross tons of mine-run and 12,000 gross tons of slack coal, delivery to be made alongside dock, Haverhill, as follows: 1200 tons on Apr. 1, May 1, June 1, July 1, Aug. 1, Sept. 1, Oct. 1, Oct. 15, Nov. 1 and Nov. 15. Address Pur. Agt. F. P. Mooney, care of Charles H. Tenney & Co., Managers, 201 Devonshire St., Boston.

Contract No. 147—Revere, Mass.—Bids will be received until Feb. 23 for furnishing 4500 gross tons of mine-run and 4500 gross tons of slack coal alongside Proctor's Wharf, Revere, for the Suburban Gas & Electric Co. Delivery is to be made at the rate of 1125 tons on Mar. 1, June 1, Sept. 1 and Nov. 1. Address Pur. Agt. F. P. Mooney, care of Charles H. Tenney & Co., Managers, 201 Devonshire St., Boston.

Contract No. 148—Fitchburg, Mass.—Bids will be received until Feb. 23 for furnishing 15,000 gross tons of mine-run and 15,000 gross tons of slack coal to the Fitchburg Gas & Electric Light Co. Quotations should be f.o.b. consignee's siding, N. Y., N. H. & H. R.R., Fitchburg. Deliveries are to be made in equal monthly shipments and consignee is to have the privilege of increasing this rate 100% during certain periods, and also suspending shipments during certain other periods, if necessary. Address Pur. Agt. F. P. Mooney, care of Charles H. Tenney & Co., Managers, 201 Devonshire St., Boston, Mass.

Contract No. 149—Montpelier, Vt.—Bids will be received until Feb. 23 for furnishing the Consolidated Lighting Co. with 6500 gross tons mine-run, or 2500 gross tons mine-run and 4500 tons of slack coal, delivery to be made alongside siding at Central Vermont Ry. The consignees are to have the privilege of increasing the rate 100% during certain periods and of suspending shipments during certain periods, if necessary. Address Pur. Agt. F. P. Mooney, care of Charles H. Tenney & Co., Managers, 201 Devonshire St., Boston, Mass.

CONTRACTS AWARDED

Contract No. 49—Harlan, Iowa—This contract (p. 231), which provides for furnishing about 2800 tons of coal to the Municipal Electric Light Plant of Harlan, has been awarded to the Colfax Consolidated Coal Co. of Colfax, Iowa, at $1.10 per ton f.o.b. mines. Address Supt. C. D. Lutton, Municipal Electric Light Plant, Harlan, Iowa.

Contract No. 62—New York, N. Y.—This contract (pp. 189 and 275) which provides for furnishing and delivering coal, has been awarded as follows: Geo. D. Harris & Co. for 650 gross tons bituminous coal to the Far Rockaway disposal plant, Borough of Queens, $2788.50; 100 tons of semibituminous coal to the Crematories of the Bureau of Street Cleaning at Far Rockaway, $4.29; 180 tons of semibituminous coal to the Far Rockaway Aqueduct $4.24 per ton. To Jurgen Rathjen Co. 280 gross tons pea coal to the Newton disposal plant, Borough of Queens, $1307.60. To A. J. and J. J. McCollum 1040 gross tons of anthracite coal to the county and borough buildings, Borough of Queens, $6523. Address Mr. Buckley, Borough Hall, Jackson Ave. and Fifth St., Long Island City, New York.

Contract No. 65—Columbus, Ohio—The bids on this contract (p. 231), which provides for furnishing coal to the various municipal departments, were as follows:

12,000 TONS for the municipal light plant. Hocking mine-run, General Hocking Fuel Co., $1.67½; New River & Ohio Coal Co., $1.85. West Virginia mine-run, General Hocking Fuel Co., $1.69½; New River & Ohio Coal Co., $1.59; Hisylvania Coal Co., $1.72. Hocking nut, pea and slack, New River & Ohio Coal Co., $1.35; Hocking Valley Products Co., $1.20; Fletcher-Williams Coal Co., $1.20. West Virginia nut, pea and slack, New River & Ohio Coal Co., $1.39; Lorain Coal & Dock Co., $1.49; Victoria Coal Co., $1.54.

6000 TONS for the Scioto River Pumping Station. Hocking mine-run, General Hocking Fuel Co., $1.62½; New River & Ohio Coal Co., $1.85; Lorain Coal & Dock Co., $1.59; Fletcher-Williams Coal Co., $1.69½. West Virginia mine-run, General Hocking Fuel Co., $1.69½; New River & Ohio Coal Co., $1.59; Hisylvania Coal Co., $1.72; Lorain Coal & Dock Co., $1.61; New York Coal Co., $1.59. Hocking nut, pea and slack, New River & Ohio Coal Co., $1.35. West Virginia nut, pea and slack, New River & Ohio Coal Co., $1.39.

2500 TONS for the Garbage Reduction Plant. Hocking mine-run, General Hocking Fuel Co., $1.62½; New River & Ohio Coal Co., $1.85; Hocking Valley Products Co., $1.63. West Virginia mine-run, General Hocking Fuel Co., $1.69½; E. A. Cole & Co., $1.63; New River & Ohio Coal Co., $1.59; Hisylvania Coal Co., $1.72. Hocking nut, pea and slack, New River & Ohio Coal Co., $1.35; Fletcher-Williams Coal Co., $1.19½; Victoria Coal Co., $1.29. West Virginia nut, pea and slack, New River & Ohio Coal Co., $1.39; Lorain Coal & Dock Co., $1.49; Victoria Coal Co., $1.54. Kentucky nut, pea and slack, Victoria Coal Co., $1.64.

380 TONS, delivered for other municipal departments, Hocking Valley Products Co., $2.35; Fletcher-Williams Coal Co., $2.30; M. A. Suydam & Co., $2.34; John Wilhelm, $2.30; The Franklin Builders Supply Co., $2.32.

Awards were as follows: Fletcher-Williams Coal Co., 12,000 tons for the Municipal Light Plant, Hocking nut, pea and slack coal at $1.20; 6000 tons for the water-works pumping station, Hocking nut, pea and slack at $1.19½; 380 tons for the city hall, city prison and other city departments, Hocking lump at $2.30. Victoria Coal Co., 2500 tons West Virginia mine-run at $1.54 for the garbage-disposal plant.

Contract No. 73—Washington, D. C.—This contract (p. 318), which provides for furnishing and delivering bituminous coal either at Washington, D. C., or at Alexandria, Va., has been awarded to W. A. Smoot & Co., Alexandria, Va., at $3.69 per gross ton. Address Lieut.-Col. J. P. Houston, Depot Quartermaster, Washington, D. C.

CONTRACT NOTES

A careful census recently taken of the steam plants in St. Louis that buy screenings in carload lots revealed the fact that the tonnage of this coal used now, in comparison with former years, is considerably lower. There is approximately 5300 tons of Standard screenings used for steam purposes in St. Louis per day, and about 1000 tons of Carterville screenings, in carload lots. One industry in St. Louis, the breweries, uses about 2000 tons of assorted screenings per day, delivered by wagons. This constitutes the bulk of the screenings moving into St. Louis, and represents about 8500 tons per day.

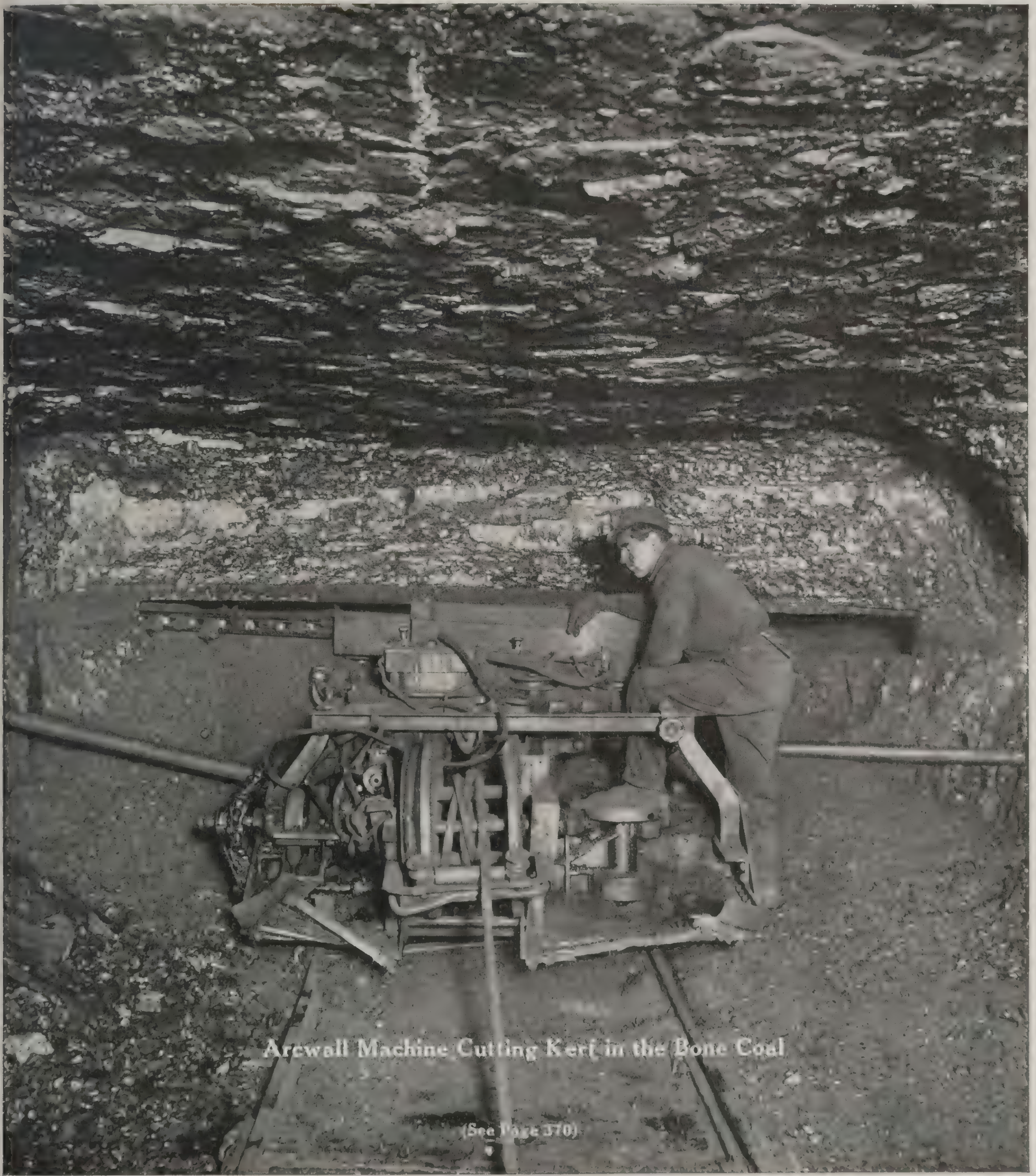
The New England Coal & Coke Co. has been recently awarded a contract by Stone & Webster for furnishing 79,500 tons of mine-run coal, deliveries to be made as follows: 18,000 tons to Everett, 26,500 tons to Providence and 35,000 tons to Woonsocket. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

COAL AGE

Volume 7, No. 9
Issued Every Saturday
Hill Publishing Company

NEW YORK, FEBRUARY 27, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page



Arcwall Machine Cutting Kerf in the Bone Coal

(See Page 370)

Barsteel Insurance

Means Hauling Coal "All Day Every Day"—

accomplished by the following features:

Barsteel Frame—Never been broken in service.
Commutating Pole Motors—Sparkless over wide range of loads and overloads.
Bronze Bearings with oil and waste lubrication. Last for years—and do not need an expert to replace.
Only mine locomotive on market with **Vauclain removable gib**—simplest device for Journal Box.
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Brake rigging supported at three points—two points close to Brake Shoes. Strongest and safest on market.
MCB Brake Shoe—recognized standard by all large railroads—strongest and simplest scheme on market.
Motor's spring suspended.
Separate axle caps—Oil and waste lubrication of axle bearings.
Separate Oil Channel for filling axle bearings.
Diagonally split Motor Field Frame.
Heavy Controllers with large copper contacts.
Only locomotive with **nickel alloy grid**-resistance.
D-21 Trolley—Combines simplicity with strength.

Barsteel Users are Boosters

Ask any user about the BARSTEEL, or write for information to either of the companies.

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Philadelphia, Pa.

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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

LAST SUNDAY NIGHT I was just finishing dinner in a hotel in Pittsburgh when the General Manager of a company, which operates eight large mines, happened along.

Naturally, I asked him how Coal Age was satisfying him and what he had to say about its value to the busy, progressive officials at the mine. His reply was interesting and I am going to quote it as nearly as I can remember it:—

"You bet I read your paper. Of course, the editorial part is invaluable to any coal mining man, but I want to tell you something you may not know or realize—and that is that the *advertising pages* are just as valuable to me as the editorials."

"How do you make that out?" I asked.

"Why, you see, I have eight mine superintendents under me, and those fellows seem to get all their ideas on where to buy new machinery or equipment from the advertisements. They say the argumentative copy and the different illustrations and drawings are so attractive that they naturally look in the ad pages each week and go through them from beginning to end as a sort of duty.

"Well, it got so that those boys were sending in requisitions to me for supplies I didn't know about, and I finally asked where they were getting their new hunches. When I heard it was from the ads in Coal Age, you can bet it didn't take me long to become a regular reader of that part of the paper. I can't let those superintendents be putting anything over on me."

▫ ▫ ▫

That's a true story of one case —and I know of a lot more.

The brains that modern manufacturers are putting into their printed salesmen—the advertisements—are pretty sure to suggest valuable ideas to those who read.

Are you an ad-student? If not, take an experimental course with this issue. *Begin* NOW.

COAL AGE

ONE OF THE HILL ENGINEERING WEEKLIES

Vol. 7 NEW YORK, FEBRUARY 27, 1915 No. 9

Success

The aim of all effort, in fact of all life, is the attainment of success. The common thief strives as hard to succeed in his evil avocation as the upright man who preaches the gospel. Every human thought bears a relation to success, and no single word in the English language has a broader appeal.

° ° °

IT IS FOR THIS REASON we propose to print a real "*Success Number*" of COAL AGE on April 3, and we want each and every one of our readers to cooperate with us in making this special issue the kind of a paper the subject implies.

We want it to be so interesting you will not lay it aside until you have finished reading it all; and, in addition, we intend to present in this particular issue more valuable educational coal-mining information than we have heretofore crowded into any three or four consecutive copies of this paper.

We want something from every reader, no matter whether the contribution is a long article, a few lines, a single thought, or only a suggestion. It makes no difference whether you are a miner, foreman, superintendent or president, whatever you send in will have close attention, and if published, you will be properly recompensed.

You say: I would like to help, but how can I do so? The answer is simple. Send us a description of the most successful thing you are familiar with at the mine where you work. It may be quite an elaborate machine, or it may be a simple contrivance. It may be the product of a great manufacturer, or it may be entirely homemade. It may be underground or on the surface. It may be a material object, or only a plan on paper.

It may be a system having to do with actual mine development, or it may be a night school devoted only to mental betterment. Whatever it is, if it is a success, and you can give facts to prove such is the case, let us have it.

Perhaps you are so busy that all you can send us is a suggestion. If that's the situation, we promise you we'll follow up your idea. Maybe you know a man who has accomplished a whole lot along mining lines, and whose life story would inspire others to bigger accomplishments. Tell us in confidence about him, or better still, prepare a short story of facts concerning him. And remember there are foremen and superintendents who are actually bigger successes than many mining presidents. Success is measured by what we overcome rather than how far we travel. It's easy to cover distance on a smooth level road.

Two brief announcements of this coming issue of COAL AGE have been made, and much to our surprise, a number of contributions have already been received. This early show of interest leads us to believe that, although the "*Success Number*" will be greatly enlarged, there may not be room for everything that comes in, so in fairness to all we will enter each contribution in the order of its receipt; those reaching us first will be given earliest attention, while the others left over—if suitable for publication—will be printed in subsequent issues.

DO YOU BELIEVE *it is wise to carefully improve all one's opportunities?* DID YOU EVER PROCLAIM *this brand of philosophy? Then practice what you preach, and* START PREPARATION OF YOUR "SUCCESS" ARTICLE TODAY. *If uncertain on any point, write us.*

Ideas and Suggestions

An Opportunity and a Duty

SYNOPSIS—Will the owners, operators and workers engaged in the coal-mining industry in Alabama help to eradicate the fee system which preys on the workmen, especially on the negro race?

It is not every day that opportunity and duty meet, or present themselves at the same time. Whenever they do a splendid chance is offered to do the thing, whatever it is, that duty impels.

It is suggested to us that such a condition exists at present in Alabama, where the legislature is in session and before which a bill will be presented providing for a constitutional amendment to eliminate the iniquitous fee system which for years has been an incubus to this state and its progress. The people have already expressed themselves as desiring this legislation. However it must be understood that it will not be a "cinch" to secure it on account of the opposition likely to develop from those so strongly entrenched in the system.

The "fee system" in Alabama, Tennessee and other Southern states provides in lieu of salaries that court officials such as judges, sheriffs, solicitors, court clerks, etc., be paid by a system of fees exacted from the unfortunates convicted of crime. In fact it is not necessary that persons be convicted—they need only be arrested (the fact that no bond has to be made by the party swearing out warrants of arrest makes this mighty easy) and put in jail to insure the sheriff and other officials at least $5.30 per head, regardless of whether they ever secure even a trial or conviction. In thousands of cases the fees mount up enormously and the officials paid under this system draw princely stipends. It has been said that the position of sheriff of Jefferson County in the heart of the coal-mining district of Alabama pays sometimes as much or more per year than the office of President.

Such a condition can mean but one thing. The poorer classes—the workers—pay the price of such a system.

The owners and operators of coal mines in Alabama are vitally interested in the eradication of such a plan of paying public officials. The scheme is successful for the officials who are paid in fees because they can make it so by increasing the number of arrests. It is destructive to the success of coal-mining operations, however, because it demoralizes labor.

The largest single class of labor in Alabama's coal mines is the negro. It is open knowledge that the beneficiaries of the present fee system fatten and grow rich at the expense of the negro and his employer. This is largely due to ignorance and a certain racial weakness of the negro for petty gambling. He is, therefore, the principal victim of the plan. Those familiar with mining operations in Alabama will recall many instances where the negroes have been ensnared into "crap games" on Sundays and holidays and then arrested in a bunch by the active deputies of the sheriff because of the fees that would follow. Both the workers and the operators had to pay for this kind of thing and are still doing it.

It is an open fact that some of Alabama's jails stay brimful of prisoners caught in the dragnet of the fee system. Hundreds of men who ought to be and want to be at work are kept there as the result of Sunday arrests, etc., until arrangements are completed whereby the resultant fees will accrue. It is also a well known fact that so flimsy and poor is the evidence in hundreds of these cases that they never get to trial. In Jefferson County alone several hundred such cases were recently nol-prossed because of insufficient evidence, etc.

Here is the opportunity and the duty of Alabama's citizens who are engaged in the mining industry from owner and operator down to the humblest worker in the ranks; that is to *do everything possible to secure the passage of a constitutional amendment doing away forever with the present fee system.*

It will be in line with the work that many of the coal concerns of the state are engaged in looking toward the betterment of working conditions and the improvement of living conditions. The elimination of the fee system will mean increased contentment and prosperity in the mining districts, and the part that those engaged in the industry plan and perform in bringing about this accomplishment will redound to the honor of every man who lends a hand.

Will Alabama's mining men do their plain duty? Let us hope they will.

⁂

The Case of the Man Who Quits

By M. D. Cooper*

SYNOPSIS—Coal companies might find it profitable to establish a system of investigation formed on the lines here suggested.

During recent years some companies have given considerable attention to the case of the man who is discharged. Individual inquiries and even bureaus of investigation have been organized to examine the causes of discharge and to assure each employee of just treatment. In this manner it has been found that the man discharged was not always at fault. In some cases the responsibility rested with a fellow employee, in others with the man's boss, and in still others the cause was beyond the control of any of the persons involved. The causes of discharge were discovered to be numerous and varied.

Regardless, however, of the nature of the cause, it stands to reason that a man deserves to be discharged only in those cases where he himself is proved to be at fault. Therefore, the positive identification of the person in the wrong, and the assurance that he only will be compelled to accept the consequences, is a matter of more than ordinary importance in maintaining the reputation of an employer.

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*Ellsworth, Penn.

A movement of more recent origin concerns the man who of his own initiative quits his job. What is known of the causes of his going? Very little at many places. He comes and goes and generally but slight attention is paid to the cause, even though 80 or 90 per cent. of the men leaving a company's employ may belong to this class. An inquiry as to the reason for his voluntary leaving generally reveals one of the following reasons:

1. A better job elsewhere.
2. Dissatisfaction with the present job, the boss or living conditions.

This man's case may be taken up in each instance by getting the answers to three questions. What is his own reason for leaving? What is his boss' reason for his leaving? What does a disinterested investigation reveal as to the cause of his leaving? The answer to the third question may agree with one or both of the answers to the first two, or it may differ entirely from them. The third answer is of course the most difficult to obtain, but when accurately determined is the most valuable of the three. A card index record containing these three questions and their answers should be kept in the cases of those employees who leave of their own accord.

A Record of Each Individual Case

A record of this sort will cost money to establish and maintain. Is it worth it? What are its advantages? In the case of the man who leaves to get a better job, an investigation may reveal little of importance. He perhaps leaves in the friendliest spirit and with the good will of his boss and associates. On the other hand, his going may show up a weakness in organization or stagnation that needs remedying in the department in which he worked. It is, however, the man who leaves dissatisfied who will usually bear the greater amount of attention. Either he will be found to be a chronic "kicker" or else some basis for his dissatisfaction will be brought to light. If the latter proves to be the case, it is very much to the advantage of the management to know about it.

It seems reasonably certain that unsatisfactory conditions surrounding a job, or a mine, or a town are in the end more costly than the expense involved in removing them. Ordinarily, it is not a great loss to have a mediocre workman leave, but if, on leaving, he is able to air his dissatisfaction in descriptions of conditions that cannot be denied, he may easily succeed in keeping better workmen than himself away from the place he left. In other words, if men leave and their employer is indifferent as to the cause of their going, a mine or a town may get a bad name for no other reason than some slight cause of dissatisfaction that could be removed if proper effort was made to find out about it.

In office work alone, it is possible that in some plants enough time could be saved by reducing the number of changes and the expense involved in recording them to pay for the maintenance of this important service.

Where It Affects Production Costs

Of still greater consequence, however, is the question of production and costs. It is well known that new workmen must always be broken in, the time required for this training varying with the skill and experience of the men, but in any case their production during this period is always lower than it becomes after they are well established; consequently their unit costs are higher. Therefore, the greater the number of changes, the less the average production per man and the higher the costs of the plant as a whole. If then a study of the causes of men's leaving results in more faithful and longer-continued service per man, the cost of the investigation may be saved many times.

A well kept record of the cases of the men who quit is worth its cost because it tends to keep an employer alive to the value of maintaining a good name, because it saves unnecessary office work, and finally because it results in less waste of time and lower costs.

Have you ever gone into this matter? Do you know the proportion of men who leave your service on their own initiative as compared with the total number who leave for all causes? If you find that this group constitutes 80 or 90 per cent. of the whole number, you may discover that some simple act on your part will result in a more permanent body of workmen, increased output per man, and decreased costs.

◆

Don'ts for First-Aid-to-the-Injured Corps

1. Don't fail to attend your first-aid practice. It is for your benefit and that of your fellow workmen.
2. Don't touch a clean wound with dirty hands. You are sure to infect it and cause blood poison.
3. Don't forget that in the absence of a tourniquet pressure will stop hemorrhages.
4. Don't fail to handle a sprain the same as a fracture.
5. Don't explore a punctured wound.
6. Don't tie "granny" knots; they slip.
7. Don't forget arterial blood is bright red and spurts. Venous blood is dark.
8. Don't use tobacco or cobwebs on a wound of any kind for fear of infection.
9. Don't fail to slightly loosen tourniquets at end of one hour; if hemorrhage returns, retighten.
10. Don't retain the dangerous rubber and chain tourniquet longer than 20 min., endeavor to apply a safer tourniquet as quickly as possible.
11. Don't fail to stimulate and apply heat in a condition of shock.
12. Don't attempt to reduce a dislocation. Put parts at rest and send the patient to a doctor.
13. Don't apply a tourniquet too tightly; you may cause death to the part.
14. Don't forget to handle a patient with a fractured spine with the utmost care and gentleness for fear of injuring the cord.
15. Don't handle a simple fracture except with great care; you may make it a compound fracture.
16. Don't delay efforts to restore life.
17. Don't hurry in performing artificial respiration.
18. Don't give up hope of saving the patient's life—work.
19. Don't attempt to place a person suffering from shock in a standing or sitting position.

NOTE—From Susquehanna Coal Co.'s Book of Instructions to Employees.

Equipment and Operation of a New Utah Mine

By W. W. Jones*

SYNOPSIS—The mine is worked on the three-entry plan, the pit cars are weighed by an automatic recording machine, and railroad cars are weighed both before and after loading. Coal dust is burned as fuel under the boilers.

The Standard Coal Co.'s property is located in Carbon County, Utah, approximately six miles west of Helper. This property was developed by Messrs. L. F. Rains and F. A. Sweet, of Salt Lake City, prominent in business and financial circles as well as in coal- and metal-mine operations.

The company began construction work on July 10, 1913, when one mile of standard-gage railroad track was required to connect the tipple site to the branch of the Denver & Rio Grande R.R. to Helper.

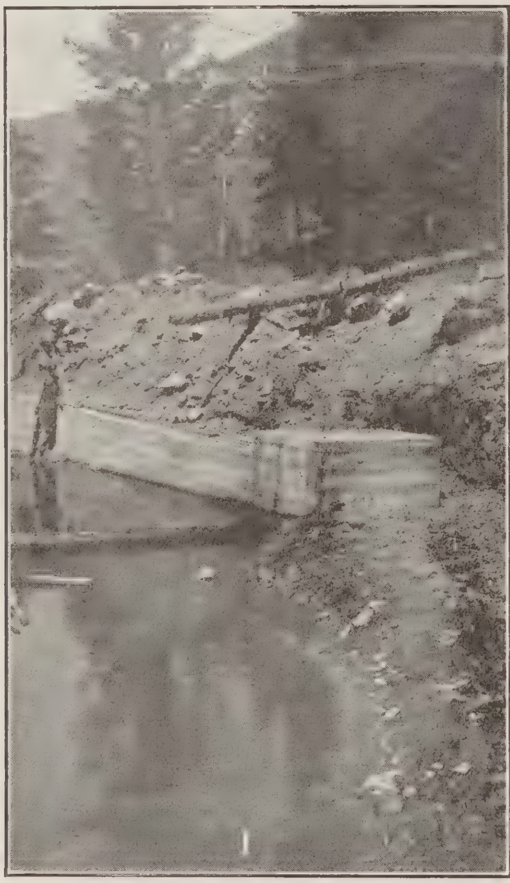
The railroad and tipple yards were completed on Sept. 15, 1913; in the meantime work on the double-track gravity tramway was well under way.

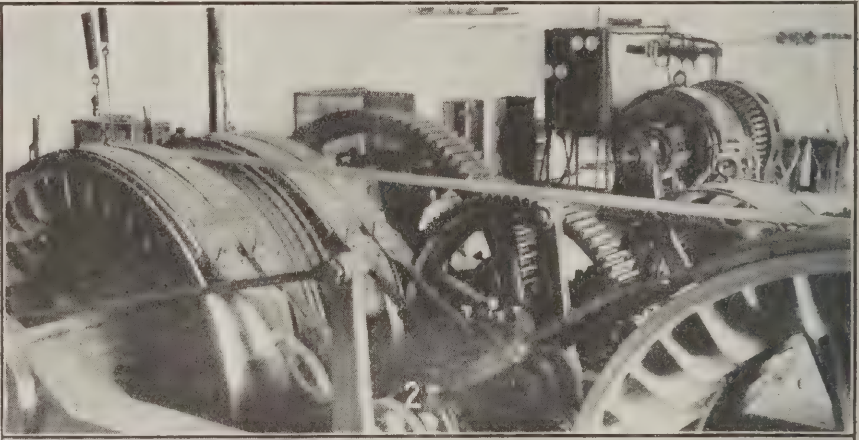
The reinforced-concrete retaining wall and tipple were completed on Nov. 3, 1913. Considerable inclement weather was encountered, but notwithstanding these difficulties the first trip of coal was lowered, dumped, screened and loaded into railroad cars on Feb. 10, 1914, just seven months after the first shovelful of earth was turned.

The company is now operating with a capacity over the tipple of 1000 tons, this record having been established on Oct. 28, 1914.

The equipment is modern, uptodate, efficient and economical in operation. The construction is permanent and solid, requiring the minimum of maintenance.

The main features of interest are the geology, mine, electric haulage, gravity double-track tram and hoist, automatic mine-car weighing machine, rotary dump, reciprocating screens, rescreening plant, box-car loaders, dust-blower system, the power-house equipment, the reinforced-concrete retaining wall and tipple and the water system.





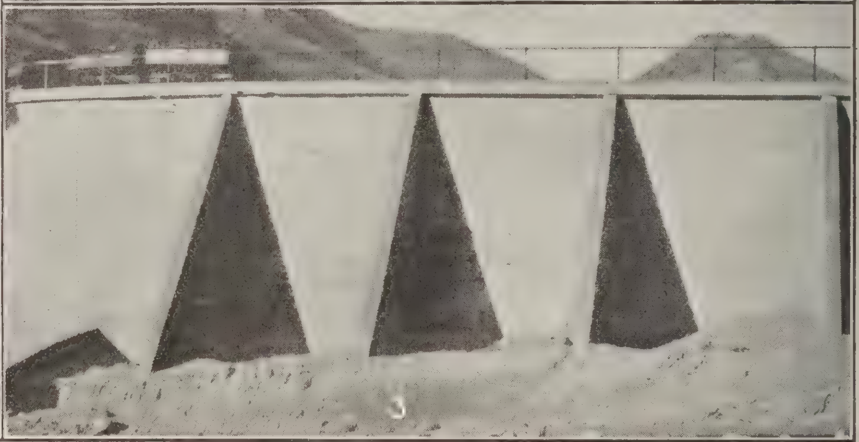


Fig. 1. Intake for One Source of Water-Supply. Fig. 2. Inside of Hoist House, Showing Engine. Fig. 3. Concrete Buttresses on Wing Wall, 30 Ft. High

The coal measures at this point dip 7¼ per cent. to the northeast. There are three workable seams, all having sandstone roofs and floors. The No. 3 bed is the same measure, although with slightly different characteristics, as the Castle Gate seam, and is the one being worked. This bed varies in thickness from 10 to 15 ft., having a parting 4 ft. 2 in. from the floor.

The coal has a pronounced cleavage in parallel and in perpendicular planes about 18 in. apart. This makes it easy to mine and gives a large percentage of lump. The coal is black and lustrous; it ignites easily and burns freely, giving a clean gray ash devoid of clinker. According to statements made by customers and as shown by steam tests, it has a high calorific value.

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*Chief engineer, Standard Coal Co., Standardville, Utah.

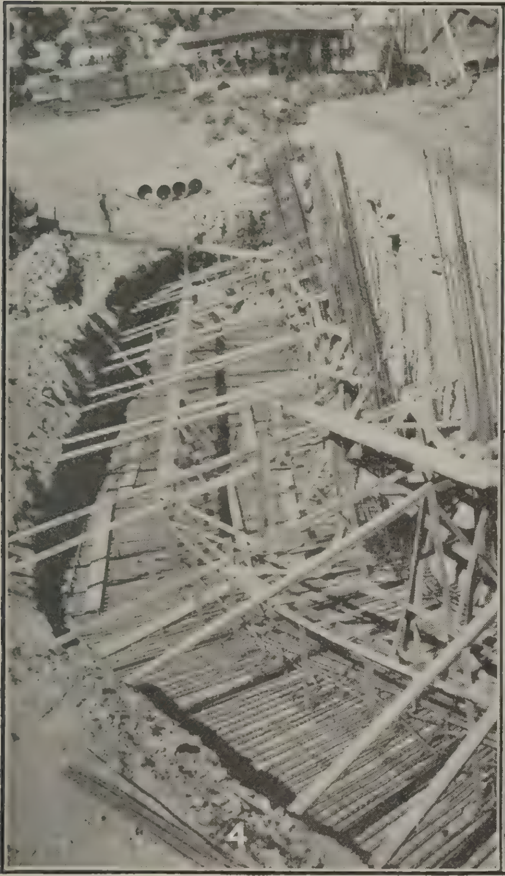
THE THREE-ENTRY SYSTEM IS EMPLOYED

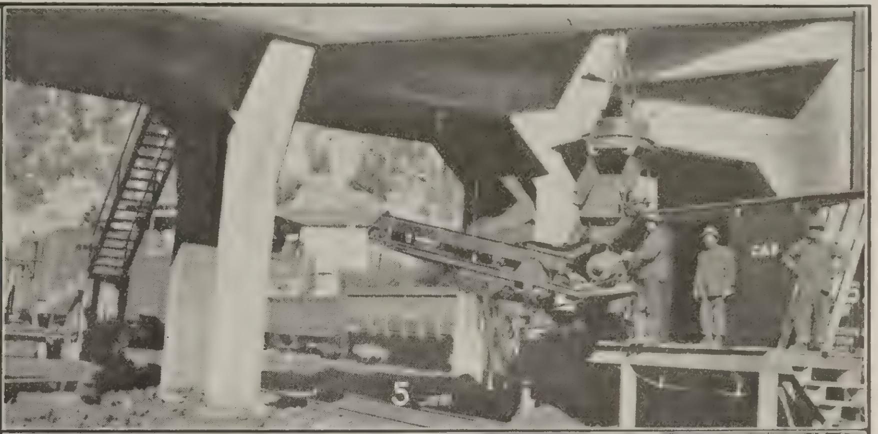
The mine is developed on the three-entry system, two haulage roads being driven, one either side of the return-air course. This system has many advantages. Separate splits of air are more easily furnished to the butt entries and reduce the chance of an explosion in one portion of the mine being communicated to the rest. The size of the entries may also be reduced without increasing the mine resistance to such a degree as is the case when the double-entry system is used.

The main entries are run on a 3½ per cent. grade against the loads. The butt entries are on a grade of approximately 4 per cent., one side of the mine in favor of the loads and the other side against them. The main entries are on 75-ft. centers; butt entries on 50-ft. centers between air courses. Rooms off the butt entries are on 72-ft. centers.

The mine fan is an 8-ft. Sullivan reversible-hood machine, of 250,000 cu.ft. per min. capacity. It is driven by a 50-hp., 2300-volt polyphase induction motor through a variable-speed drive of the disk-and-roller type.

The main entries are whitewashed. This is an added factor of safety, in that it provides reflecting surfaces for light and makes dust collections on the ribs easily detected so they may be removed.





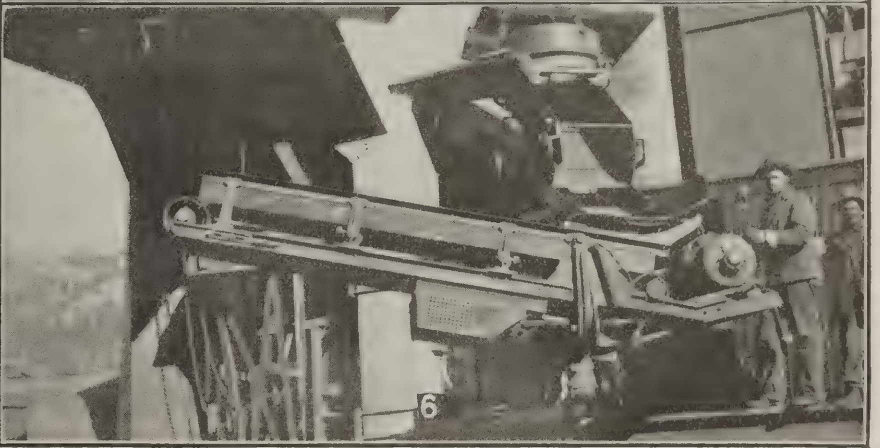


FIG. 4. FOOTING FOR RETAINING WALL, SHOWING STEEL REINFORCING IN PLACE. FIG. 5. BOX-CAR LOADER FOR EGG AND STOVE COAL. FIG. 6. A CLOSER VIEW OF THE MANIERRE LOADER

The main- and butt-entry haulage roads are laid with 40-lb. standard A. S. C. E. rail, all joints having 10-in. twin-cable fishplate bonds, of the channel-pin type. All room turnouts are of standard 40-lb. rail, switches and frogs.

The locomotives are three in number; two are 7½-ton Baldwin-Westinghouse bar-steel frame gathering-reel type, with one 15-ton haulage machine.

These locomotives are giving excellent service with but little attention or repairs. They operate on a 250-volt overhead trolley system. All of the butt-entry trolley circuits are connected to the main-haulage circuits through automatic switches.

The main-haulage circuits are sectionalized by all-metal under-run switches. All of the haulage roads are illuminated by 40-watt tungsten lamps operated on 110-volt a.c. independent circuits.

The hoist house is located directly over the portal to the mine, the floor and main entrance being of reinforced-concrete construction. In the building are located the hoist and a 200-kw. synchronous motor-generator set, which converts the 2300-volt alternating current to 250-volt direct current for trolley service in the mine. Directly in line with the tramway and over the portal of the mine is the double-drum hoisting engine, with axles mounted in a horizontal plane. The friction for holding the rope during an unbalanced pull is obtained by three wraps around each drum.

Four sets of brake bands, two for each drum, control the speed of hoisting. In case of equal loads on each end of the cable, the hoist can be driven through a friction band

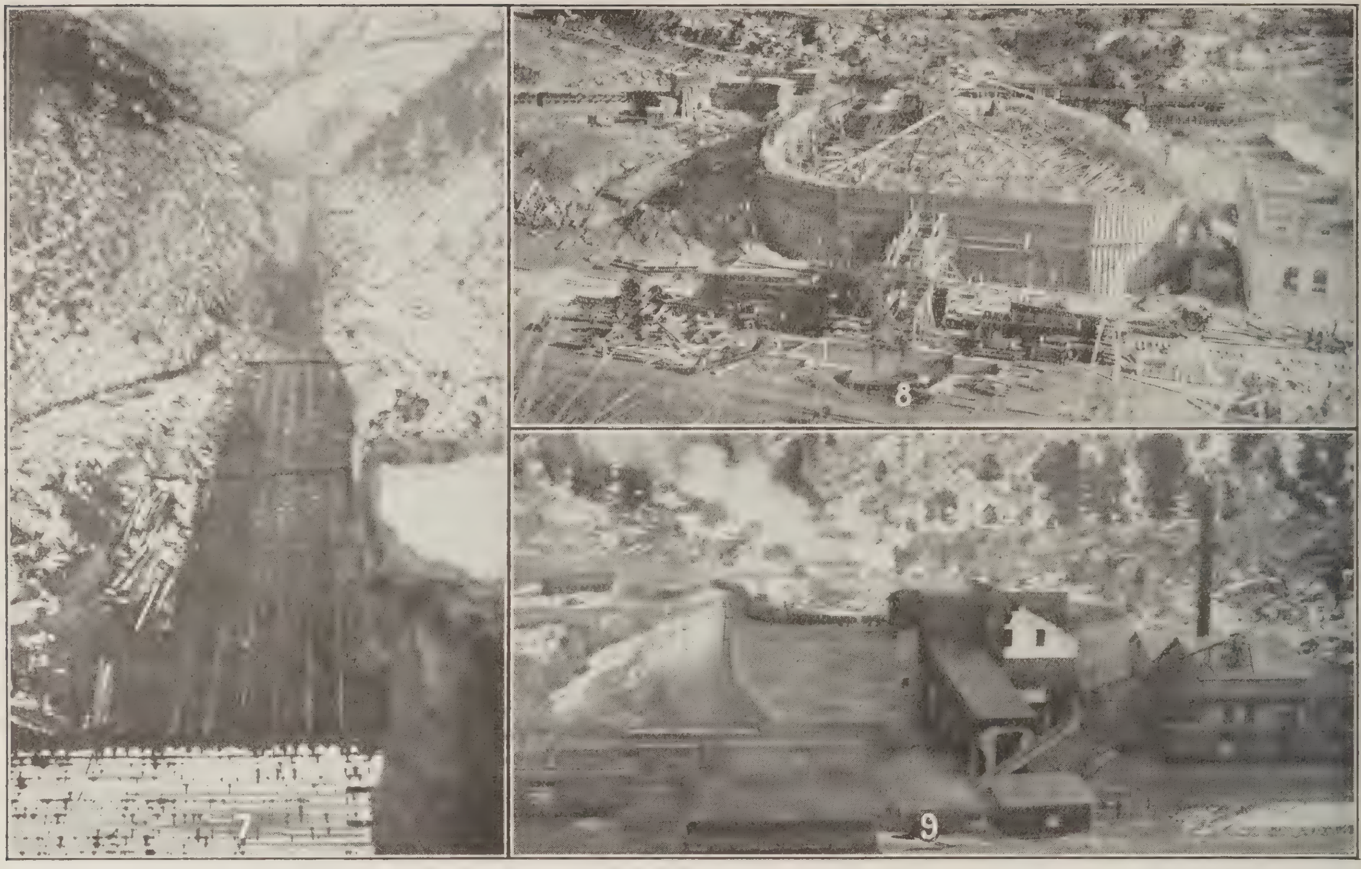


Fig. 7. Looking down the Tramline from above the Hoist House. Center Track Is Used for Empty Cars Only. Fig. 8. Showing Method of Setting Forms and Bracing. The Forms in the Foreground Are Designed to Support the Reciprocating Screens. Fig. 9. General View of Surface Plant, Showing Power House and Tipple. This View Shows Results of Proper Firing with American Stokers and Forced Draft

clutch and gears by a 150-hp. 2300-volt variable-speed polyphase induction motor. Under normal conditions the hoisting is done by gravity. The loads going down the incline to the tipple pull the empties up to the mine. The hoisting engine was built by the Denver Engineering Works.

The greatest obstacle overcome in the construction work was the building of the 4300-ft. double-track tramline. A straight road with one break in grade from a 12.4 per cent. to a 7.1 per cent. inclination connects the mine to the tipple. Large cliffs 60 to 100 ft. high were torn down to fill the cañon and build the grade.

The excavation at the lower end of the line was made by a steam shovel. The upper end was mostly solid rock and was blasted and hauled away by teams to make the fills. Approximately 100,000 cu.yd. of material was removed in construction of the grade. The roadbed is 18 ft. wide with side slopes of 1½ to 1. The tracks are of 40-lb. standard-section rails laid on a 42-in. gage. The tramway rope is 4500 ft. long and 1⅛ in. in diameter, made of the best materials obtainable. It was furnished by the Leschens & Sons Co.

Manganese steel rollers with Hyatt spiral-roller bearings are set in the center of each of the tracks to support the rope. These rollers were furnished by the Silver Bros. Iron Works and the American Manganese Steel Co.

The rope and tramway were designed for 16-car trips to travel the distance from the mine to the tipple in 4 min. At present 12- to 14-car trips are run in approximately 6 min. The ultimate capacity of the incline is 500 tons per hour. At the upper end there are three tracks, the center one for incoming empty trips and the outside tracks for loaded trips. All of the switches on the tramway are automatic and require no attention during operation.

The Weighing and Dumping Apparatus

When the cars are detached from the rope on the tipple bridge they pass over an automatic recording Streeter-Amet weighing machine which accurately weighs them, thus eliminating the necessity of a weighman and checkweighman.

As the cars leave the scales they run into a rotary dump. In this is incorporated the theory of rolling the coal out of the car rather than dropping it. The dump is driven by a constant-speed, 7½-hp., 220-volt polyphase induction motor. The receiving bins are circular and set close to the car as it is dumped, thus insuring a minimum of breakage to the coal. The feed table under this dump is run by a 15-hp. induction motor.

The reciprocating screens are of special design, having an extreme width of 8 ft., making an excellent screening area. They are driven by a 50-hp., 2300-volt induction motor. These screens are in two units, the first set having a double deck and the second a single deck. The second set is used for California lump only.

All of the coal-separating machinery was furnished by the Link-Belt Co. The rotary dump and the coal-separating machinery are inclosed in a structural steel housing furnished by the American Bridge Co.

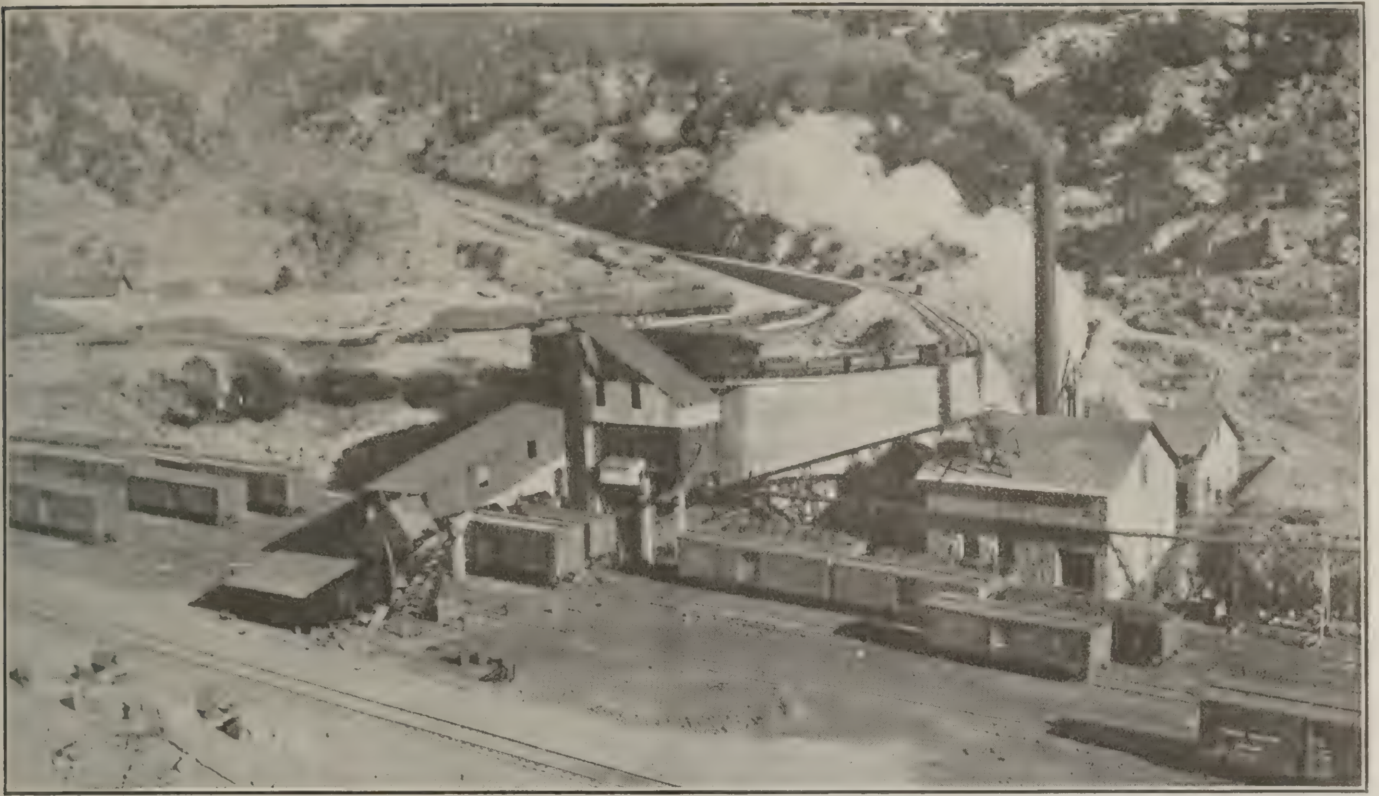


Fig. 10. In This View We May See the Results of Improper Firing and Running Noncondensing. The Pipe Line Running to Top of Boiler House Is for Blowing Dust From Rescreening Plant to Bunkers above Boilers

The slack coal from the upper deck of screens is collected in a hopper with the chute leading to an 18-in. elevator, which takes the coal to a rotary screen. The elevator is driven by a 20-hp. induction motor.

The revolving screen, which is likewise driven by a 7½-hp. induction motor, is set over an 80-ton steel dust bin. The screened slack from the rotary screen is stored in a steel bin of 50 tons' capacity.

The box-car loader for lump coal or run-of-mine takes any size of the ordinary railroad car and tips it to such a slope from the horizontal that the coal will readily roll down and fill up the end of the car. As the end of the car fills, the loader tilts back until it is horizontal; then slowly, as the car fills, it reaches the maximum inclination in the opposite direction when the car is loaded. This loader gives excellent service in that it does not break the large lumps of coal.

The tilting device is driven through a Morse silent chain by a 75-hp., 2300-volt, phase-wound induction motor. The auxiliary device for operating the clutches that hold the car on the loader is driven by a 20-hp., phase-wound, 220-volt motor. After the car is tilted on end it is held in that position by an air brake. The air is furnished by a 1-hp. motor-driven air compressor. The loader was furnished by the Ottumwa Box Car Loader Co.

The egg and stove coal is loaded by a Manierre box-car loader. This is a belt conveyor mounted on two arms hinged from a supporting column of the tipple. It is moved easily by hand as all the pivots are ball bearing. This loader is driven by a 10-hp., 220-volt, phase-wound motor; the belt is 24 in. wide, with a capacity of six tons per minute, and travels at the rate of 100 ft. per min.

Coal Dust Is Burned as Fuel

In the dust bin is a screw conveyor driven by a 5-hp., 220-volt induction motor through a Reeves variable-speed transmission. This conveyor ends in a 16-in. galvanized iron pipe through which air is traveling at the rate of 8000 ft. per min. This air current is produced by a 53-in. Sirocco pressure blower, driven by a 125-hp., 2300-volt induction motor. The blower handles approximately 13 cu.ft. of air per pound of coal, or about 25 tons per hour. The portion of the dust required for firing the boilers is conveyed by an auxiliary pipe line to a dust collector, over the steel coal bunkers, where the velocity is so reduced that the coal falls through the bottom and is carried by chutes to the bunkers. The blower was furnished by the Utah Engineering Co.

The boiler plant consists of two 200-hp. Stirling water-tube boilers fired by two American stokers to each boiler. Steam is carried at 150 lb. gage pressure. The building is of native sandstone, 34x40 ft. and 22 ft. high, with a corrugated sheet-iron roof supported on steel trusses and channel purlins.

Forced draft for the stokers is supplied by a steam-engine-driven fan, which also drives the stokers. As the steam varies in pressure the engine automatically changes its speed as required.

The ash pit is underneath the boilers, where a small car is provided to receive the ashes. This car runs on a ½ per cent. down grade to the ash dump.

Power is generated by a 2300-volt, 375-kv.-a. Westinghouse turbo-alternator. The turbine is of the impulse type, having only one set of blades. A barometric condenser has just been installed which gives 22 in. of vacuum, which corresponds closely to the altitude at this place. The circulating water for the condenser is forced through eight special spray-cooling nozzles by a 30-hp. direct-connected centrifugal pump and falls into a concrete pond, whence it again flows by gravity to the condenser.

A two-panel switchboard with all of the necessary instruments controls the distribution of power. All of the switches are operated by remote mechanical control and are mounted on the wall together with all of the instrument transformers.

Westinghouse electrolytic lightning arresters take care of all of the disturbances from the elements. The entire electrical equipment was furnished by the Westinghouse Electric & Manufacturing Co. through its Salt Lake representatives.

The water for sprinkling the mine is conducted by gravity through four miles of pipe line and stored in a 50,000-gal. wood-stave tank, situated 120 ft. above the portal of the mine. The entire mine is piped so that water is available for sprinkling and drinking purposes in each of the rooms and entries.

Water for the town and for the operation of the power house is supplied from springs 3½ miles up the cañon. The springs are all concreted in, so that the water has little chance of being contaminated. There are three sets of pipe lines from the three springs to the town, thus affording a constant supply.

Fig. 11. Spray Nozzles in Cooling Pond

The upper spring is 124 ft. above the storage tank at the mine and gives a static pressure of 285 lb. at the town if desired. The two lower springs will produce a pressure of 170 lb. at the town. The two pipe lines from the lower springs are connected to a 50,000-gal. wood-stave tank situated so as to give a pressure of 70 lb. for the town hydrants. In the complete system there are over 11½ miles of pipe. All of these systems are interconnected through valves that can be used for emergency.

Tipple and Yards

The reinforced-concrete retaining wall, which is a part of the tipple structure, is 480 ft. long. In plan it is pear-shaped, with a height varying from 10 to 46 ft. The maximum height is next to the tipple structure.

The wall is 19 in. thick at the base and 10 in. at the top and is set on reinforced-concrete footings. On the outside the wall has a batter of ½ in. to the foot. Throughout its length there are reinforced-concrete buttresses spaced approximately every 12 ft., the spacing depending on the height of the wall. The steel was furnished by Ryersons & Sons Co., of Chicago. Lyman & Samuels, of Salt Lake City, contracted the erecting of the forms and placing of the steel and concrete under the direction of D. H. Blossom, of Salt Lake City. The proportion in the aggregate was: 1 part cement, 2½ parts sand, 2½ parts gravel.

The tipple yards and railroad yards leading to them were excavated by a steam shovel and construction train. They are approximately 1000 ft. long by 150 ft. wide on a 2 per cent. grade. All of the rails are standard 75-lb. set on 8-in. tie-plated ties.

The empty cars are taken past the tipple on a passing track and are stored in the upper part of the yards above the scales. The storage capacity accommodates 40 cars at present. From these storage tracks the empty cars pass over a Fairbanks-Morse 150-ton full-suspension concrete-and-steel-set scales, where they are weighed and then distributed onto the four tracks leading to the tipple. Between the scales and the tipple there is storage space for 18 cars, together with one car under the chutes on each of the tracks.

As the cars are loaded they are dropped by gravity over a similar set of scales below the tipple and reweighed, then dropped onto two makeup tracks ready for the train. Below the tipple there is storage for 19 loads and on the makeup tracks there is storage for 29 cars.

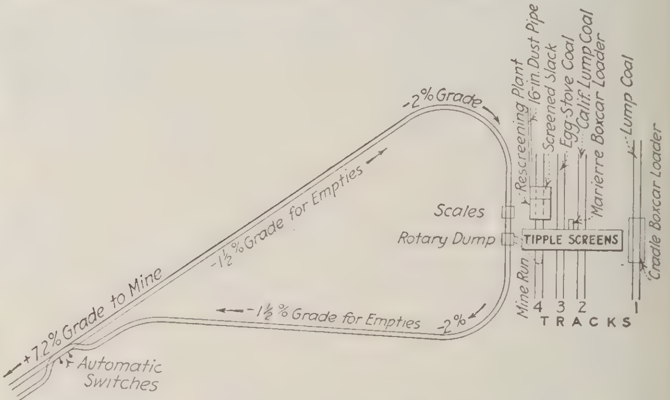


Fig. 12. Plan Showing General Layout of the Surface Plant

At present all of the employees are living in tents. There are an office building, a meat market, store and hotel, all of metal lath and pebble-dash construction. The meat market is equipped with a 10-ton refrigerating plant driven by a 15-hp. induction motor.

A mine-rescue and first-aid corps is organized and provided with a full equipment of first-aid supplies.

⁂

Fatalities at Coal Mines during 1914

By Albert H. Fay*

It is gratifying to note that the fatalities in coal mines in the United States in 1914 were 334 less than during the preceding year, the total fatalities being 2451 as compared with 2785 for 1913.

The principal causes of accidents showing a material decrease are: Coal-dust explosions, 96 per cent.; haulage, 11 per cent.; and falls of roof and pillar coal, 10.6 per cent. The net decrease in underground fatalities was 365, or 14 per cent. This is equivalent to one life every day during the year.

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*Mining engineer of the U. S. Bureau of Mines.

There were 331 fatalities due to gas explosions as compared with 91 in 1913, making a net increase of 240. Of the total gas-explosion fatalities, 261 were due to four serious explosions. There were slight increases in accidents due to explosions and electricity.

There was also a net increase of 26 fatalities in shaft accidents, or 42 per cent.; while on the surface, the net increase was five, or about 3 per cent. The net decrease for the year for both underground and surface accidents at coal mines as compared with 1913 was 12 per cent.

Fatalities per Thousand Employed

The exact figures for the number of men employed are not yet available, but taking the estimates as furnished by the inspectors for part of the states and using the same number of men as employed in 1913 for the other states, gives an estimated total number of employees for the year of 742,868 as compared with 747,644 in 1913.

The fatality rate, therefore, becomes 3.30 per 1000 men employed in 1914 as compared with 3.73 in 1913. Excluding 1912, when the rate was 3.27 per 1000 men employed, the 1914 rate of 3.30 per 1000 is lower than any year since 1903.

Greater Reduction in Loss of Life Than in Tonnage

While there was a reduction of 12 per cent. in the number of fatalities, there was also a reduction of 10.5 per cent. in the production of coal. The United States Geological Survey estimates the production for 1914 as 510,000,000 short tons as compared with 570,048,125 tons for 1913. The fatality rate per 1,000,000 tons of coal produced in 1913 was 4.89 and in 1914, 4.81. With the exception of 1912, when this rate was 4.41, the 1914 rate is the lowest yet recorded for the United States. The amount of coal produced per fatality in 1914 was 208,078 short tons, which with the exception of 1912 is the largest on record. The production per fatality in 1913 was 204,685 tons, which compares with 226,469 tons in 1912 and 144,325 tons in 1907.

There were 316 lives lost in disasters in which more than five men were killed at one time as compared with 464 in 1913, a net reduction of 148, or 32 per cent., in this class of accidents.

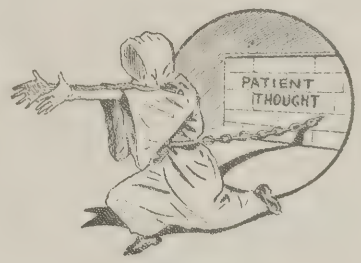
It is not possible to attribute these lower rates to any one particular influence. They may, however, be assigned in part to any one of the following agencies or to a combination of all of them: Closer and more careful inspection by the state inspectors; better enforcement of laws and regulations by the operators; a realization of the dangers attendant upon the miner in his daily work and his efforts to reduce accidents due to the educational campaign conducted in his behalf; the extended use of safety lamps in doubtful mines; the use of permissible explosives; humidifying dusty mines; first-aid and rescue training which saves lives that might otherwise be lost by reason of injuries received; the enactment of industrial-accident compensation laws; and last but not least the spirit of coöperation on the part of all concerned.

I AM *a Menace to Them All.*

Moloch

Written Expressly for
COAL AGE

By Berton Braley



WOULD *Bring My Power All to Naught.*

I AM Death's helper, for I slay
My thousands ruthlessly each day,
And all along my trail you find
Those I have crippled and made blind,
And children wailing piteously
Who starve and want because of me.

THE miner with his pick and drill
Who does his work with easy skill,
The trapper at his swinging door
Who whistles as he does his chore,
The old and young, the great and small
I am a menace to them all.

MY boast it is to kill or mar
Almost as many men as war,
And wise men know me and beware
But fools defy me and declare
They have no fear of such as I
And so they go their ways—and die!

IN mine and breaker, hoist and shop,
I reap my monstrous human crop,
And thus to meet that sacrifice
Mankind must pay a fearful price;
And yet a little patient thought
Would bring my power all to naught.

MAN *makes me—he can end me, too, and end the evil that I do,*
The pain—the sorrow—the distress, for lo, my name is CARELESSNESS!

Longwall Conveyor and Loader for Thin Seams

By James Dickson*

SYNOPSIS—A sectional coal conveyor and loader that is moved forward following the face. The results obtained by its use have been quite satisfactory and the cost of production has been reduced.

In reference to inquiry by John Harvey concerning "Loading Coal by Machinery at the Face" (Coal Age, Dec. 5, p. 920), I venture to give a brief description of a longwall conveyor and loader that is suitable for thin coal beds.

This conveyor is easily fitted up, is simple in operation and gives good results, both in the matter of output and in keeping down expenses.

It was first tried in a seam where the coal varied in thickness from 20 to 24 in., both roof and floor being of shale, which was generally fairly hard. The bed was worked on the longwall system, with roadways at 30-ft. centers, 3 ft. of rock being taken out in the branch roads, and from 4 ft. to 5 ft. in the main roads, to make sufficient height for the cars and horses. Packwalls were built along both sides of the roads with the rock, but there was generally a surplus of the material which had to be loaded out and sent to the surface, or else used for stowing purposes in some other part of the mine.

The cost of working the thin coal, together with the expense due to the large amount of rock-work necessary to make and maintain the roadways, became so great that the management was compelled to look for some other system that would give better results; and, as usual, necessity was called upon to mother still another invention, as follows:

The section first tried had 11 places on a straight face fully 300 ft. long, the main road being in the center. This main road, and those on the extreme right and left of the section, were the only ones kept in use after the conveyor was installed. The end roads were carried on as before, but in the main road all the necessary rock to make the required height was removed from the floor, this being taken up for about 10 ft. of width, or sufficient to permit double track being laid to the face. The two end roads were connected to the main road by two diagonal passages, as shown in Fig. 1, these end roads serving only as airways and ropeways and also as emergency exits in case of a cave taking place along the face.

The Construction of the Conveyor

The conveyor itself was built in 6-ft. sections, each section being of ¼-in. plate, 6 ft. long and 3 ft. wide, having on the edge nearest the gob a 9-in. side, and on that nearest the coal no side at all. Each section was mounted on two T-irons, which strengthened it, and also served as skids. The sections were coupled closely together, the junction being underneath the plates and only one center coupling being used.

When fitted together ready for use, the whole conveyor should be just a few feet less than half the total length of the face, the section at each end being carefully rounded off, so as to clear any obstruction that it may come against.

The timbering must be done systematically and kept in a straight line, in order that a clear passageway may be left through which the conveyor may pass. The posts were set about 4 ft. apart, as this was found to leave ample room for the conveyor to pass easily.

The roof support was augmented by two rows of hardwood cogs between the conveyor and the gob. These were generally built on a small pile of loose dirt to facilitate their withdrawal, as all this cog timber was recovered and used many times over. As soon as the conveyor was moved closer to the face, a new row of cogs was built, and the row farthest back taken out and the roof permitted to cave. The miners were each given about 20 ft. of face to work on, the fireboss measuring the distance and keeping a chalk line on the roof so that each man had to do his share, or his part of the wall tended to fall behind.

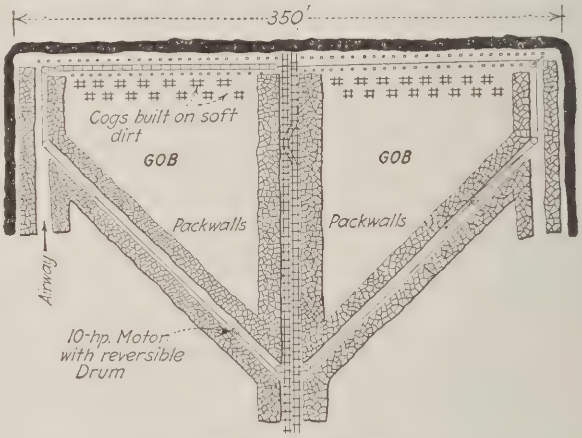


Fig. 1. Plan Showing General Scheme of Development

When in actual operation, the conveyor was drawn up until one end was close to the wheel on the end road, and the miners on that side of the section were given 3 min. in which to load their coal. Each section of the conveyor carries easily from 300 lb. to 500 lb., so that if there are 20 sections, or thereabouts, there will be from 3 to 4 tons on the conveyor. When ready to move, the man in charge signals the motorman to go ahead (see motors, drum and rope connections, Fig. 1).

The tracks on the main road are laid right up to the coal, so that a light trestle bridge is built across the tracks to carry the conveyor, the cars to be loaded standing under this trestle. When the first section of the conveyor reaches the part of the trestle immediately over the empty cars, the man in charge drops a small sheet of iron onto the bedplate of the conveyor, and this sheet being set at an angle of 45 deg. to the line of travel, the coal on coming against it is pushed over the side of the conveyor into the waiting cars—a car on each track being loaded alternately, so that while loading on one track the cars on the other are being changed.

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*Vancouver-Nanaimo Mining Co., Nanaimo, B. C.

The speed of the conveyor is low, in order to give sufficient time to change the cars, and also to keep down any excessive noise. Three minutes is allowed for the conveyor to travel from one side to the other, so that the speed is about 50 ft. per min. The switches on the main road require to be kept as close as possible to the face, in order that no time be lost in changing the cars.

As shown above, the conveyor can easily and safely make a trip in 6 min., discharging in that time, say 4 tons of coal, or at the rate of 320 tons per day of 8 hr. The capacity of the conveyor, of course, is changeable with the height available, and at 2 ft. 8 in., as stated in the query, there is plenty of room for variations to suit any individual case. The miners can be paid by the day, by the yard of advance or by the ton on the total output. The last method, in my opinion, is the best.

The timber and any surplus rock left after building the packwalls can be taken to any desired place along the face, this being done by the afternoon or night shift.

Supposing that in the case under discussion the actual output was ¾ of the output calculated above, or 240 tons, this would be equivalent to a daily advance of about 8 ft. on a 350-ft. face, so that the conveyor would require moving ahead almost every night. This moving is done by four men in two hours if the timbering near the face has been put up to suit the conveyor. This is a point that requires constant attention from the fireboss or man in charge.

THE CONVEYOR MAY BE EASILY MOVED

The actual changing is simple, the conveyor being drawn to one end of the run and the haulage rope detached from the end nearest the main road. The wheel at the corner of the section is advanced to its new position and the end of the rope carried down the new line on which the conveyor is to run. The conveyor is then guided easily into its new position, there being sufficient flexibility in the couplings to take the slight curve involved the other end being then changed.

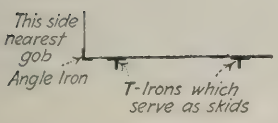


FIG. 2. AN ENLARGED SECTION OF THE CONVEYOR

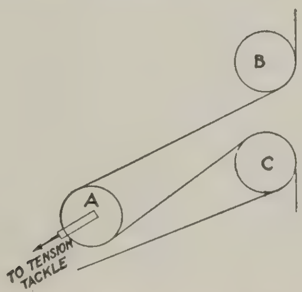


FIG. 3. PLAN FOR EXTENDING THE HAULAGE ROPE

Fig. 2 shows an enlarged section of the conveyor, and Fig. 3 an enlarged plan of the system for extending the haulage rope when the conveyor is moved forward, the rope from wheel *B* going to the conveyor, while that from wheel *C* goes to the motor. Wheel *A* is an idler held in tension by block and tackle, there being enough rope between it and the other two to serve for several weeks without splicing any new rope onto it.

The result of this conveyor was an increased output, the number of roadways was reduced from 11 to 3, with a corresponding decrease in expense, the handling of the cars was concentrated, requiring fewer pushers and drivers, and the roof was much better due to the rapid advance of the face. Above all, that which was sought was gained, namely, cheaper coal.

I may say that this system works equally well whether the coal is hand- or machine-mined.

I trust this may prove of interest to readers of your paper, and hope to see other systems of coal conveying described therein.

The Griffith Mine Pillar

William Griffith, of Scranton, Penn., some time ago patented a mine pillar made by the shooting down of "top" rock. This was described in our issue of Jan. 20, 1912, under the title, "Permanent Roof Sustention." Recently he has suggested another form of support, which has been tested at the laboratory of the Delaware, Lackawanna & Western R.R. Co. at Scranton. It has also been tested at Pittsburgh, at the testing plant of the Bureaus of Mines and of Standards.

At present, Mr. Griffith has not revealed precisely the character of the pillars, but it may be said that they are formed mainly of concrete reinforced in a peculiar manner with wood. The wood should be creosoted and the pillar coated with cement placed in position by the cement gun. They all contain rock as blasted roughly from the roof. The experiments are said to show that, after 30 days has been allowed for the cement to set, the Griffith pillar will settle only 3 per cent. when loaded with 80 to 90 times as much weight as a timber-and-rock cog of the same size undergoing a similar settlement. From 25 to 40 times as much weight is needed to reduce the vertical height of a Griffith pillar 5 per cent. as to settle a timber-and-wood cog by that percentage. Even when the settlement reaches 10 per cent., the Griffith pillar is still found 15 to 20 times as strong as the old timber-and-rock cog. Nor, according to report, does it crumble to dust, as does concrete, when tested to the limit. Its failure is slow and would give time and abundant warning to men to escape in case of such failure. Moreover, when tested to its limit it is found twice or three times as strong and three times as elastic as a concrete pillar.

Placed in a 4-ft. coal seam, a pillar 4 ft. square with timbers 4 in. square would support 100 ft. of overburden for an area 21 ft. square. Spaced 20 ft. apart such pillars would support the roof with only 5 in. of permissible settlement, provided the floor was sufficiently unyielding. The pillars will support 224 tons to the square foot of cross-sectional area.

Among the persons present at the test were: Alex Bryden, consulting engineer of the Pennsylvania Coal Co.; S. D. Dimmick, superintendent, Peoples Coal Co.; Eli T. Conner, consulting engineer; Geo. Engle, mining engineer, Temple Coal Co.; H. J. Force, engineer of tests, of the Delaware, Lackawanna & Western R.R. Co., coal-mining department; Arthur Long, engineer, Scranton Mine Cave Bureau and William Schunk, Scranton city engineer.

* * *

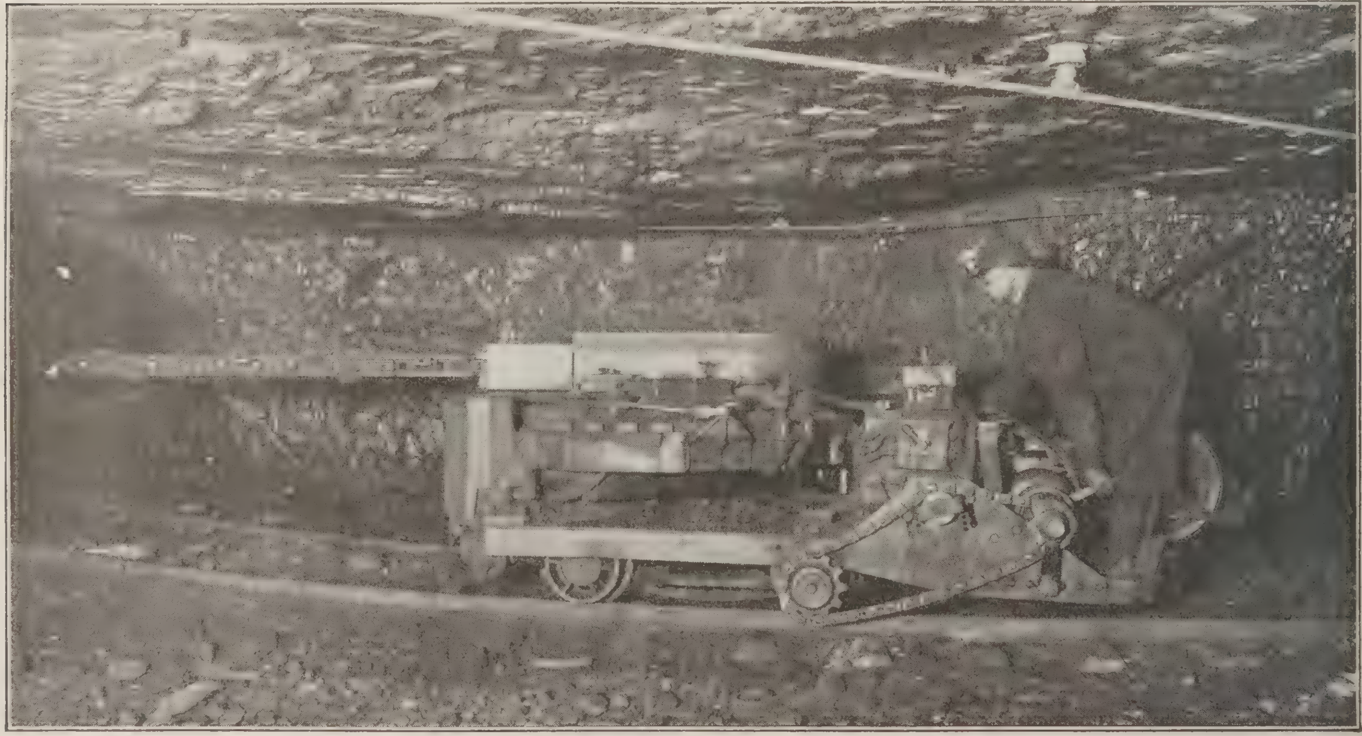
The Current-Carrying Capacity of an Electric Conductor is limited both by the allowable temperature rise and the allowable drop of potential. The potential difference required to transmit a given electric current through a conductor will vary directly as the resistance of the conductor, and, inversely, as its cross-sectional area. The diameter of conductors used for long-distance transmission is usually determined by the drop of potential allowable rather than other electrical considerations.

Working with a New Type of Coal Cutter

By John G. Bart*

SYNOPSIS—Results obtained with a machine that cuts an 8-in. kerf in the bone parting of a 6-ft. seam of bituminous coal. The coal is obtained in better shape, that is, larger lumps, and the entire product is cleaner than before. Lighter shooting, which results, also insures a better top, thus improving safety and cost.

Because of numerous requests from men in the coal-mining industry for information relative to the use of a new type of mining machine which has been in operation under my supervision for a period of about six months, and for coal men in general who are interested in progressive methods of mining, this article is presented. I particularly invite comment and discussion of the subject.



Transporting the Cutter to Another Room

The mining machine in question has been given locally the name of "bony machine," on account of the fact that the original purpose of the machine was to cut a kerf in the bone coal which occurs in the Twin Freeport seam, thereby eliminating the loading of this bone coal with the clean coal. This bone forms a stratum varying in thickness from 5 in. to 7 in. and occurs approximately 3 ft. from the bottom. The good coal above the bone varies in thickness from 2 ft. to 4 ft., making the total thickness of the seam from 5 ft. 6 in. to 7 ft.

The system of mining in use is the room-and-pillar panel system, each panel consisting of 22 rooms on 40-ft. centers driven to a depth of 250 ft. The mine is equipped throughout with electrical machinery, including gathering locomotives and electrical chain machines. The type of mining machine in regular use is the shortwall or continuous cutting machine which undercuts the coal to a depth of 6 ft. with a 5-in. kerf in the bottom part of the seam. This cut leaves several inches of good coal at the bottom, which is done to avoid the possibility of cutting in the fireclay, and thereby depreciating the value of the coal. Under this system it is extremely difficult to regulate the thickness of bottom coal left by the machine; this coal, however, is entirely lost, thereby decreasing the percentage of recovery from the seam.

The Bone Parting Raises Difficulties

With reference to the shooting of the coal after it is undercut at the bottom, it will be readily understood by mining men that the 5 in. to 7 in. of bone coal makes it extremely difficult to shoot without the use of excessive amounts of powder. The system of shooting consists of placing one hole 6 in. above the bone coal in the center of the working place to break down the center. After cleaning up this shot, a shot is placed in each corner, bringing down the bone coal and the clean coal, thoroughly mixed and difficult to separate. This results in some of the bone coal being loaded with the clean coal, and in narrow work the hard shooting practically pulverizes the coal.

Consideration of these points, and some others which will be mentioned later, led me to investigate a mining machine for cutting a kerf in the bone coal, which resulted in a trial installation of the machine known as the "Arcwall" or turret machine, and which, as before stated, is known locally as the "bony machine." This machine is shown in the accompanying photographs, also on the front cover, and consists essentially of a motor-propelled truck on which is mounted a turret capable of being raised and lowered by power. In this turret is a mounted revolving cutter-bar measuring 10 ft. from center of drive sprocket to center of idler sprocket.

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*General superintendent, Bessemer Coal & Coke Co., Russellton, Penn.

The machine was originally installed in entry work with a maximum depth of undercut of 7 ft. and a kerf of 5 in. The entries are driven from 10 to 12 ft. in width.

How the Coal Was Shot

The plan employed in shooting the coal after the initial cut was to place a shot in either the right- or left-hand corner of the top coal, which resulted in breaking it down at the back of the cut and required pick work to bring it down at the front of the cut. After loading this out, the second shot was placed in the opposite corner, and this shot having a loose end gave a large proportion of lump coal. After the top coal was loaded, the third shot was placed in either the right- or left-hand corner of the bottom coal, and the coal from this shot was loaded out before shooting the fourth and last hole in the opposite corner of the bottom coal. This last shot gave an excellent grade of lump coal.

The first experimental work with the machine led to a consideration of cutting a wider kerf and it was decided to change from a 5-in. kerf to an 8-in. kerf for the following reasons:

1. The bone coal that was left on either the top coal or the bottom coal made it more difficult to shoot the tight shot.
2. The 5-in. kerf was not wide enough to permit the proper bringing down of the top coal with a 7-ft. undercut.
3. The bone coal remaining after the 5-in. kerf mixed with the coal and required cleaning.

In adopting the 8-in. kerf, we practically eliminated the above mentioned troubles, as this kerf left practically no bone coal and the wide kerf was an additional advantage in bringing down the top coal. It eliminated also the trouble mentioned above, with the tight shot in the top coal, by bringing down the front of the cut.

Quality of Coal Is Improved

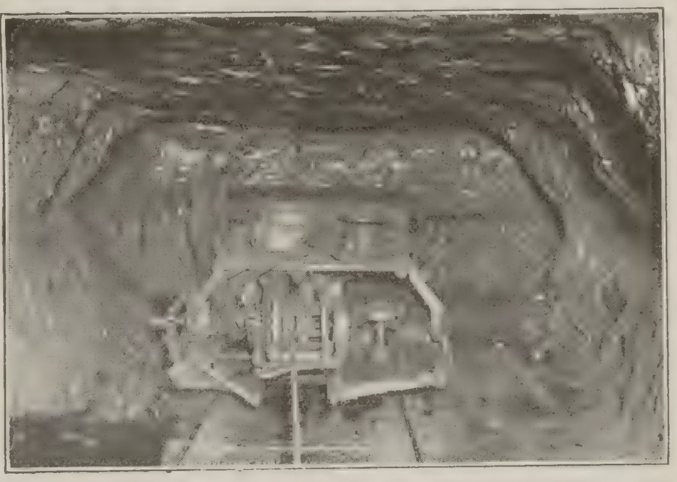
The important point which I wish to emphasize is the quality of the coal produced by cutting out any foreign matter which may exist in a seam 5 ft. or more in thickness. This is true not only because the impurities are eliminated, but also because of the better grade of lump resulting from shooting the coal in two benches with four shots, in comparison with shooting the full thickness of the seam with three shots. Another advantage of this method concerns both the safety and cost of mining in that the light shooting required for the top coal has no effect on the roof.

For the benefit of those wanting to know the character of the results obtained with this machine during the regular operation of same, the following points are brought out: The "bony" cutter requires less manual labor than the shortwall type of machine, as the former runs directly to its working position on a track laid with steel rails and steel ties and is almost immediately in position for making the sumping cut, which is made by pulling the machine to the place by a wire rope anchored in the face. This operation requires from 4 to 5 minutes.

Operation of the Machine

The wire rope is then removed from the anchor and attached to a lug on the machine for the purpose of revolving the turret, and two jack pipes are placed against the ribs as shown in the front-cover photograph. The machine is then ready to make the cut across the face, which requires from 10 to 12 min. When the cut has reached the required width, the turret is locked in position and the machine is pulled back on the rails by the self-propelling mechanism and is ready to move to another working place.

The power required during the operation of the "bony machine" at no time exceeds the power required for operating the shortwall type of machine when cutting in clean coal. It is evident that the time required between the finishing of one place and being ready to sump in another place is considerably less with the "bony machine," on account of its being integral with the truck and requiring no loading and unloading.


Sumping the Machine

With reference to repairs on machines, my experience up to the present time based on a comparison of the mechanism of many cutters would indicate that the cost of maintenance will be considerably less than the shortwall and breast types of machine.

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A Good Hoisting Record

The New Staunton Coal Co.'s mine at Livingston, Ill., produced 102,115.15 tons of coal during December, 1914, working 22.4 eight-hour days, making an average of 4538 tons per day. For the month of January, 1915, it did equally as well, making an average of 4537 tons daily. From July 1, 1914, to Jan. 31, 1915, it averaged 4515 tons per day. The largest output for one day was on Nov. 4, 1914, when 4826 tons were hoisted, making 1658 hoists, or an average of 10 tons per min.

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Buy It Now

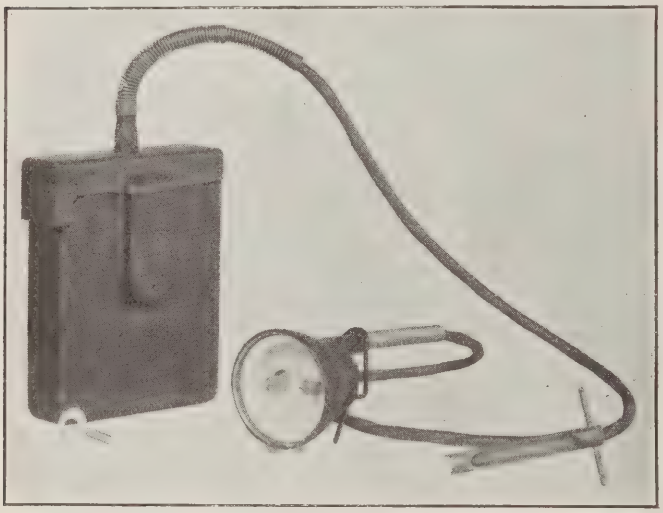
Get now what you need in the spring and help pass prosperity along. Don't buy what you don't need, but buy now what you do need. It will put thousands of idle men at work who are suffering this winter.

A New Miners' Electric Lamp

SYNOPSIS—The new lamp of the General Electric Co. is guaranteed to burn more than 10 hours per charge after one year's service. It distributes light through an angle of 130 degrees. It weighs only 3¾ pounds.

The General Electric Co. is offering a new miners' electric lamp that is safe to use, of strong construction yet light in weight, simple in design, foolproof, efficient in operation and of ample guaranteed capacity. The outfit consists essentially of a lead-plate battery, carried on the belt; a ¾-cp. Mazda lamp with a suitable reflector held in a steel shell carried on the cap. A strong, serviceable cable connects the battery and the lamp.

That an electric lamp would be safe to use in coal mines has long been recognized, because it could be made so that it would not ignite inflammable gases and would produce a uniform light regardless of atmospheric conditions. While the carbon-filament lamp represented the best available electric illuminant, such a miners' lamp was not possible because of the relative inefficiency of the lamp; for storage batteries of the required capacity could not be designed within permissible weight and dimension limits. The perfection of the efficient Mazda lamp in miniature sizes by the General Electric Co. and the development of small, efficient, light-weight storage batteries have resulted in the design of this type of miners' electric lamp.



New General Electric Miners' Lamp

The prime feature of this lamp is that it has been made thoroughly safe to use. By adequate insulation of the entire circuit, placing all the terminals and contacts inside of locked and sealed steel cases and providing automatic means for extinguishing instantly the glow of the filament, should breakage of the lamp bulb expose it to the air, this lamp, built of high-grade materials, has been made both safe and rugged.

Lamp Will Burn 12 Hours

The outfit complete weighs but 3¾ lb., of which 3½ lb. are carried on the belt and 4 oz. on the cap. The battery is rated at 7.2 amp.-hr. Normally it will light the lamp 12 hr. per charge and can be relied on to furnish light at least 10¾ hr. per charge at the end of one year's service. The ¾-cp. Mazda lamp operates at 1.9 volts and the reflector distributes the light evenly through a solid angle of about 130 deg.

The battery is nonspilling and the terminals are not subject to acid corrosion. The case is of medium-hard rubber. Exide plates are used. The battery box measures 6¼ in. high by 5 in. wide by 2 in. thick overall. It is made of drawn sheet steel, electrically welded, including the two side straps for the miner's belt. After welding, the box is lead plated and painted with acid-proof paint. The cover is drawn steel, hinged at one end and fitted with a substantial lock at the other end. The terminal contact block is riveted to the inside of the cover. Connection to the battery terminals is made by strong spring contacts, arranged to close the circuit when the cover is shut. The cable entrance bushing is watertight and clamps the cable firmly to prevent strain on the terminals.

Some Details of Construction

The lamp bulb, reflector and terminal contact block are incased in a light, strong, drawn-steel shell, which is copper oxidized, enameled and provided with a hook for attaching to the miner's cap. The entrance bushing leads the cable through the back of the shell where it is reinforced by a steel plate. On the terminal contact block, which is waterproof and screwed to the protecting shell, are mounted suitable terminals for cable connections and the spring contacts which hold the lamp bulb. The contacts are nickel plated. The reflector is of drawn steel, white porcelain enameled. A rubber gasket between this and the glass renders the case waterproof. The glass is held by a phosphor-bronze retaining ring, which has its ends looped and flattened to extend through slots in the rim of the case for a seal wire if desired.

The Mazda lamp bulb has its filament inserted and connected with a base contact in the usual manner, and at the tip of the bulb is a duplicate contact to which the filament is connected by a fine copper wire along the outside of the glass. The bulb is held at the focal point between the contact springs, which maintain it constantly under stress, so that, in case of a blow otherwise only sufficient to chip or partly break the bulb, it will be completely shattered by the springs and will drop clear of the contacts. Sufficient space is provided between the reflector and glass cover to keep broken lamp parts from short-circuiting the spring contacts. This prevents the possibility of ignition even if the cap lamp is seriously damaged amid explosive gases.

The Cable Has Been Carefully Designed

The cable consists of two braided-strand, rubber-covered conductors, each having a steel piano wire at the center. These are twisted together and then heavily rubber covered, making the cable strong, well insulated and not liable to kink. The ends are protected from wear and damage by flexible steel armor. To meet practice analogous to that of flame lamps, this electric lamp is designed to be supplied to miners from the lamp house. The outfits are to be assembled and locked with the lamps burning when delivered, and are to be returned to the lamp house in the same condition at the end of the shift. No care or attention whatever is required from the miners.

Direct current only should be used for charging. In some instances mercury-arc-rectifier or motor-generator sets may be required to change alternating current into suitable direct current. Small sets adapted for this purpose can be supplied readily. Racks arranged for charging batteries conveniently in quantities are also offered.

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Extracts from a Superintendent's Diary

There are two possible ways of keeping in touch with the affairs of the world. One is to travel extensively and the other is to associate with people who *have* traveled extensively. I have been able to travel but little; however, because of the fact that widely traveled men are continually called into our camp on business, I have been able to satisfy my desire to keep tab on what is going on in the world to an extent that often astonishes my acquaintances, who have come to think of me as a man almost buried from civilization.

This week, for example, I have been constantly thrown with four men who are experts in four different lines of work, and owing to their reputations in their respective fields, they have received calls from all the corners of the earth and have been to some of them many times.

One is a designing engineer for a coal-washing equipment company, one a consulting engineer in private practice, specializing on valuation reports for boards of directors, one a field superintendent for a company operating diamond drills and one an expert on byproduct coke ovens.

They were strangers to one another and their arrival in our camp simultaneously, on business connected with their professions, was purely accidental, but because of the isolated location of our camp and the fact that all of them had to make my office their headquarters, we were all soon on most intimate terms.

If any one of these men had come alone I would have gained much information (two men can not be thrown together in isolated surroundings without unbridling), but the four together comparing experiences and discussing viewpoints kept me in the clouds most of the time.

It is extremely doubtful if four more interesting men could be found than those who have just left our camp. They have, in times past, been sent to all parts of the globe in search of all sorts of information by all kinds of people. Sometimes their employers have been rascals trying to get the best of honest associates, and at other times their reports have been desired by worthy men searching for evidence to make possible the ousting of rascals.

Because their own actions must be always kept above suspicion, they have learned the importance of inquiring closely into the motives of all who would employ them. As a result they have become most excellent judges of men and have acquired a vast amount of information covering the possibilities of companies now organized and others that hope some day to complete an organization.

The reports which they are employed to furnish are not always concerned with technical details alone but often most fully cover market conditions and possibilities, railroad and transportation facilities, tariff influences, labor conditions, etc. It naturally follows that these men have become so familiar with the people and governments of the civilized and uncivilized countries of the globe, that they comment on a newspaper item about China or Alaska for example very much as I might discuss a happening in my own country.

I feel very sure, however, that such men are hard to draw out when thrown with a crowd, especially if there are any professional men present; so in recalling the pleasure I have derived from this and many similar appointments with mining experts, I am inclined to hold that life in a mining community has many very delightful advantages after all.

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Explosion at the Prospect Colliery

An explosion occurred on Feb. 18 at the Oakwood Shaft of the Prospect Colliery operated by the Lehigh Valley Coal Co. near Wilkes-Barre, Penn. It caused the death of 13 men and boys.

The scene of the explosion was a chamber off the gangway just east of the foot of No. 10 slope which is driven in the Red Ash vein and connects with the various levels.

It is believed that behind the coal breast was a large body of gas under heavy pressure contained in the crevices of a piece of faulted coal. This breast had been weakened by a blast and was broken down suddenly by the gas pressure. The escaping gas was lighted by an open lamp of a laborer who, with the miner, was driving the chamber.

The miner after firing the shot waited the proper length of time for the coal to fall and then entered the chamber and tested the roof, examining the face for gas with a safety lamp. He found the face free from gas and sent his laborer in to load the coal. This man used a naked light. Shortly after he went to work, the face, weakened by the blast, gave way before the gas pressure. The coal runs quite freely, and the thin shell was thus easily blown out.

On the gangway, a group of men and driver boys, runners, and nippers had seated themselves for lunch. The explosion swept down on them without warning and almost all of them were roasted alive. About thirty men were employed in the section in which the explosion occurred. Only those miners and laborers were injured who were working adjacent to that chamber where the gas was ignited.

Had it not been the lunch hour, the loss of life would not have been so great, for there would not have been so many on the gangway. Instead of an accident of ordinary size the chance presence of the men in the roadway made it a disaster of larger proportions than has occurred in a Lehigh Valley Coal Co. mine for a long time. It was the more pathetic that all the victims except two were less than 22 years old.

The report of the explosion could be heard on the surface. It tore down pillars, brattices and other development timber and in many cases caused heavy falls of roof. The work of rescue was immediately started, General Manager F. M. Chase ordering first-aid and rescue corps from Dorrance, Henry, and the Pittston Division Collieries to the scene.

A bad fire broke out in the gangway and was not subdued until after 72 hours of hard work.

Twenty Men Drowned in Mine near Nanaimo, B. C.

A sudden incursion of water from the old Southfield colliery into South Wellington Mine No. 1 of the Pacific Coast Coal Co. formerly known as the Fiddick colliery, at 11:30 a.m. on Feb. 9, resulted in the death of 20 men, including the mine manager, Joseph Foy.

According to the president, J. H. Tonkin, the company believed the workings were hundreds of feet away from the water, and the intention was to leave everywhere a 100-ft. pillar. It is said that the idea prevailed that, at the point where the incursion happened, the pillar was 450 ft. thick whereas 50 ft. was thought to be ample for safety.

David Nillerst, a fireboss, was indirectly the cause of the accident. He fired the shot releasing the water which poured into the workings and drowned 17 men. Joseph Foy, William Anderson and Thomas Watson were later victims, the two last mentioned having escaped from the flood.

Foy, on his way to the accident, met Thomas Watson and three other men and asked them to go with him to see if anything could be done. There was a counterslope or parallel airway and he hoped that some men could be rescued by that roadway.

THE MANAGER AND TWO OTHER MEN RISK AND LOSE THEIR LIVES

The *Daily Colonist* of Victoria says:

> Foy, with Watson and the others following, proceeded to a point in the counterslope where there was an air regulator. Debouching on the counterslope at this point was a slant to the main slope, and in this crosscut was a stopping. It was the washing out of this stopping which caused the death of Foy and Watson.
>
> On the low side of the regulator was a drop of 3½ ft., and, when Foy clambered through the opening and dropped to the floor, he was up to his waist in water. The jar of the jump extinguished his lamp, and he asked the men on the high side of the regulator for one of theirs. His companions lighted his wick and at the same time Tom Watson climbed through the regulator and into the water.
>
> It is said that at this time Foy could hear the shouts of victims down the counterslope, and this explains the willingness of the men to follow him. But they did not know the danger to which they were exposed, for the water had backed up the main slope well above the slant and was bringing a severe burden to bear on the stopping by which it was blocked. Just as Watson scrambled through the regulator the stopping broke down and the wave of water engulfed Watson and Foy, who could not climb back through the opening.
>
> Another man who risked and lost his life for others was William Anderson. He was working in No. 3 level, where the flood occurred, but succeeded in reaching the main slope. Then he remembered that his brother-in-law, Robert Millar, had been working down the slope lower than No. 3 level, and he thought he would at least try to warn him and the other men working in that section. He handed his coat to his partner, Gourlay, and started down the slope. Part way down he came across a boy tending a winch, and told him to run for his life. The boy reached safety, but Anderson continued on to his death.

WERE THE DRILLHOLES OMITTED?

It will be a long time before the responsibility for the accident will be determined. Meanwhile, of course, there will be much interest in the question whether the drillholes were kept ahead of the work as required under the Coal Mines Regulation Act. Unfortunately a severe cave-in has occurred under a stream which carries the water from Becks Lake, and much water has poured into the workings. The stream will be diverted, at once, but the damage is now largely done and the dewatering of the mine will be no small task.

The families of the deceased miners will receive $1500 each as compensation. Seventy-eight other mine workers were in danger of being engulfed in the flood, but they managed to escape.

The Nanaimo district inspector, John Newton, is in charge, in the absence of Thomas Graham, the chief inspector, who is at Fernie, Crowsnest pass, inquiring into the cause of the explosion at Coal Creek colliery on Jan. 2, in which the district inspector lost his life.

SOME ACCOUNT OF THE MINE

The mine at which the accident occurred is at South Wellington, four miles south of Nanaimo on the Esquimalt & Nanaimo Ry. The mining of coal was commenced in 1907 by the South Wellington Coal Mines Co., Ltd., on what were then known as the Fiddick and Richardson estates.

The coal seam, the old "South Wellington" coal, a continuation of the "Douglas" coal at Nanaimo, was developed by three slopes, the larger of the three being 13 ft. wide and the two others, parallel with it, being 10 ft. in width. The seam was from 6 to 16 ft. thick and the coal was of good quality. The room-and-pillar method of working was adopted, though, where the coal was thin, longwall was attempted.

The mine was apparently conducted with some regard for safety, for two 2-hr. Draeger helmets and one of one half-hour capacity were provided. There were four oxygen tanks and a pulmotor kept on hand. Monobel powder and electric batteries were used exclusively in the firing of shots.

However, it may be that the simple precaution of drilling ahead of the work was overlooked. Sometimes expensive equipment can be obtained where items appearing on the daily cost sheet are cut off in the interests of economy though they are equally necessary for safe operation.

Recent Legal Decisions

Contract Which Need Not Be in Writing—The statute which provides that an agreement to pay the debt of a third person shall not be enforceable unless reduced to writing and signed thereby, does not apply to a promise to pay for coal delivered to a third person, where the seller refused to make delivery in the absence of such promise, which, in the circumstances, must be deemed to be an original and not a collateral obligation. (Texas Court of Civil Appeals; Timpson vs. Roach, Stansell & Crane; 170 Southwestern Reporter, 863.)

Negligence Must Be Direct Cause of Accident—A miner injured through sudden movement of a cage, through which he was passing at the bottom of a shaft, cannot recover damages against the employing operator on the theory that the latter violated statutory requirements concerning signaling devices, if it appears that the accident resulted from the miner's own violation of orders which required him to use a passageway around the shaft, instead of passing through the cage. (Colorado Supreme Court; Colorado Capitol Coal Mining Co. vs. Chatfield; 143 Pacific Reporter, 1095.)

Rights Under Coal-Mining Contract—An agreement by a land owner that an operator may continue to remove coal at a royalty of 25c. per ton mined creates the relation of lessor and lessee, and not a sale of the coal in place. A clause in a lease providing for payment of coal mined in accordance with the lessee's "usual condition and practice" does not prevent the lessor from recovering royalties on coal passing through a ⅝-in. mesh, although the lessee has been in the habit of appropriating such coal without payment therefor, if such practice was not known to the lessor. (Pennsylvania Supreme Court; Girard Trust Co. vs. Delaware & Hudson Co.; 92 Atlantic Reporter, 129.)

The Hampton Roads Coals--IV

By F. R. Wadleigh*

SYNOPSIS—This is the concluding article of this series. This installment takes up the Virginian district, with some interesting comments on the railway by that name. The probable future of the Hampton Roads coals is discussed, as is also the question of transportation to the foreign markets.

The Virginian Ry. is one of the best equipped coal-handling roads in the world. It was built by the late H. H. Rogers, for the purpose of developing the coal fields of West Virginia, and constructed with the sole idea of handling freight at a minimum cost. No expense was spared to build the road according to the most approved standards of railroad construction and equipment, so as to make it possible to handle the heaviest trains with one locomotive.

The road was opened for through traffic on Apr. 1, 1909. It extends from Deepwater, W. Va., where it connects with the Chesapeake & Ohio Ry., to Norfolk, Va., a distance of 436 miles. The tidewater terminals and coal pier are at Sewalls Point, on Hampton Roads.

Shipments of coal over the Virginian in 1913 amounted to 4,555,331 tons, of which 3,283,677 tons, or 72 per cent., were dumped over the Sewalls Point pier, the balance going to the inland Eastern trade. The road has, as yet, no Western outlet. Nearly all of this coal was from the New River field, as there are at present only two operating mines in the Kanawha beds, and about 75 per cent. of their output is used as locomotive fuel.

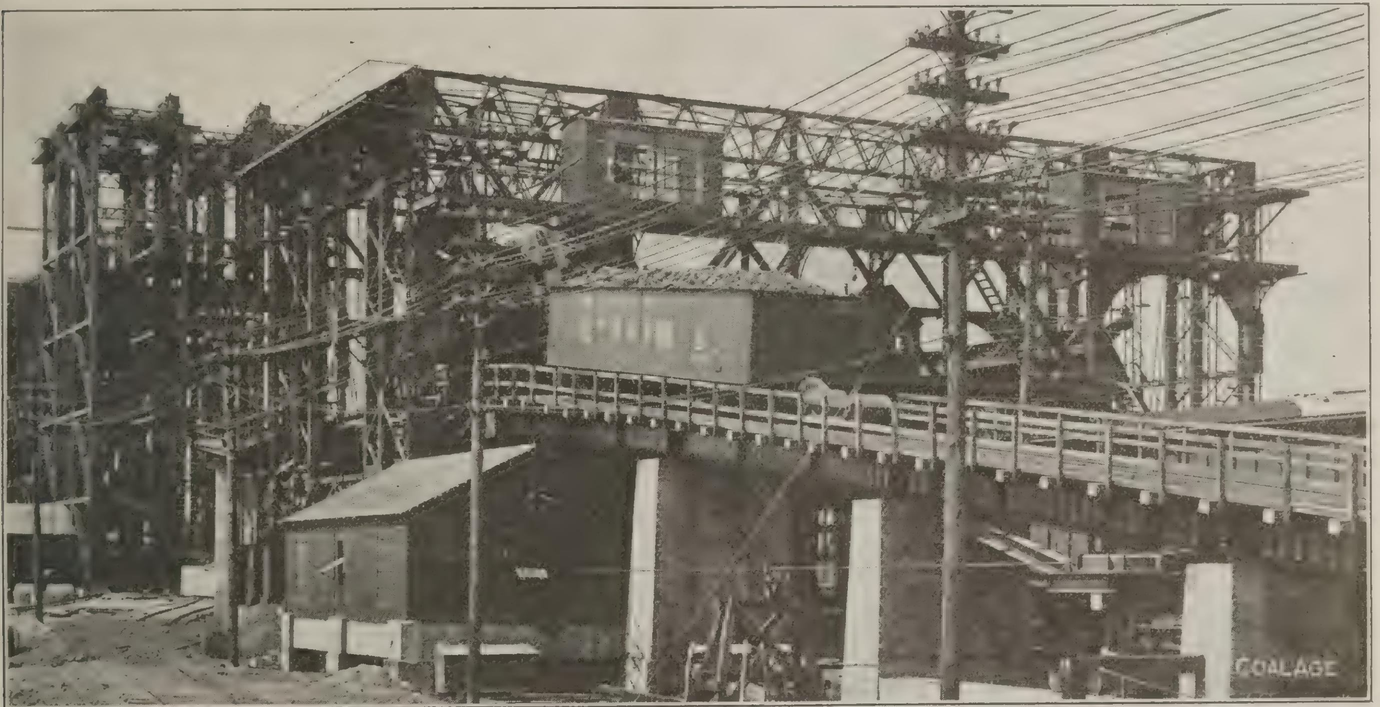
The average distance from the mines to tidewater is 388 miles, and the maximum distance, 427 miles. The freight rate on all coal shipped to tidewater is $1.40 per gross ton.

For handling its coal traffic, the Virginian has 108 locomotives, 250 cars of 80,000-lb. capacity and 5450 of 100,000-lb. capacity.

There are 58 mines on this road, all but three being in the New River beds, Sewell and Beckley, one in the Pocahontas and two in the No. 2 Gas and Eagle beds of the Kanawha measures.

Virginian Ry. District

About 37 per cent. of the total shipments of New River coal are handled over the Virginian Ry., and as noted elsewhere, some of the mines in this district are also served by the Chesapeake & Ohio Ry. Of the New River coal dumped over the Hampton Roads piers, 51 per cent. moved over the Virginian in 1913.



Shore-End View of the New Pier of the N. & W., Showing Duplicate Car Dumpers and Elevators

The two mines in the Eagle and No. 2 Gas beds of the Kanawha field also ship to Hampton Roads. One of these mines is operating in the No. 2 Gas bed alone, where the coal is of excellent quality, especially as a locomotive fuel. Analyses of this coal are given in the accompanying table:

ANALYSES OF VIRGINIAN RY. DISTRICT COALS

	No. 1	No. 2	No. 3	—As Received—	
Moisture...	Dry	Dry	0.85	4.60	Dry
Volatile matter...	29.87	30.63	32.83		30.57
Fixed carbon.....	64.88	65.92	60.32	...	64.85
Ash.........	5.25	3.45	6.00	...	4.58
Sulphur.	0.88	1.09	1.60	...	0.82
Hydrogen.	5.09	5.02	.....	...	
Carbon.........	82.46	82.42	.....	...	
Nitrogen.........	1.42	1.59	.....	...	
Oxygen.........	4.95	6.43	.....	...	
B.t.u.........	14,697	14,866	14,593	14,153	14,835

No. 1. Mine sample, U. S. Bureau of Mines Bulletin No. 22. No. 2. Shipment car load, U. S. Bureau of Mines Bulletin No. 22. No. 3. Shipment three cars locomotive fuel, Fuel Testing Co. analysis.

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The other mine is working both the Eagle and No. 2 Gas beds, loading both over the same tipple. It produces an excellent steam coal, most of which goes to Hampton Roads, for shipment to New England and for bunkers.

The receiving yards of the Virginian Ry. have a capacity of some 2500 cars, and in addition to this there is a pier yard for both loads and empties.

The coal pier of the Virginian Ry. at Sewalls Point has made some remarkable records in loading ships. It was the first cargo pier on the Atlantic Coast to be equipped with car dumpers, and its operation has been very successful. The pier is 1045 ft. long from bulkhead to outer end and 70 ft. above low water; the slips on each side are 140 and 300 ft. wide, with 30 ft. of water alongside. Each side has 31 coal pockets and adjustable chutes.

The rated capacity of the pier is 1500 tons per hour, but 1721 tons per hour have been loaded.

An example of the rate of loading at this pier is as follows: Steamship "Melrose" arrived at 12:25 p.m.; commenced loading 12:35; loading completed and vessel ready for sailing at 5:35; cargo, 7238 tons; bunkers, 238 tons.

Mines and Mining Methods

The systems of mining and preparing coal are practically the same in all of the fields shipping to Hampton Roads, and the following brief outline will cover the subject.

In all of the coal fields tributary to Hampton Roads, most of the mines are opened by drifts, the shaft and slope operations comparing as follows:

	Shafts	Slopes
Pocahontas	7	7
Thacker and Kenova	1	0
Clinch Valley	0	0
New River	18	5
Kanawha	..	..

The depth of the shafts runs from 675 ft. at Parral in the New River field down to 100 ft. in the Pocahontas.

The mining methods used are all based on the room-and-pillar system. Great improvements have been made of late years in the efficient working of the mines, especially by the larger companies, as shown by the increase in the percentage of coal recovered and in the output per man employed.

Screening and Sizing—Probably 75 per cent. of the mines in all the districts considered have some provisions for screening their coal, either for making sizes for domestic use, taking slack out of run-of-mine coal for sale or for coking. The usual sizes are:

Run-of-mine	Standard 35 to 40 lump
Lump	Over 3-in. screens
Egg	Through 3-in. over $1\frac{1}{2}$-in. screens
Nut	Through $1\frac{1}{2}$-in. over $\frac{3}{4}$-in. screens
Nut and slack	All through $1\frac{1}{2}$-in. screens
Slack	All through 1-in. or $\frac{3}{4}$-in. screens

Practically none of the lump, egg and nut sizes are shipped to Hampton Roads from either the Pocahontas or New River fields, all coal of this kind going inland East or West, for domestic use. There is, however, quite a large tonnage of nut and slack coal shipped to New England for steam making.

Cleaning the Coal—There are five washeries in the Pocahontas field and none in the New River; all of the Hampton Roads coal is cleaned by hand, by the same general methods, as follows: In the mine, by the miner; in the railroad car, as it is being loaded; on picking belts and conveyors.

There are usually some more or less efficient provisions to avoid breakage, but there is much room for improvement. Some of the newer tipples are equipped with conveyor loading booms that can be lowered into the railroad car, avoiding the usual drop from the chute and screens.

The Future of the Hampton Roads Coals

The following table will show the varieties of uses to which Hampton Roads coals are adapted:

Use	Best Coal to Use
Stationary steam plants	Pocahontas, New River, all others
General, hand-fired	Pocahontas, New River, all others
Where minimum smoke is desired	Pocahontas and New River
Stoker-fired steam plants	All coals
Locomotives	All coals
Steamships	Pocahontas, New River and lower volatile
Gas making, illuminating	Kanawha gas, Kentucky gas
Gas making, producers	New River, Kanawha splint and gas
Furnaces, heating and melting	New River, Thacker, Kanawha gas and splint coals
Coke making, byproduct ovens	Kanawha gas and mixtures, Eagle bed coals
Smithing and forging	Pocahontas, New River
Domestic, grates and furnaces	Pocahontas, New River, Thacker, Kanawha cannels and splints

Domestic Markets—The shipment of coals from Hampton Roads to the coastwise markets will continue to grow under normal and existing conditions, with the increase in manufactures and other lines of business using coal. It is not likely that the present balance of shipments as between these coals and those from Baltimore and Philadelphia will be altered, unless unforeseen changes take place.

The only disturbing factor in sight will be the new coal-shipping facilities at Charleston, S. C., to be completed during the current year. Just what effect these piers will have is rather hard to determine at present. The coals will all be comparatively high volatile, from 31 to 33 per cent., and not as high in heat value as Pocahontas or New River, but they are excellent locomotive coals and good steam fuels. How much Hampton Roads coal they will displace depends largely on the f.o.b. Charleston price. The freight from the mines to Charleston has been definitely fixed at $1.40 per gross ton, while the actual mining cost is not to exceed 90c. per net ton.

The placing of these coals, however, will probably affect the Philadelphia and Baltimore coals more adversely than those from Hampton Roads, especially in the South Atlantic and Gulf trades. It is not likely that they will be shipped in any quantity to the New England markets, as the distance from Charleston to Boston is 35 per cent. greater than from Hampton Roads, not to mention the dangers of the Diamond Shoals or Cape Hatteras. In addition to this, they are not of the quality most used in New England.

Foreign Markets—For some weeks after the beginning of the war, all exports of coal from Great Britain and Australia were prohibited. Now that this embargo has been lifted, the British coal agencies are making energetic efforts to supply their South American and Italian trade. It is true that all Admiralty British coals are withdrawn, but there are others almost as good, and but little Admiralty coal went to these markets even in normal times.

As it stands now, Italy and the South American countries are in great need of coal, but this emergency has found us unprepared; we are dependent on foreign bottoms to handle the coal and our coal agencies are willing to sell only for cash. We must have the necessary banking facilities in foreign countries if we are to do business with them, a fact that we do not seem to have accepted until lately.

The coals from Hampton Roads will undoubtedly experience a large increase in foreign buying, but after the present war is over, will we be able to hold this new business? If England still maintains command of the seas, our own ships will be put out of business, unless our present navigation laws are changed, as it costs over 50 per cent. more to operate under our flag than the British. Under our laws, all officers of the United States ships must be citizens and our ships must have three navigating officers in addition to the captain, while the English only require two; our vessels must have a 25 per cent. larger crew, and our wage scale is much higher.

A United States 4500-gross-ton ship costs per month, in wages, $1700, while a British 6000-ton ship costs $850 per month. Our system of measurement of cargo space and classification often operates against our ship owners as compared with the British measurement. We will, therefore, after the war is over, either have to lose business, operate at a loss, change our navigation laws or sail our ships under foreign flags. [Since writing these notes, the President has suspended the operation of a part of our navigation laws.]

The distances (nautical miles) from Hampton Roads (Newport News), Baltimore, Philadelphia, Charleston, S. C., and New Orleans to various coaling ports of the world, also time of voyage from Hampton Roads at nine knots' speed *via* Panama Canal to Pacific ports, are given in the accompanying table.

From To	Hampton Roads	Baltimore	Philadelphia	Charleston	New Orleans	Time from Hampton Roads, Days	Hr.
Aberdeen	3,248	3,372	3,216	3,528	5,078	13	25
Adelaide	10,177	10,401	10,343	10,071	9,785	47	6
Aden	6,657	6,781	6,634	6,908	7,846	30	20
Alexandria	5,144	5,268	5,121	5,395	6,333	23	21
Antwerp	3,478	3,602	3,446	3,810	4,801	16	2
Bahia	3,994	4,118	4,092	4,010	4,475	18	12
Barbados	1,699	1,823	1,828	1,630	2,115	7	21
Barcelona	3,872	3,996	3,849	4,123	5,061	17	22
Bordeaux	3,417	3,541	3,401	3,649	4,671	15	20
Bremen	3,727	3,851	3,694	4,059	5,050	17	6
Buenos Aires	5,774	5,898	5,870	5,790	6,225	26	17
Cherbourg	3,233	3,357	3,201	3,565	4,531	14	23
Colon	1,772	1,896	1,938	1,566	1,380	8	5
Constantinople	5,165	5,289	5,142	5,416	6,354	23	22
Copenhagen	3,722	3,846	3,690	4,002	5,228	17	6
Genoa	4,208	4,332	4,185	4,459	5,397	19	12
Gibraltar	3,360	3,484	3,337	3,611	4,549	15	14
Glasgow	3,126	3,250	3,094	3,498	4,447	14	11
Hamburg	3,745	3,869	3,712	4,077	5,068	17	8
Havana	988	1,112	1,158	605	588	4	13
Havre	3,299	3,423	3,267	3,631	4,622	15	7
Honolulu	6,533	6,657	6,699	6,327	6,141	30	5
Jamaica	1,257	1,381	1,423	1,051	1,115	5	18
Lisbon	3,177	3,301	3,156	3,378	4,676	14	16
Liverpool	3,211	3,335	3,149	3,548	4,532	14	21
London	3,428	3,562	3,406	3,770	4,761	15	22
Madeira	2,908	3,032	2,880	3,270	4,056	13	11
Malta	4,345	4,469	4,322	4,596	5,534	20	3
Manila	11,215	11,339	11,381	11,009	10,823	51	23
Marseilles	4,050	4,174	4,027	4,301	5,239	18	18
Montevideo	5,659	5,783	5,757	5,675	6,140	26	5
Naples	4,330	4,454	4,307	4,581	5,519	20	1
Oporto	3,092	3,216	2,969	3,360	4,344	14	8
Panama	1,822	1,946	1,988	1,616	1,430	8	10
Para	2,836	2,960	2,947	2,760	3,136	13	3
Pernambuco	3,520	3,738	3,712	3,630	4,095	16	7
Port Said	5,260	5,384	5,237	5,511	6,449	24	9
Riga	4,175	4,299	4,154	4,400	5,226	19	8
Rio de Janeiro	4,590	4,808	4,782	4,700	4,813	21	6
St. Thomas	1,291	1,415	1,425	1,194	1,590	6	0
St. Vincent	2,956	3,110	3,023	3,080	3,870	13	19
San Francisco	5,099	5,223	5,265	4,893	4,707	23	15
Stockholm	4,128	4,252	4,036	4,329	5,574	19	3
Suez	5,149	5,471	5,324	5,598	6,536	23	21
Teneriffe	3,050	3,174	3,049	3,260	4,181	14	3
Trinidad	1,800	1,924	1,928	1,605	2,081	8	8
Valparaiso	4,437	4,561	4,603	4,231	4,045	20	13
Vera Cruz	1,783	1,907	1,953	1,400	790	8	6

Before the war began, the Hampton Roads coal exports were showing a steady increase, with excellent prospects for the future, partly based on the opening of the Panama Canal. These coals were being quoted daily in foreign markets, a number of contracts for them had been made and some of the larger companies had established their own agents in foreign countries. In brief, the outlook was extremely promising and may be made more so, if the shippers take advantage of present conditions, do not raise prices and supply coal properly prepared.

The proposed legislation under which the Government proposes to buy and operate merchant ships will open the doors for a large-sized political job and will not aid our export trade. We do not need large transatlantic liners or ships of that class; what is required is tramp ships—cargo boats that can be operated economically, using 30 to 40 tons of coal a day, which are adaptable for bulk cargoes, grain and coal, and not passengers and package freight.

SUPPLEMENTARY NOTES

Domestic Markets—Since writing the above, the unexpected and unexampled rise in ocean freights and demand for ships in the overseas trade has somewhat changed the conditions in the coastwise markets.

A number of coastwise collieries and schooners have been withdrawn from their usual trade and chartered for ocean voyages. This has had the effect of raising rates on coastwise business, Hampton Roads to Boston, from 65c. per ton, Oct. 1, 1914, to $1.10 today, with prospects of $1.25 being reached.

Such high-water rates should undoubtedly increase the all-rail shipments to New England as well as to southern ports. The near approach of the contract season will cause the buyers in these markets to figure closely on the comparative costs and quality of the Pennsylvania and Hampton Roads coals.

Foreign Markets—As written several weeks ago, the statements made above as to our export trade were justified by conditions, but today these conditions are altogether different.

Our exports from Hampton Roads have fallen off considerably, due to the high ocean freights and because the usual difference in rates as between British ports and our own has not been maintained, making the delivered price of Hampton Roads coals higher than even the best grades of British coals at foreign ports.

There seems no immediate prospect of any lowering of ocean freights; they are higher now than they have been in the world's recent history. For instance, in 1863 freight on coal from Cardiff to Genoa was $5.35, a point never reached since, until today: now it is $7.53.

HAMPTON ROADS EXPORTS

December, 1913	December, 1914
251,955 tons	140,215 tons
January, 1914	January, 1915
Europe and Africa	Europe and Africa
49,542 tons	34,066 tons
South America	South America
39,589 tons	23,422 tons
Total exports	Total exports
218,716 tons	117,607 tons

Compare the following c.i.f. prices as quoted at Genoa, Jan. 30:

Best Welsh	12.64
Seconds, Welsh	12.39
Monmouthshire	12.15
Best gas	11.91
Pocahontas and New River	13.34

⁂

It is more economical to run the boilers above their rating 100 or even 200 per cent. than to carry banked fires under stand-by boilers. The drop of efficiency is small for such excess steam generation above rating as that indicated.—Bromley in "Power."

The Labor Situation

SYNOPSIS—Indications favor the initiation of the "open shop" in northeastern Ohio, after evictions have taken place. The anti-screen law is declared constitutional. A strike is developing in the Fairmont region. The legislature in West Virginia is asked to decree that all coal be weighed. Arkansas is now pacified. No more strike benefits will be paid in Colorado.

At a meeting of the eastern Ohio operators held in Cleveland on Feb. 16, they decided to open the mines in that district on an "open-shop" basis. This decision was only made after the joint committee of operators and miners and the federal investigators had failed to provide for arbitration.

The details of the plan were left to a special committee which was named for that purpose. Agencies representing strike-breakers and mine guards have been conferring with operators and have been in Cleveland for some time. It is believed that trouble will result from the attempt to operate, but the operators are firm in their stand that they start their mines. They feel they are fully justified in so doing because of the inconsistent position which the representatives of the miners hold relative to the wage scale.

The announcement comes from the Coshocton field that the operators will not attempt to operate the mines on the "open-shop" basis. The workings in that district have been idle since Apr. 1, 1914.

Report of Commission to Be Pigeonholed

Word comes from Washington, D. C., that the report of the Federal investigators will not be made public for some time. D. J. Keefe, of the investigators, stated that it would be rather "voluminous."

The committee named to go to Washington to confer with Secretary of Labor Wilson consists of George M. Jones of Toledo, S. H. Robbins of Cleveland, and R. L. Wildermuth of Columbus. This committee went to the national capital to inform the labor secretary that the operators had exhausted every means of settling the strike, and the operators expect to resume mining on the "open-shop" basis.

The first serious outbreak occurred at Bellaire, last week, where Industrial Workers of the World were most active last summer. A mob of about 200 striking miners seized three men employed at the West Wheeling mine and led them through the streets bearing placards "I am a scab." The mob marched its prisoners to Bridgeport. The arms of the three men were tied with ropes and they were surrounded by a strong guard

After a demonstration in Bridgeport, the mob started back to Bellaire, permitting two of the men to escape. Arriving at Bellaire the sheriff rescued the remaining man, who had been pretty badly beaten. Work at the West Wheeling mine was resumed the following morning under protection from the sheriff.

The Sunday Creek Co. Contract

Mine 256 of the Sunday Creek Co. started operation in the Hocking Valley field recently at a scale which if duplicated in eastern Ohio would give the men 38.57c. per ton on the run-of-mine basis. The company agreed to pay the recognized rate of 47c. per ton for the lump coal and proposed to estimate the slack coal at 26.59 per cent. of the lump and to pay for it at the same rate. But the proportion of slack coal made according to the determination of the commission was 28 per cent. of the whole coal.

If 72 per cent. of the coal is lump, the amount of lump coal in a ton will be 1440 lb. If 26.59 per cent. is allowed for slack nearly 383 lb. will be added. Thus the miner will be allowed 1823 lb. for a ton of coal, for which he will receive at 47c. almost 42.84c., which is 6.8c. less than last year's scale.

In eastern Ohio only 64 per cent. of the coal is lump or 1280 lb. per ton. Adding 26.59 per cent. for slack, the miners would receive an additional 340 lb. A ton would therefore weigh only 1620 lb., which at 47c. would give the miner 38.57c. per ton. If the statement is correct, it is clear that the Sunday Creek Co. has jockeyed itself into an extremely favorable contract.

New Freight Rates Are Proposed

The miners in West Virginia are arguing the passage of a bill establishing a maximum freight rate on intrastate coal traffic. The schedule is to be as follows: 125 to 175 miles, $0.75 per ton; 175 to 300 miles, $0.80 per ton, and 300 miles or more, $0.85. They hope in this way to compete in Ohio at least with the coal mined in West Virginia and Tennessee, for it is claimed that intrastate rates are higher than interstate rates to some places.

Operators are divided on the measure. Some claim it is introduced only to becloud the situation. Other operators and the miners favor the measure. At a conference with Governor Willis, Feb. 17, the miners were represented by President John Moore, Secretary G. W. Savage, former Representative Percy Tetlow and Judge G. B. Okey, while John H. Winders, of the Sunday Creek Co., headed a delegation of operators.

This matter was brought up a year ago by Senator Dolliver, who showed that the rate on Ohio coal from Nelsonville to the Toledo docks was $0.80, while West Virginia coal was hauled from Armitage, 12 miles farther from Toledo than Nelsonville, at $0.40 per ton. Cars were assembled by the carrier at Nelsonville, while at Armitage the train was already made up. These rates apply only to Lake coal, the rate from Nelsonville to Toledo proper being $1 per ton. It is a question whether the General Assembly or the Interstate Commerce Commission should act.

Evicting Northeastern Ohio Miners

The Glen's Run Coal Co. is now endeavoring to secure evictions of its idle men. Its case against Leonard Snell, of Rush Run, was tried before the justice of the peace and a jury on Feb. 16, and resulted in a verdict for the coal company, giving it possession of its property. Five other cases are pending, but as jury trials are demanded the progress of law is slow.

On Feb. 23, the Supreme Court affirmed the decision of the Federal district court of northern Ohio holding the mine-run or anti-screen law of Ohio constitutional.

The Fairmont Strike

The continued references to the rates of mining in Ohio appearing in the daily press of West Virginia has apparently started a strike of no small dimensions. This outburst appears to have surprised the union leaders, who do not feel financially able at this time to back strikes in more than one region. However, the strike has arisen, and they are but little disposed to frown on what under normal conditions they would encourage. Coming after a long period of short-time operation, the men are not in a position financially to put up a long contest.

Apparently the trouble crystallized with the Jamison Coal & Coke Co. at its Farmington mines. This concern had hitherto supplied its miners with free powder. An order was issued requiring them to supply their own. The miners claimed that this was the equivalent of a reduction of 4c. per car loaded, and a strike followed. On Feb. 20 there was a severe riot at Farmington and a fight between C. D. Conaway, the sheriff, assisted by 12 deputies and the striking miners. W. R. Riggs, a constable, was alighting from his buggy when the horse became frightened at the revolver shots and ran away, dragging Briggs, whose foot was entangled in the reins. He was found unconscious and was hurried to the Cook Hospital at Fairmont, W. Va. He is believed to be dying from internal injuries and a fractured skull.

The riot started when the sheriff tried to arrest striking miners on a charge of throwing stones at workmen. Two were arrested and were about to be taken to jail by Deputy Sheriff George Straight, when a score of striking miners surrounded the officer and his quarry and demanded that he release his prisoners. The men arrested escaped, and also all those who had interfered with the sheriff's officer. Twenty-five men were immediately sworn in, but the rioters by that time had dispersed to the woods. The sheriff of Marion County appealed on Feb. 22 to Governor Hatfield, asking him to send militia to quell the disturbances at Farmington. Meantime there has been no further exhibition of disorder.

The Ronda and Dry Branch mining dispute still continues. In violation of their agreement the men remain on strike. The operators' commissioner, however, has discussed the issue with the representative of the miners, though he would have been justified in refusing, seeing that the miners should work while the case is under arbitration. The men expect to submit the matter to John P. White, president of the United Mine Workers of America.

Coal by Weight or Measure

On Feb. 9 the Mines and Mining Committee of the West Virginia House of Representatives and Senate held a hearing at Charleston, W. Va., relative to a bill providing that the miner must be paid by weight and not by measure.

Senator Sam B. Montgomery, who is legal representative of the United Mine Workers of America, argued for the bill, urging that the first cost to a small mine for scales would be only $250, while a large mine could buy a self-recording scale for $500. In all, he figured that $146,250 would fit up the coal industry in West Virginia with scales.

He stated that cars at any one mine varied in size and that the amount loaded into them depended on the height to which they were rounded on top. The argument that in good times the miners took advantage of this fact by loading their cars barely to the level of the end gates did not, he declared, make the condition morally sound, and it was equally wrong for operators to bring pressure to bear on their men to have the cars loaded above the rated capacity.

As coal is sold invariably by weight, he could not see why miners should not be paid in the same way. He argued that the weight of coal per cubic yard was not uniform and that the miner should be compensated for the burden of the material handled and not for its bulk. He also declared that as operators could increase the size of a car and keep the rate uniform, it furnished a species of improper competition from which operators and miners in West Virginia alike suffered. He asserted that cars usually held more than their rating would indicate. The state law requires the operator to mark in plain numerals the amount of coal each car will hold. This law, he said, was almost invariably violated.

The Reply of the Operators

The operators were represented by George W. Williams, of Beckley, who declared that the proposed law was unconstitutional, citing in support of his contention the mining laws of Colorado, Kentucky, Indiana, Ohio, Illinois, Pennsylvania and West Virginia and decisions of the Supreme Court of West Virginia and of the United States. It would interfere with freedom of contract and would be class legislation unless it also applied to the farmer who would under similar provisions be obliged to sell fruit, grain, hay, eggs, milk and other products by the pound, instead of by more convenient and adaptable methods.

An operator, D. T. Evans, declared that the use of scales had been a constant source of trouble between the miners and the men, and that he had never had so little dispute and discontent as when the coal at his mines was paid for by car and not by weight. The operators declare that the introduction of scales and the hiring of weighmen would add considerably to the cost of mining at a time when the industry is suffering from the expenses resulting from the Workmen's Compensation bill.

About 80 men employed at the Opperman Coal Co.'s mine at Blair, Logan County, W. Va., went on strike Feb. 16. The men allege that the operators sublet the work to contractors.

Troops Withdrawn in Arkansas

All the troops sent into Arkansas by Secretary of War Garrison on Nov. 6, 1913, were withdrawn on Feb. 12, as it was believed their services were no longer needed. There had been no trouble in the Prairie Creek district, which they were guarding, at any time after their arrival, and Maj. N. M. McClure, believing that the disorder was at an end and that the civil authorities could control the disturbing element, urged that the squadron be withdrawn.

The Colorado "Strikers"

The State of Colorado is having much trouble in finding work for the former strikers and their adherents in the mining districts. The companies do not have work for all these trouble makers, and many of them are starving. It is proposed that work be found for them on the public roads and that the convicts who are now working at these utilities be sent back to prison.

It was announced that no strike benefits would be paid after Feb. 20 in the Colorado strike district. While some help may be extended to the needy, no regular weekly strike pay will be dispensed hereafter.

Conciliation in the Anthracite Region

The report of the Anthracite Board of Conciliation for the year beginning Apr. 1, 1912, and ending Mar. 31, 1913, now in press, shows that the establishment of local grievance committees at the collieries of the anthracite region of Pennsylvania by the agreement of May 20, 1912, has been productive of much trouble and many misunderstandings. The number of grievances that the full board was obliged to hear was nearly double that of the previous three years together.

It has been the policy of the members of the board to use all their influence to have difficulties settled without resort to formal argument, and many additional grievances have been settled by them in their respective districts since May, 1912, without the necessity for the action of the entire board. So numerous have these been that the total number of grievances since that time to date exceeds the whole number brought before the board in the previous nine years of its existence.

Operators Sustained in 14 and Miners in Nine Instances

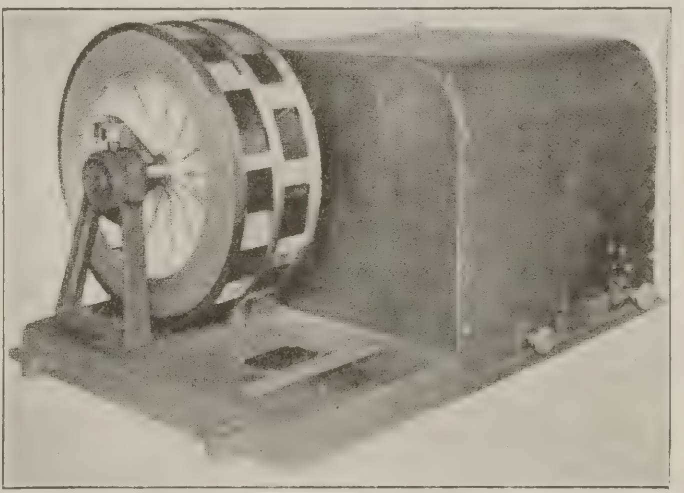
Several of the 46 cases recorded in the present volume of the board's proceedings contained two or more items for decision, so that the total number of grievances aggregates 61. Of these, 26 were withdrawn, the operators were sustained in 14, the mine workers were sustained in nine, in six cases no further action was necessary after the hearings, five were compromised and one item of one case is still pending before the board. It should be explained that many grievances are settled by a compromise of the parties, by failure to appear before the board or by the complainant quitting the employ of the company.

Twelve of the grievances presented to the board were brought by the operators, generally on account of the activities of the local grievance committees, which, it is claimed, devote much of their time to seeking causes for small local strikes. In four of these the operators were sustained, and eight were either adjusted by the parties and withdrawn, or withdrawn without prejudice.

The board consists of three representatives of the mine workers and three representatives of the operators. Its members hear the testimony, discuss the cases among themselves, and, if possible, decide them by a majority vote. In case of a tie vote an umpire is called in. The board was established by the Roosevelt Strike Commission in the spring of 1903 and has done efficient work in maintaining peace in the anthracite coal region ever since that time.

The Denver Siren

The Denver Siren, built by the Hendrie & Bolthoff Mfg. & Supply Co., of Denver, Colo., is of interest to coal-mining people. It is a motor-driven electric, fire or accident alarm, which may be operated from the telephone central's desk or any other convenient point. The rotor is made of aluminum and mounted on Hess-Bright ball bearings. The stator, which is mounted outside of the rotor, is of bronze. These two parts do not touch but operate in close proximity to each other.



The Siren with Boxed-In Motor

The Siren gives best results when driven by a three-phase induction motor. When the switch is closed, the pitch rises rapidly from the lowest audible sound or that produced by about 16 vibrations per second, to the sound made by 700 vibrations per second, which is approximately high C, two octaves above middle C.

By alternately closing and opening the switch, the pitch of the Siren can be changed between these limits. The sound emitted is extremely penetrating and can readily be heard for four or five miles. For best results, the Siren should be placed upon a building or tower, with no higher structure closer than about 200 ft. To prevent the instrument from becoming choked with snow or ice, a roof may be placed over it. This also tends to deflect and project in a horizontal direction that volume of the sound which would otherwise travel skyward, increasing by this much the efficiency of the instrument.

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A New Mine Pump

In order to attain its maximum efficiency, a mine pump should be rigid, simple, durable and accessible. It should be strong and rugged in design to successfully resist over a long period of time the severe and rough handling which it is certain to receive in the mines. For the same reason, it should be built of as few parts as possible, each of these being abundantly heavy to do the work required of it. At the same time, since space is at a premium in underground operations, the unit should be as compact as possible.

On account of the small amount of skilled care which such a machine receives, it should be as simple in construction as possible, no more parts entering into its construction than are absolutely necessary.

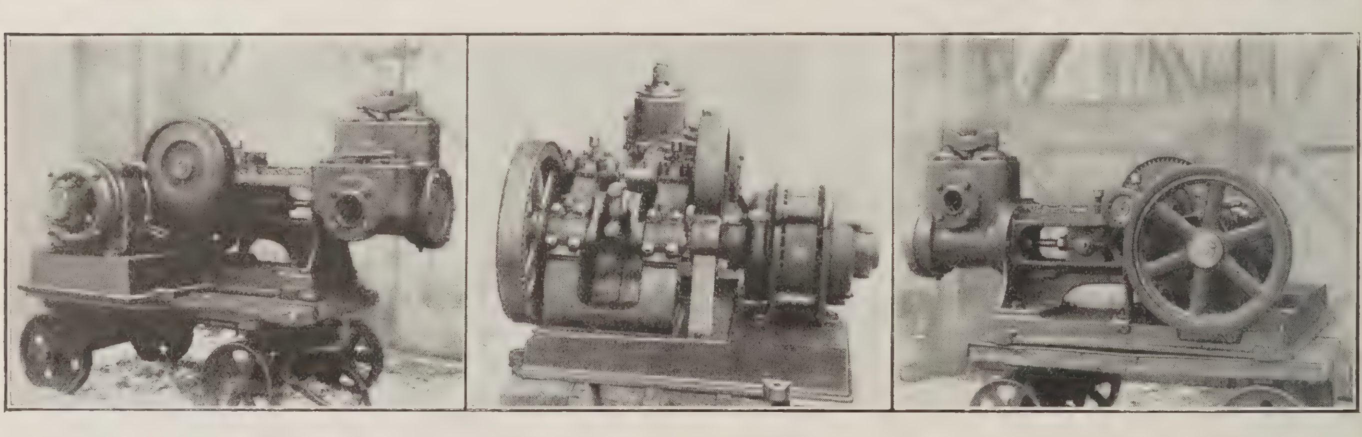
The accompanying illustrations show a mine pump designed and recently placed on the market by the J. C. Stine Co., of Tyrone, Penn. This pump has been planned with the especial purpose of meeting the severe conditions encountered in mine service and embodies many novel and interesting features. The water end of the pump may be made either of anti-acid bronze or a close-grained cast cylinder equipped with an anti-acid renewable bronze lining. This lining is so built that it may be turned six times, thus assuring the maximum possible wear of this part. All the small parts, including the valve seats, stuffing boxes, valve stems, nuts, piston and piston rods which come in contact with the mine water are composed of acid-resisting bronze. The frame is of the box type and heavy. The connecting-rod is of the marine type with a solid bushed wristpin bearing and an adjustable crankpin bearing. This rod is cast solid and the babbitt cast and expanded in place. The cap is then cut off and provision thus made for adjustment. The crank shaft is of cast steel and is made abundantly strong. The gears are all cut.

As will be noticed in the illustration, the jackshaft gear has an unusually heavy rim. This acts as a flywheel. Since the stress on the crankpin is unequal, the stabilizing effect of this wheel tends to relieve the motor or the otherwise unavoidable surges of current as the crankshaft alternately requires a small amount and a maximum of power.

The valve disks, four in number, are of rubber backed with bronze. As may be seen in the illustration, the removal of only two nuts gives access to all four of the valves. This is an important consideration under certain conditions.

The pump is so constructed throughout that no water can possibly get to any of the studs or nuts holding the various parts together. Corrosion and consequent weakening of these parts is therefore reduced to the least possible amount.

This pump is the result of much painstaking care and years of experience in manufacturing apparatus for use solely in mining. Before it was placed on the market, also, it was given a thorough tryout under working conditions. It is built with a bore of 5 in., and a stroke of 6 in., the suction is 3 in. and the discharge 2½ in. It operates at 60 to 80 r.p.m., and the capacity is from 60 to 80 gal. per min. It is small enough to be mounted on a truck traveling upon the regular mine track. This truck is so constructed that the pump may be either retained thereon for temporary work, or the four wheels may be dismounted, the truck body forming the permanent foundation for the machine.



Three Views of the Pump, Showing Accessibility of the Valves and the Heavy Rim on the Gear Wheel

One of these pumps delivering 84 gal. per min. under a total head of 54 ft. in operating continuously for 513 hr. consumed 651 kw.-hr. of electrical energy. This shows an efficiency of over 67 per cent.

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Decrease in Anthracite

There was a decrease of 449,315 tons in the shipments of anthracite in January last, as compared with January, 1914. The consumption, small even for such a mild January, bears out the theory of the operators that householders are economizing coal and keeping only one stove lit where they formerly kept two or three.

Total shipments last month were 4,831,329 tons, as compared with 5,280,644 tons in January, 1914, according to the Bureau of Anthracite Coal Statistics, which now includes the tonnage of the Lehigh & New England R.R. The amount of coal on hand at Tidewater shipping ports increased from 669,833 tons on Dec. 31 to 798,125 tons on Jan. 31.

Editorials

Confederating Our Mining Societies

We received a letter this week from an engineer in central Pennsylvania who wanted to join one of the mining societies and desired to know enough about their activities so that he could make a good choice between them. It is perhaps not hard to answer his letter, but when we sent him a complete reply we could but feel that he would think that there were so many societies in the field that it was best not to join any of them.

There is no reason why all the various coal-mining institutes in West Virginia, Illinois, Pennsylvania, Tennessee, Alabama and the Rocky Mountain states should not be amalgamated into a strong organization, national in scope and of such commanding influence that everyone would desire to join the confederation.

There is no opposition existing between these various institutes. They have no relation to business. A Pennsylvanian or a West Virginian attending any of these gatherings would find his welcome warm and friendly and hear nothing of the competition between the fields, with which we are so much impressed elsewhere.

Moreover, we do not believe that anybody desires to keep the institutions apart. Several people living in one district with their interest purely local belong to other institutes in order to get the benefit of the proceedings and for the pleasure and broadening effect of visiting in other fields. Those thus affiliated with several institutes have never failed to receive a welcome wherever they went, which was perhaps conceded to them as much because of their personal excellence, as because they were members of other organizations.

If any believe that there is friction existing let them consider that meeting together in a technical convention and sitting at the same banquet board will help to change that deplorable difference of viewpoint and bring harmony out of dissension.

Some organization should make the necessary move, and which institute makes the attempt is a matter of no concern. It is unfortunate that no one association was strong enough when the others were started to make the leaders of the industry in other states extend that parent society's work instead of starting independent bodies.

And turning from the technical coal-mining field to that of safety, it would seem that the American Mine Safety Association is so large and comprehensive that no rival local organization would be started. Yet recently one was founded in Alabama which was entirely independent of the larger body though duplicating its work.

Some time ago, a local branch of the American Mine-Safety Association was about to be opened at Franklin Furnace, N. J., within territory in which there is a local branch of the National Safety Council. It was then asked why the American Mine-Safety Association does not affiliate with that body having broader aims. Perhaps that amalgamation might be advantageous, but it is surely not well to have a dozen independent mine-safety organizations in separate expensive existence all over the country, and so insignificant in many cases as to make no appeal to the imaginations and pocketbooks of the members.

Certainly the shifting membership of local institutes as compared with the permanence and strength of national bodies warns, or should warn the "home-rule" element that the local organization always has a precarious hold on existence, owing to the lukewarm support of its following.

We would be pleased to have suggestions concerning this matter from Coal Age readers.

Sobriety in Mining Villages

There is no avoiding the conclusion that total abstinence is coming. It is not merely practical politics; it is now practical business. Just as soon as we look at it from that point, the very dregs will fall from the liquor bottle.

Mining is behind the transportation industry in this matter. For years the railroads have discriminated against drinking men, while even those coal companies which kept saloons off their property feared to be equally stringent. As a result, they gained but little from excluding the drinking places. If they had shut out drinking men, they would have gained in the character of their employees, in their output per man, in the safety of their mines, in the respectability of their villages and would have received the approval of the public.

To gain or retain a few worthless men, some companies have allowed their whole force to be debauched and have injured their own reputations, for the man who drinks heavily saves nothing, condemns his company, his working place, his home and invariably declares, usually with truth, that he has not seen a dollar for years. It is the part of folly to permit saloons to be built on the company's property, and it is even more a folly not to carry the campaign to its natural conclusion and prohibit the employment of every man who drinks to excess, if not also of all those who imbibe in moderation.

We do not believe that the companies would have had trouble from strikes had such drastic action been taken, for no one really respects a drunkard, or even grants the right of a man to his whisky. We are glad to see that the Delaware, Lackawanna & Western R.R. Coal-Mining Department has warned its foremen, driver bosses and others in authority against entering saloons.

In a short while, a few of the old operating heads in the industry who still retain the liking for a nip of whisky will go the way of all flesh and then it will be ruled out with an iron hand. After all, the foreigner is not so much bent on his liquor as we think. Across the water he can't afford to convert himself into a swill-wagon and he will not miss his beer and whisky as much as we apprehend, except perhaps at weddings and funerals.

At the recent meeting the American Institute of Mining Engineers, J. Parke Channing told of a mine in Russia which lost 60 per cent. of its men when the war broke out. Slowly the force was increased, until it had 50 per cent. of the normal number of employees. But meantime vodka had been prohibited, and that depleted force of men actually produced 30 per cent. more tonnage than the full crew of men had done before the war broke out.

The men who were working four days a week asked to be put on piece-work and to be allowed to put out product seven days a week. Later they decided that such continuous work was not desirable, and they cut the working days to six. They showed, however, very clearly that it is not so important to have many men as to have them all sober.

Charles W. Goodale, of the Anaconda Copper Mining Co., then discussed the effect which martial law and the closing of the saloons in Butte had on the accident rate at the mines of the company. On Sept. 1, 1914, all the saloons in Butte were closed for ten days. They were then opened, but only from 8 a.m. till 7 p.m. During the balance of the month, the saloons were open from 7 a.m. till 10 p.m. only.

As a result, in September only 4.21 accidents occurred per 10,000 shifts. In the August before, the rate was 11.25, and in the October after, 7.58. The rate in July was 6.22 and in November 6.07. The appearances are—though this is merely our idea—that the great loss in August was due to the drinking, consequent on the strenuous events preceding the proclamation of martial law. In any event, with excitement still almost at its height, the accident rate was lowest in September, because, concurrently, the chance to secure liquor was restricted. Probably the result would have been even better had the liquor been wholly cut off.

The Workmen's Compensation Bill is going to make some wonderful changes in the attitude of employers to the genial habit of imbibing liquor. We do not anticipate as large an improvement will arise from temperance as in Russia or perhaps even in Butte, but we do expect the change will be most perceptibly for the better.

Miners and other men whether employers or employees too often drink to excess. But we do not blame the action of a number of union men in bitterly resenting the aspersions on their sobriety said to have been made by a Delaware, Lackawanna & Western R.R. official, if the statements they quote are truly reported. But we do admire the protesting union men because in the resolutions passed they say we "do not uphold anyone going to work in an intoxicated condition." Let them make their stand even stronger, and we will applaud their declaration even more loudly.

The Fee System

The abuse of the fee system among negroes in Alabama, to which reference is made in our Ideas and Suggestions, is not confined to men of color or to citizens of that state. It exists in a degree throughout the whole country. We well remember how the constable and justice of the peace in a little mining village in Pennsylvania used to look upon the "foreign drunks" as legitimate picking. The Americans were passed over and the aliens chosen.

Order was none too well maintained because the arrests were made not to enforce order but to levy a tribute on those whose political influence would not weigh when the vote was taken. The foreign-born who did not know how to vote could be depended on to cast their ballots for all in one party regardless of the way in which some of the lesser nominees had victimized them in the recent past. And the foreigners, having no votes, had in the eyes of the minions of the law no rights deserving of respect.

Had the constable and justice been temperance advocates we might have sympathized with them in their efforts to arrest drinking men, but the justice himself liked his liquor only too well. The campaign in Pennsylvania as in Alabama was animated by a desire simply to corral the easiest, least resisting quarry.

Judge H. B. Abernethy of Birmingham has asserted his right to try cases where certain misdemeanors are committed. Particularly, he has had haled before him the negroes who have been arrested for shooting crap. This change does not directly help the negro, but it diverts the fines to public funds and discourages the activity of the exploiters of the fee system.

Judge Abernethy at a recent trial vigorously expressed his indignation saying:

> If the officers were half as diligent in running down actual criminals as they are in arresting petty offenders, there would be less crime in the city and county. The practice of rounding up negroes Saturday night for the purpose of making fees is one of the most pernicious practices in the county and imposes great hardships on a class that is practically helpless so far as the courts are concerned.
>
> In the case cited above, the solicitor agreed to nol-pros the case on the payment of the fine and costs. The law fixes the fine at $10, which in my opinion, is entirely too much for a first offender. The fine, however, is insignificant compared with the costs involved. Just think of it, $37.55 costs for a case involving nothing more than a petty offense against public morals.
>
> In nine cases out of ten, the negroes so convicted have to work out the sentence and costs on the county roads, all to the benefit of the fee-system office-holder. There is no fee attached to the court of common pleas. Judge Hickman and myself are on a salary as are both of our clerks. All the fees collected, which are very small, go into the county treasury.
>
> I propose to try all cases of this character that come before me and if the law would permit, for the first offense, I would impose a more nominal fine, but for the chronic offender, I would give the limit.

It seems that not only in Alabama but in several states north, south, east and west, a more reasonable system should prevail. A number of legislators in Alabama have been elected on the strength of their opposition to the fee system, and though there will undoubtedly be a strong lobby in favor of the spoils, the advocates of a more scientific system will probably win their fight.

To show that the fee system is a form of spoliation, it is only necessary to quote the fees received by the sheriffs of New York County—men whose names are hardly known to the citizens of the city which they are supposed to serve. These men also receive salaries of $12,000 per year. Nicholas J. Hayes (1906-1907) received in fees $70,193.91, Thomas F. Foley (1908-1909) made $92,594.84 and John S. Shea (1910-1911) $95,623.91. To Julius Harburger (1912-1913) fell no less than $98,769.24 of fees. Max S. Griffenhagen made more than $71,000 last year. The total amount of fees retained by sheriffs in New York County from 1906 to 1914, inclusive—9 years—was $408,324.44.

Discussion By Readers

Recognition of Bravery

Letter No. 1—I have seen no replies to the invitation extended in Coal Age, Jan. 16, p. 109, asking for suggestions recommending the adoption of some feasible and practical method of properly rewarding miners who risk their lives in performing deeds of heroism. Although I am not directly connected with the coal-mining industry, I am associated with it enough to be deeply interested in this question, and beg to offer a few words on the subject.

Deeds of heroism in and about a coal mine are, as a rule, given little consideration and quickly forgotten, because it is generally assumed that such acts are a part of a miner's calling and he is expected to face all dangers without a thought for his own personal safety. The fact has been proven many times that the miner himself does not know such a word as "falter" or "hesitate" when called to sacrifice his own safety, or when there is a service to be done for others in danger. In time of trouble or danger, the self-interest of a true miner disappears and he faces death as bravely as does the soldier on the field of battle.

The question of making adequate recognition of exceptional courage exhibited by the miner in times of peril, presents two aspects in working out a practical plan of operation. First, let us ask, would it be advisable to set a standard of *degrees of courage*, or would it be better to bring all worthy acts under one general classification? Second, Should the reward be entirely honorary in all instances, or conditioned to suit the rescuer's own physical condition when that is permanently impaired?

Many of our larger cities have honor rolls of brave firemen and policemen. In the city of Chicago, today there are two separate funds maintained for the recognition and commendation of heroic work. One of these is called the "Lambert Tree Fund" and is so named in honor of its founder, Mr. Tree. The other is supported by the self-styled "World's greatest newspaper," the Chicago *Tribune*. Each year medals are awarded and recognition bestowed on deserving ones, who are selected by a board of judges, acting for each of these funds. In making their recommendations the board of judges considers three grades of classification; namely, commendation, honorable mention and honorable mention with recommendation for a medal.

Coal Age is certainly to be commended for having taken the first step in an effort to extend the warm hand of friendly recognition to the brave men who face danger and death for their imperiled fellows in the dark recesses of coal mines. Without doubt the suggestion will receive the hearty support and coöperation of the larger coal-mining companies and men of the coal industry, who appreciate and understand what individual volunteered bravery means in and about the mines. No vast sum is required to accomplish the desired result, and I firmly believe the idea will be well received and liberally supported by everyone in the coal-mining fraternity. Let an authoritative and permanent record at least be made of the many brave rescues that have been already made, and thereby perpetuate heroic deeds in coal mining.

Bykem.

Joliet, Ill.

Letter No. 2—In the foreword that appeared in Coal Age, Jan. 16, p. 109, a suggestion was made in regard to providing in a suitable manner for the recognition of the acts of bravery and heroism so often displayed, not only in mine-rescue work but in the humble performance of the daily duties of miners and all mine workers.

I want to say that I consider your suggestion in this regard a most worthy one. I believe that such recognition would go far toward increasing the efficiency of rescue work, by stimulating the desire on the part of mine workers to render every aid in their power in an emergency or at times of danger to fellow employees.

Following your suggestion, which I regard as a timely one, I have taken some steps to obtain an expression of opinion in regard to the form such recognition of brave acts and heroism on the part of mine workers should take. I would like to ask if we understand that the columns of Coal Age are available for the frank and full discussion of this subject by its readers, and the free expression of their opinions in regard to the same.

Such a discussion would undoubtedly develop many good ideas and eventually make known the best course to be pursued in such an important and worthy undertaking, in order to bring about the greatest good to the industry. I believe this could be handled to advantage in a way similar to the question "Who Gets the Promotion?" which recently appeared in Coal Age and attracted such wide interest and attention.

I. R. Packard, vice-president,
Harper Coal & Coke Co.

Bates, Ark.

[It is the desire of Coal Age to obtain a full and frank expression of opinion from all its readers who are interested in this important matter. We hope, thereby, to work out eventually a plan that will make suitable recognition of heroism and bravery in mining work. The purpose should be to stimulate in the minds of *all* a generous disregard of personal safety in times of danger, whenever there is a reasonable expectation of aiding and rescuing others.

Such recognition should not be regarded in the light of a *reward* for action that is incumbent on every fellow workman. To the right-minded, the faithful performance of duty is its own reward. Few who are willing to risk their own life in an effort that bids fair to save another's would consider accepting a reward for their deed. Deeds of heroism are too costly to be purchased.

We hope for a discussion of this question that will bring splendid results, and Coal Age invites all its readers who are interested to lend their aid to this end.—Editor.]

Mining Laws, Legislation and Mine Regulations

Letter No. 35—In connection with the dangers attending the operation of mines in the same territory with oil and gas wells, mentioned by D. W. S. Coal Age, Jan. 30, p. 216, I thought it would be of interest to give a brief summary of the Ohio law, which is headed "Relating to Oil and Gas Wells Through Coal Measures" (Mining Laws of Ohio, 1914, pp. 107-112) and reads as follows:

> Sec. 973. Any person, firm or corporation causing to be drilled any well for oil or gas, or elevator well, or any test well within the limits of any coal-producing county of this state must give notice, in writing, of such fact to the chief inspector of mines, stating the location of the land upon which such well is to be drilled.

The law further requires that the parties shall make or cause to be made an accurate map, on a scale of 1 in. to 400 ft., showing the location and number of wells, property lines, township, section and quarter section in which the well is located, together with measurements from the section and quarter-section lines. The map must be accompanied with the sworn statement of the person, firm or corporation making the same and must be kept on file in the office of the state mining department and be open for inspection by the public at all reasonable hours. The owner or surveyor shall retain the original map, but a blueprint copy must be furnished the chief inspector of mines and another copy filed with the recorder of the county where the well is located, within 60 days after commencing to drill. If the drilling is continued a complete blueprint copy of the map must be filed at the end of each year. The law continues:

> No oil or gas well shall be drilled nearer than 300 ft. to any opening to a mine, used as a means of ingress or egress for the persons employed therein, nor nearer than 100 ft. to any building or inflammable structure connected therewith and actually used as a part of the operating equipment of said mine.
>
> In the event that a well being drilled for oil or gas penetrates the excavations of any mine, it must be cased with casing of approximately the same diameter as the diameter of the hole, the hole to be drilled 30 ft. or to solid slate or rock and not less than 10 ft. below the floor of such mine; and the casing shall be placed in the following manner: One string of casing shall be placed at a point above the roof of said mine so as to shut off all of the surface water and then the hole drilled through said mine and another string of casing put in, and the bottom of the second string of casing or the one passing through said mine shall not be nearer than 10 ft. nor more than 30 ft. from the floor of the mine where it passes through the same.

When abandoning an oil or gas well that has penetrated a mine from which the mineable coal has not all been removed the law provides that:

> * * * The person, firm or corporation owning said well shall leave in said well the casing passing through said mine from a point not less than 10 ft. nor more than 30 ft. below the floor of said mine and extending above the roof of said mine 5 ft.; and a seasoned wooden plug or iron ball shall be driven to a point 40 ft. below the floor of the mine. * * *

The hole must then be filled with cement to the top of this casing and, after driving another iron ball or seasoned plug, cement must be again filled into the hole to a depth of not less than 20 ft.

If the oil or gas well to be abandoned has penetrated *two or more* workable seams of coal a seasoned wooden plug or iron ball must be driven to a point 30 ft. below the lowest workable seam of coal, and the hole filled with cement to a point 20 ft. above the upper seam, when another wooden plug or iron ball must be driven and the hole filled with cement for a distance of 20 ft. more.

The law concludes:

> When any oil or gas well is to be abandoned, the person, firm or corporation having drilled or operated such well shall notify the chief inspector of mines, at least 10 days in advance, so that he may direct one of his district inspectors to be present at the time of abandonment.

It will be seen from the above quotations that not only are owners of property required to give written notice of wells to be drilled or abandoned, but they must also make and file an accurate map showing the exact location of the wells on the property and file copies of the same with the state inspector of mines and the recorder of the county; and when drilling is continued a yearly report must be made showing the number and location of each well drilled.

Referring now to Mr. Weigle's suggestion that the mine foreman should be a state official, Coal Age, Feb. 13, p. 302, in my opinion, there are many objections to such a procedure. Without discussing the legal difficulties that might be encountered but which could be easily overcome if it were desired, I will simply state my objections, which are as follows:

1. I believe the control of a mine foreman placed in charge of a mine should rest, in part at least, with the company or owner of the mine and not with the state, whose interest in the operation of the mine relates to safety alone.

2. I do not believe the state should dictate or control the selection of a mine foreman to be placed in charge of a mine that it does not own or operate.

3. State control might lead to term service, which would be a disadvantage in the operation of a mine.

These objections are made in full recognition of the dual capacity of a mine foreman, who must act both as safety inspector and coal producer.

There are, however, other duties devolving on the foreman that have no relation to *safety of operation*. For example, in order to maintain the output of the mine at its full capacity, the foreman must plan its future development. In these plans, as well as in the details of operation, *economy of production* is an essential factor; and the foreman in charge must be a man who understands the details of the work, the ordering of needed supplies and the economical management of men, in order to give satisfaction to the operating company or owner.

In all these respects, the state has no concern. The state already employs the mine inspector to look after the safe operation of the mine and to see that the law is obeyed. In my opinion, the selection of the mine foreman and his control should be wholly in the hands of the operator or owner of the mine.

Assuming for a moment, however, that the mine foreman is or should be a state official, we are confronted at once with difficulties relating to his appointment. There is, already, much diversity of opinion in respect to the manner of selection of mine inspectors; and the question arises, "Would the mine foreman, as a state officer, be *appointed* by the governor or *elected?*" In any case, it would be difficult to secure a man who would be satisfactory to the company or the mine owner. There is material difference in the policies of different companies and mine operators, which would still further increase the difficulty.

There is no question but that the examination and certification of mine foremen as to their capabilities tend to greater competency in the operation of mines as well as provide a greater degree of safety. From among such certified men, the operator or company can best select the man suited to their needs. In making this selection, an important consideration is the familiarity of the candidate with the conditions existing in the particular mine of which he may have charge. Any selection for this office, by the state, could not satisfactorily determine this qualification.

Mr. Weigle suggests further that the removal of a mine foreman should only be possible after he had been given a fair trial by "an executive board composed of at least two district mine inspectors and one member of the operating company." This suggestion virtually takes from the operator all power to dismiss a mine foreman from his employ, since the majority vote of the board would be in line with the state's interest. In other words, the owner or operator of the mine would be prevented from removing a mine foreman, which they might desire to do for economical reasons; but would be forced to operate under conditions that were not economical. Again, on such a plan, a mine foreman with the support of the inspectors could safely oppose the plans and wishes of the operating company who would be powerless to discharge a man simply for poor management or uneconomical methods. He would be forced to see his cost-sheet eat up his reserve.

However, it hardly seems fair to criticise this suggestion without offering a substitute. The method that appeals to me most strongly is to hold the operator responsible for any failure to enforce the mining law in the operation of the mine when it appears that he is rightly to blame and to impose a heavy penalty for such failure. The orders of the mine inspector might be written in duplicate—one being given to the foreman in charge and the other to the operator. It might be further provided that any order given to a mine foreman that is plainly in conflict with the mining law should be made in writing and duly signed by the superintendent or operator. Such written order would shift the responsibility from the shoulders of the foreman to the responsibile party or parties, in case any action resulted therefrom. In the absence of such a written order, the mine foreman would be regarded as responsible for any violation of the law in matters in his charge. By this means, responsibility would be placed where it rightly belonged, and neither operator nor foreman could shift the blame, but every man would shoulder his own load and suffer for his own act.

GEORGE N. LANTZ.

New Straitsville, Ohio.

Safety Hints

There appeared in COAL AGE, Oct. 24, p. 676, an editorial entitled "Safety Hints." After stating what railroads were doing along this line, by means of committees appointed in each operating department, the belief was expressed that a similar system could be put in operation, with good results, at coal mines.

I am not opposed either to safety committees in mining or to the posting of danger signals in and about coal mines as a precautionary means of impressing the idea of safety on all mine workers. However, I greatly fear that the multiplicity of these signs, giving warning of unsafe places or conditions, may engender in the minds of many mine workers the idea that all unsafe places are properly marked and guarded, and that less care and precaution are needed on their part in protecting themselves in their own working places or where such danger signals do not appear.

In other words, too much reliance may be placed on the work of the safety committee or the mine foreman or fireboss, and too little care taken by the miner for his own safety. The habit of risking danger and postponing the doing of things that should be attended to at once has cost many a miner the loss of his life. Safety committees and mine foremen cannot be expected to be always on hand when danger is present; and the responsibility for his own safety must rest on the individual worker in the mine.

I have long felt that the best safety rule and method that can be adopted in coal mining is, *Train and discipline every mine worker to detect dangerous conditions and to know how to avoid or escape them.* It is important to impress strongly on the mind the danger of delay or of assuming unnecessary risks. I have observed, and statistics will generally show, that the percentage of accidents occurring in mines where danger signals are displayed almost everywhere is as high or higher than in mines where this system is not carried to such an excess, other conditions of course being similar. It will be generally granted that the percentage of accidents, under like conditions, will be less in proportion as miners have been trained to care for themselves by observing every precaution for safety, however insignificant the need of such precaution may appear.

The idea has gained some prevalence among miners that the mine foreman knows much more about mining than even good miners do themselves. It need not be stated that this is true only where the mine foreman is a good practical miner himself and a man of broad experience. Even in that case, however, the mine foreman should not be expected to be as well acquainted with the conditions in a working place as the miner who works there continually.

Another idea that has gained some prevalence is that long experience as a miner renders him immune from accident. Whatever his experience, the exercise of *precaution and constant vigilance* on the part of a miner is absolutely necessary for his safety; and experience of the proper sort should make this fact certain. Long experience will not keep a loose piece of slate from falling on a miner who neglects to keep away from under it and to set the necessary timber for its support. Long experience will not prevent a man from being run over by a trip of cars when he travels on a haulage road, in disobedience to orders. Long experience will not prevent a miner from being burned when he walks into gas with an open light. Indeed, *long experience will teach men the need of precaution and obedience to the rules and regulations of the mine.*

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

Humidifying Mine Air

Letter No. 2—I was much interested in the inquiry of Miner, COAL AGE, Jan. 2, p. 29, and have read also the suggestions of Geo. Morris, to the effect that sufficient exhaust steam should be introduced into the intake current to produce a relative humidity of 93 per cent. in the live workings when the outside temperature is at or near the freezing point, COAL AGE, Jan. 16, p. 135.

The subject of humidifying the mine air has interested me greatly during the past few years, since the explosibility of coal dust has been so clearly demonstrated by many fatal occurrences. In this connection, it has been my good fortune to have had the opportunity of inspecting many devices and methods designed for the purpose of maintaining the degree of humidity in the mine air at or near the dew point so that the tendency will be for the air current to *deposit* rather than to *absorb* moisture in its passage through the mine.

The appliances inspected have included many types of apparatus, from the most elaborate systems for the injection of watery vapor into preheated air, to the more simple application of deliquescent chemical compounds to the haulage roads and intake airways. While many of these methods have given beneficial results more especially in the smaller mines, they have demonstrated to my mind that any apparatus that will produce and maintain a desirable percentage of moisture in the live workings of a mine, at all seasons, would be precluded by the necessary expense for the installation and upkeep of the system.

In this connection, I thought the following description of a device that is both simple and inexpensive and that has, in a number of observed instances, been entirely efficacious would be of interest. I would say, however, that this apparatus is designed for a mine operated on the blowing system of ventilation; and, since it must be installed on the intake, its adoption presupposes that the mine haulage is performed on the return airway. The description is as follows:

The device consists of a radiator composed of a series of 2-in. pipes hung from the roof in horizontal layers 10 in. apart. The first layer is suspended from the roof, while each layer below is hung from the one above it. The length of the radiator pipes will depend somewhat on the volume of air in circulation. For an air volume of 60,000 cu.ft. per min., a radiator 50 ft. long will suffice, while a 90-ft. radiator would probably be required for an air volume of 100,000 cu.ft. per min. The steam is introduced into the top layer of pipes, and, after passing successively through each of the lower layers, is discharged from the layer next to the floor, at the inby end.

By the operation of this device, the air current is heated to a temperature sufficient to enable it to absorb and carry into the mine all of the water in the exhaust steam, which is as much as can be asked or desired of any apparatus or device. The radiator is located a few hundred feet from the bottom of the intake shaft, slope or drift mouth.

FLAT TOP ENGINEER.

————, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Example—Given the two sides of a right triangle to find the hypotenuse: Thus, altitude, a = 300 ft.; base, b = 400 ft.; to find the hypotenuse c and the other two angles A and B.

Solution—There are two methods to employ, which are as follows:

First Method—Substituting the given values in the formula previously given and transposed to give the value of c,

$$c = \sqrt{a^2 + b^2} = \sqrt{300^2 + 400^2} = \sqrt{250{,}000} = 500 \textit{ ft.}$$

For the two unknown angles,

$$Sin\ A = \frac{a}{c} = \frac{300}{500} = 0.6; \quad \text{and } A = 36° 52'$$

then, $$B = 90° 00' - 36° 52' = 53° 08'$$

Second Method—The angles may be first found, after which the hypotenuse is found by the law of sines or the law of cosines. There are two ways of finding the angles A and B, in this case:

1. By the law of circular functions:

$$Tan\ A = \frac{a}{b} = \frac{300}{400} = 0.75; \quad \text{and } A = 36° 52'$$

or $$Tan\ B = \frac{b}{a} = \frac{400}{300} = 1.333; \quad \text{and } B = 53° 08'$$

2. By the law of tangents:

$$Tan\ \tfrac{1}{2}(B - A) = \frac{b - a}{b + a} = \frac{400 - 300}{400 + 300} = \frac{100}{700} = 0.1429, \textit{ nearly}$$

$$\tfrac{1}{2}(B - A) = 8° 08'$$

Then, since for the half-sum of these angles, ½ (B + A) = ½ (90°) = 45°

$$B = 45° 00' + 8° 08' = 53° 08'$$

and $$A = 45° 00' - 8° 08' = 36° 52'$$

To find the hypotenuse, now, apply either the law of sines or of cosines, as follows:

Law of sines, $$c = \frac{a}{sin\ A} = \frac{300}{0.6} = 500 \textit{ ft.}; \quad \text{or} \quad \frac{b}{sin\ B} = \frac{400}{0.8} = 500 \textit{ ft.}$$

Law of cosines, $$c = \frac{a}{cos\ B} = \frac{300}{0.6} = 500 \textit{ ft.}; \quad \text{or} \quad \frac{b}{cos\ A} = \frac{400}{0.8} = 500 \textit{ ft.}$$

Example—Again, taking the same triangle, and given one side and either angle; thus, given a = 300 ft. and A = 36° 52′, to solve the triangle.

Solution—Whether the given angle is adjacent or opposite to the given side the same method of solution can always be applied, since the other angle is 90 deg. less the given angle.

$$B = 90° 00' - 36° 52' = 53° 08'$$

$$b = a\ tan B = 300 \times 1.333 = 400 \textit{ ft.}$$

$$c = \frac{a}{cos\ B}; \text{ or } \frac{b}{sin\ B}; \text{ or } \frac{b}{cos\ A}; \text{ or } \frac{a}{sin\ A}, \textit{ as before.}$$

The Coal Age Pocket Book

Example—Again, taking the same triangle as above, and given c = 500 ft. and A = 36° 52′, to solve the triangle.

Solution—The other angle, found as above, is B = 53° 08′

Altitude, $a = c\ sin\ A = 500 \times 0.6 = 300 \textit{ ft.}$

Base, $b = c\ cos\ A = 500 \times 0.8 = 400 \textit{ ft.}$

Or, since in any right triangle, sin A = cos B; and sin B = cos A,

Altitude, $a = c\ cos\ B = 500 \times 0.6 = 300 \textit{ ft.}$

Base, $b = c\ sin\ B = 500 \times 0.8 = 400 \textit{ ft.}$

Formulas for Use of Logarithms—When using logarithms, in the solution of triangles, it is desirable to have a formula that avoids as much as possible the addition and subtraction of terms. This is possible in Case 4, where the three sides only are given. For example, denote the half sum of the three sides by S; or say S = ½ (a + b + c) and we obtain

$$Sin\ \tfrac{1}{2}\ A = \sqrt{\frac{(S - b)(S - c)}{bc}} \qquad (1)$$

$$Cos\ \tfrac{1}{2}\ A = \sqrt{\frac{S\,(S - a)}{bc}} \qquad (2)$$

$$Tan\ \tfrac{1}{2}\ A = \sqrt{\frac{(S - b)(S - c)}{S\,(S - a)}} \qquad (3)$$

The letters in these formulas, as previously stated, can all be changed correspondinly, as will appear in the following solution of the example in Case 4.

Example—Given the three sides of a triangle, as follows: a = 300 ft., b = 500 ft. and c = 700 ft.; to find the angles A, B and C.

Solution—Using the formula for the sine of the half angle, since S = ½ (300 + 500 + 700) = 750; S — b = 750 — 500 = 250; and S — c = 750 — 700 = 50; we have

$$Sin\ \tfrac{1}{2}\ A = \sqrt{\frac{250 \times 50}{500 \times 700}} = \sqrt{0.03571} = 0.1889$$

$$\tfrac{1}{2}\ A = 10° 53\tfrac{1}{2}'; \ A = 21° 47'$$

Again, since S — a = 750 — 300 = 450,

$$Sin\ \tfrac{1}{2}\ B = \sqrt{\frac{450 \times 50}{300 \times 700}} = \sqrt{0.10714} = 0.3273$$

$$\tfrac{1}{2}\ B = 19° 06\tfrac{1}{2}'; \ B = 38° 13'$$

It is well to remember that Formula 3, above, giving the value of the tangent will yield generally closer results for angles between, say 10 deg. and 60 deg. Below 10 deg., there is little practical difference between the sine and the tangent; and above about 60 or 70 deg., the value of the tangent becomes less and less definite.

Also, Formula 2 for the cosine should be used in preference to Formula 1 for the sine, for all angles between 45 and 90 deg. **For angles less than 45 deg. Formula 1 or 3 is preferable.**

Inquiries of General Interest

Purchase of Electric Power

At a mine purchasing electric power for the operation of its haulage motors and coal-cutting machines at the face, a 100-kw., direct-current generator is direct-connected to a 150-hp., 2300-volt, 60-cycle, three-phase synchronous motor, as illustrated in the accompanying diagram. If the generator delivers 50 kw. to the power line extending into the mine, for 10 hr., how many kilowatt-hours will the alternating-current motor take from the mains in that time?

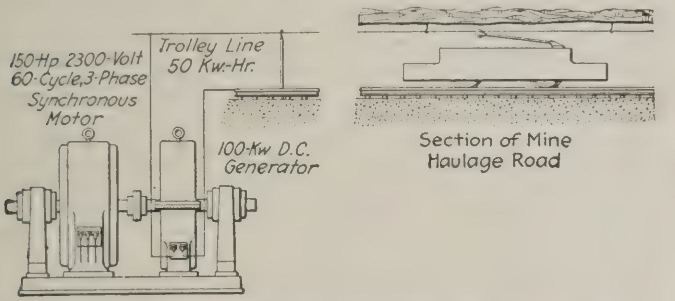

150-Hp 2300-Volt 60-Cycle, 3-Phase Synchronous Motor
Trolley Line 50 Kw-Hr.
100-Kw D.C. Generator
Section of Mine Haulage Road

Diagram Showing Arrangement of Motor and Generator Supplying Power to the Mine

ELECTRICIAN.

Handley, W. Va.

According to the above statement, the generator delivers 50 × 10 = 500 kw.-hr. to the trolley line. Then, assuming an efficiency of 90 per cent. for the generator and 90 per cent. for the motor, the latter takes from the mains, in the same time, $500 \div (0.90 \times 0.90) = 617.28$ kw.-hr. The combined efficiency of the generator and motor, in this case, is 81 per cent.

⁂

Pick vs. Chain Machines

I am desirous of ascertaining in what parts of this country mining machines of the pick type are most largely used. Available statistics do not mention the type of machines used. Kindly state, also, whether the increased use of the chain type of coal-cutters is due to the fact that they use electric power or is it due to any general preference on the part of miners for chain machines? What objections, if any, have been made to the use of pick machines, in the mining of coal? I shall appreciate any information you can offer on the subject.

CHAS. O. PALMER.

Cleveland, Ohio.

In regard to the use of these machines, respectively, it may be stated, in a general way, that pick machines are employed most largely in sections of Illinois, Indiana and Pennsylvania; but it is worthy of note that, at the present time, the records of these three states show a greater increase in the use of chain machines for cutting coal than any other state or district, except eastern Kentucky and West Virginia, which stand first in point of increase. Pick machines, however, never had much popularity in eastern Kentucky and West Virginia, for the reason that the chain machine of the side-cutting type was available for use at the time when the extensive development of the West Virginia field began.

The increasing use of the chain type of coal-cutter is due chiefly to three causes or conditions: 1. Chain machines are operated by electricity; and as electric power is now being so largely introduced into mines for the purpose of haulage, the adoption of the chain machine requires but one power installation for coal cutting and haulage.

2. It cannot be denied that there is a general preference for the chain type of machine, owing to its greater speed of cutting. The early type of chain cutter was a breast machine, which could make but one cut at a time and was little better, if as good as the pick machine. The introduction of the side-cutting, chain machine, however, made it possible to undercut an entire breast in a single operation, without withdrawing the cutter-bar from the coal. This greatly increased the speed of cutting coal with the chain type of machine; and, in this respect, made it superior to the pick machine.

3. The side-cutting machine, of which the "Ironclad" is a good representative, is much more flexible and easy to handle than the old breast type of chain cutter and is adapted to a much larger range of conditions.

It may be stated that a chain breast machine, under favorable conditions of roof and floor, will cut about twice as much coal as a pick machine, in the same time. The recorded results of coal cutting show that an "Ironclad," continuous coal-cutting chain machine cuts double the quantity of coal previously cut by a breast machine having the same length of cutter-bar, in the same time. An important feature of the "Ironclad" is that it permits the use of a considerable length of cutter-bar. Bars 10 ft. 4 in. long are in successful use in a number of mines today, while the present capacity for depth of cut of the pick machine does not exceed 5½ or 6 ft.

Correspondent will find much information on machine mining, including the number of each type of machine in use for a number of years, in the annual report, U. S. G. S. for 1913, by E. W. Parker, p. 759. In this connection, we would draw attention to an interesting paper entitled "Some Recent Developments in Electric Coal Mining Machines," by S. B. King. This paper was read at the New York meeting of the American Institute of Mining Engineers, February, 1914. It gives an interesting chart or diagram showing the total number of coal-mining machines in use; percentage of coal mined by machine; compressed-air pick machines; electric machines and all types in use; and continuous-cutting, electric machines to 1914. Copies of the paper can be obtained from the secretary of the institute.

Examination Questions

West Virginia Mine Foremen's and Firebosses' Examination

(*Selected Questions*)

Ques.—What are the chief points to be considered in establishing and maintaining substantial and reliable ventilation in coal mines? Should the circulation of air in mines be made continuous and not during the day only?

Ans.—The ventilating equipment of a mine should be such as to provide an ample supply of air throughout the mine at all times. If the mine is particularly gaseous, it is well to provide a duplicate fan for alternate or emergency use. Careful attention should be given to the question of whether the mine should be ventilated on the exhaust or the blowing system, which will depend on the conditions in the mine. The mine should be divided into separate ventilation districts, each district being supplied with its own air split taken from the main-intake current and returned directly to the main-return airway. By the use of regulators, the air should be distributed between the several districts according to their respective needs.

In general, the air should be conducted at once to the face or inby end of each district and returned from that point along the working faces to the mouth of the district where it joins the main return. It is important to hang canvas on the entries and at the mouth of each room so as to force the air current to travel the working faces. In many cases, it will be necessary to erect temporary brattices at the faces of the rooms as these are advanced beyond the last breakthrough in order to cause the air to sweep the working face in each chamber.

The circulation in a mine should be continuous, day and night, in order to make sure that there will be no accumulation of gas in cavities or void or abandoned places, for lack of a sufficient circulation of air during the night or on idle days. It may be possible, under certain conditions, to reduce the ventilation by running the fan at a lower speed during such time; but this should only be done after a careful inspection to ascertain the effect of such reduced ventilation on the condition of every place in the mine.

Ques.—How would you reduce accidents from falls of roof and slate at working faces? How would you prevent accidents from mine cars? Is it necessary for a miner to examine his working place after firing shots; and, if so, why?

Ans.—Accidents from falls of roof and coal at the face can only be properly guarded against by a thorough and constant inspection of the working faces throughout the mine while the men are at work and by seeing that a plentiful supply of needed timbers and cap pieces is kept on hand. It is also necessary to impress on every miner the absolute need of taking every precaution for his own safety and the danger incurred by taking unnecessary risks, or delaying the setting of timber for the support of the roof, until after loading out the coal.

To prevent accidents from the movement of cars in a mine, the track and rolling stock should be kept in good condition and constantly oiled and inspected. Separate traveling ways should be provided where it is necessary for men to walk in and out of the mine. It is a good rule to permit no one to travel on the main haulage roads of the mine, except those whose duties require them to do so. Where it is necessary to use a haulage road for travel, there should be provided a sufficient clearance on at least one side of the track to enable men to pass cars in safety. If this is impracticable, refuge holes should be provided at short intervals along the roadway, and these should be whitewashed and kept free of all obstructions. On gathering hauls, drivers should work together following each other; and in no case should they be permitted to alternate, one coming out after another goes in. Doors should not be placed at the foot of a grade. Where necessary to sprag cars in descending a grade, ample room should be left at the side of the road for the safe performance of the work. Cars should never be left standing on a haulage road and when standing on a siding should be properly blocked or spragged to prevent their running out or being knocked out onto the main track. Safety blocks should be placed at the head of all inclines used as haulage roads.

After firing a shot, a miner should never return to the face until sufficient time has elapsed for the air current to carry away the smoke and gases produced by the explosion. Where there is danger of gas feeders being ignited by the flame of a shot, suitable provision should be made for the inspection of the working faces by competent persons within a short time after the shots have been fired. The neglect to do this has frequently been the cause of disastrous mine fires.

Ques.—What tools should a miner have to properly timber his place?

Ans.—A miner should always have an ax, saw and sledge for use in timbering his working place.

Ques.—What means are necessary to properly conduct the air current to the faces of the workings? What are the advantages to be obtained by dividing the air current into separate splits? Should mine fans be built reversible?

Ans.—Canvas should be hung at the mouth of each room to prevent the short-circuiting of the air at that point. As the face is advanced beyond the last breakthrough, it is often necessary to erect a line of brattice from the outby corner of the last breakthrough and extend this to a short distance from the coal face so as to conduct the air to that point.

Splitting the air current provides a larger quantity of air in circulation by the same power. The ventilation in the mine is under better control, as the quantity of air in each district is proportioned to the need therein. Better air is supplied to the working face, and the smoke and gases in each district are conveyed directly out of the mine without passing through other districts.

Mine fans should be built reversible at all gaseous mines. At such mines occasion is liable to arise when the reversing of the air will be necessary.

Coal and Coke News

Harrisburg, Penn.

To the surprise of everybody, members of the Senate clashed bitterly on Feb. 16 over the Catlin Mine Code (160) when it reached the third reading in the Senate. A motion by Senator Thompson of Beaver to have the bill placed on the postponed calendar brought a strong objection from Senator Catlin and for a few minutes the chamber was thrown into the greatest excitement since the opening of the Legislature. The Thompson motion was carried by a vote of 24 to 15.

As far as the final success of the bill goes, the coal operators' victory it is thought means nothing. The bill is on the calendar and may be called up any time by Senator Catlin for a vote. There seems to be a strong feeling that the code will eventually secure the constitutional 26 votes, for many who voted for the Thompson motion did so on the usual "senatorial courtesy" ground rather than with the scheme of delay.

The Catlin bill has smashed all records and precedence for quick action in the usually slow and deliberate Senate. The bill was only introduced recently, and this argument was used by the operators' agents in canvassing the Senate for the purpose of having the bill recommitted to the committee for a chance to give the vested interests time to consider the measure, which is radical. They failed to induce the Senate to move to recommit and had to be satisfied with the postponed calendar.

Fourteen sections of the anthracite law are modified by Senator Catlin's bill. One of the sections of the present law is amended giving the operators of mines the right of free selection of foremen. This breaks up the practice of coal companies going behind the mine foremen when an accident occurs. By this amendment coal companies will hire employees and not mine foremen, or at least the companies will be held responsible for their foremen. The Supreme Court has held on repeated occasions that the operator is not to blame for the neglect of duty of a mine foreman. Unless the bill goes through, the miners claim, no workmen's compensation act will affect the anthracite miners.

It is stated, that the United States Bureau of Mines is behind one of the amendments.

It has been agreed that a hearing on the Catlin bill be given the operators and miners on Tuesday, Mar. 2. at 2:30.

Would Compel All-Steel Cages

Representative Dawson is the author of a bill introduced in the House to eliminate wooden cages in mine shafts where men are raised and lowered. It would substitute for the wooden cages all-steel cages, with wooden plank floors and would make it a misdemeanor for mine foremen, etc., to use any other construction, in the anthracite region.

The Dawson bill is the result of the agitation for greater safety that started at the time 13 men were killed when the bottom of the mine carriage at the Diamond Shaft in Scranton suddenly and mysteriously dropped away.

Mr. Dawson is a mine operator himself, and is manager of the Clearview Coal Co. in North Scranton, and has the distinction of being the first and only superintendent to anticipate the law in this respect.

A bill to regulate the use of lamps in bituminous mines was introduced on Feb. 15, by Representative Myers. The bill makes it unlawful to use any lamp in a bituminous mine, other than a portable electric mine cap lamp of the style or type approved by the Federal Bureau of Mines. An ordinary gas testing lamp known as a safety lamp may be used as directed by the chief of the Department of Mines of Pennsylvania, only for the purpose of examining working places and for testing the gaseous conditions of air currents in the mine.

The portable electric mine cap lamp may be used only when they comply with the standard of requirements as stated in the bill.

The bill provides for a fine of $25 for failure to comply on first offense, $100 for second and a jail sentence of one year or both on third offense.

Certified Miners in the Bituminous Field

Senator Burke has introduced a bill to provide for the examination and prohibit the employment of incompetent persons as miners and providing penalties for the violation of same in bituminous mines.

The Burke bill provides that no person shall be employed as a miner in any bituminous mine in the state until he shall have first obtained a miners certificate of competency and qualification, from a "miners examining board" of some county of the state. Provided that any miner actually employed when the act becomes effective who has been employed as a miner at least two years in the mines shall be entitled to a certificate permitting him to work as a practical miner. The bill also provides that any certified miner may have one uncertified person working with him and under his direction for the purpose of learning the business of mining and for the purpose of obtaining a certificate in conformity with the provisions of the act. It also states that in cases where a miner holds a certificate and has two or more sons who do not hold certificates they shall have the right to work with him if he so desires.

Senator Croft has introduced a bill relating to the manufacture, keeping, storage and transportation of explosives and providing for any violation of the act.

Representative Powell, has introduced a bill in the House providing for an increase in pay for the several boards for the examining of candidates for Mine Inspector.

Representative Evans has introduced a bill regulating the sale of liquors, etc., making it unlawful for any saloon to be open between the hours of 11 p.m. and 8 a.m., the primary object of which is to compel saloon keepers to close while miners are on their way to work, and stop all night carousing, which is in line with the movement started by many of the anthracite operators.

Representative Kitts has introduced a bill to compel employers to publicly advertise in newspapers or by posters or otherwise if they have a strike or lockout on their hands when soliciting employees.

Representative C. J. Roney, chairman of the Ways and Means Committee, and sponsor of the anthracite coal tax, is discussing a proposition to place coal companies under the control of the Public Service Commission on the ground that they are purveyors of a utility. Just what will be done about it is not known but it is thought that a bill will be prepared and shown to the Governor.

Amendment of the act imposing a tax of 2½ per cent. ad valorem on anthracite is likely to be made by the present Legislature, and not repealed as asked for by the Ramsey bill. It is thought by amending the act, it will restore the measure to the form in which it was drawn by Attorney General Brown, who was counsel for the commission to consider and report upon a revision of the corporation and revenue laws.

The bill as drawn by Attorney General Brown was amended on its passage through the house. No amendment has as yet been suggested which will relieve the consumer of coal from the tax burdens.

That the Corporation and Revenue Commission in framing the bill realized that the burden of taxation would fall ultimately on the consumer is revealed by this clause in its report: "We (Pennsylvania) have a monopoly on anthracite coal, and it must be taken from us by those who consume it. Bituminous coal is produced in many other states, and a tax upon it would not be passed on to the consumer. The price would be regulated still by competition with other states where no such tax is laid, and would be in effect, merely an increase of the tax on land."

Mr. Ramsey declares that his sole reason for seeking to annul the tonnage tax is that the coal companies have made an asset of the tax, and are extracting from the people of the state 25 cents for every 6 cents of tax imposed.

Mr. Roney states that the study of coal prices is coordinate with the proposition which Mr. Ramsey has put before the Ways and Means Committee, and that he will look into the charters of several of the coal companies before taking any definite steps.

PENNSLYVANIA

Anthracite

Wilkes-Barre—An explosion of gas in the Prospect Colliery of the Lehigh Valley Coal Co. occurred on Feb. 17, resulting in the death of 12 persons. At last report two others were in a serious condition at the City Hospital, while one was unaccounted for.

Shamokin—Frederick Dornsife and other prospectors on Feb. 18 discovered a 12-ft. bed of anthracite near Dornsife. For several months prospecting for coal has been conducted in this region, which is primarily an agricultural center.

Scranton—Although the state and most of the large coal operators in the anthracite mining region are devoting much time and money to the education of mine workers, the Y. M. C. A. of Scranton has not stopped offering facilities to the ambitious who wish to study to advance themselves. The mine foremen's class in this institution is 12 years old and there are now 11 men in the class and 25 in the preparatory class leading up to the course.

Lansford—Two steam shovels are now in operation in the swamp between Lansford and Coaldale in removing the huge culm banks.

Bituminous

Republic—On Feb. 19, the Tower-Hill Connellsville Coke Co. landed another large contract for coke and ordered that 200 additional ovens be fired at once. There are already 130 ovens in operation and those ordered fired will increase the force of workmen more than 200 men. No. 2 plant which has more than 300 ovens will probably be fired shortly.

Butler—On account of increased orders and general stimulation in the coal trade, a number of additional trains have been placed in commission on the Bessemer & Lake Erie R.R., with prospects that additional trains will be ordered before long. Greater activity in the mills in the Pittsburgh district is making necessary an earlier than usual start in ore traffic and a number of train crews which have been idle for months have been ordered to report for duty. It is thought that by the first of March hauling of coal and ore on the Bessemer will require the services of a large number of additional crews. On Feb. 18, officials of the road stated that they are preparing for one of the biggest coal and ore carrying seasons in the history of the road.

West Brownsville—An unsuccessful attempt was recently made to fire the coal tipple of the Lilley Coal & Coke Co. a short distance from West Brownsville Junction. This is the second attempt made within four months to burn the tipple, and officials of the company are seeking the incendiary.

Star Junction—The Washington Coal & Coke Co. recently issued orders for the firing of 100 ovens at the Star Junction plant. When these are in operation, 700 ovens out of a total of 1000 will be working; 50 additional ovens are to be fired at an early date.

Connellsville—Orders were issued by the H. C. Frick Coke Co. for firing 418 additional coke ovens on Feb. 22. These ovens are at plants in Fayette and Westmoreland Counties, and make a total of 3773 since the increased production began somewhat over two weeks ago. W. J. Rainey has also placed 50 ovens in operation at the Royal Works. This makes 350 active ovens out of 375. Conditions at all plants of this company are now approaching normal.

Altoona—Ten miners were killed and 51 injured in the 10th Pennsylvania District during 1914, according to the report of Mine Inspector Joseph Williams. In the district there were 51 mines, and 4,386,738 tons of coal were produced by 7000 men and boys.

WEST VIRGINIA

Charleston—Romeo Campi and John H. Riley, firebosses at the Carlisle Mine of the New River Coal Co. were fined $50 each recently when tried before Justice Samuel Jasper on the charge of negligence in connection with the recent explosion which cost 21 lives. The firebosses' certificates and also that of foreman Pilkington who was in charge of the mine at the time, were revoked by the State Department of Mines.

Newburg—The mines of the Virginia & Maryland Coal Co. have been closed as the result of a disagreement over wages between the miners and the officials of the company. About 75 per cent. of the miners are idle as the result of this strike.

Grafton—Over 900 miners employed by the Jamison Coal Co. went on strike Feb. 18 in the Farmington-Barracksville region following a disagreement over a new wage scale.

Huntington—Representatives of the State Fish and Game Commission are prosecuting a case against four officers of the United States Coal & Oil Co. on the charge of pumping mine water into the Guyan River and thus destroying the fish. The maximum fine for a violation of this kind is $100.

Montgomery—All the Minden Mines are now in operation, the last one having resumed recently. Full time is now promised for an indefinite period.

KENTUCKY

Lothair—The Kentucky Jewel Coal Co. has increased its shipments from 800 to 1200 tons daily, and has employed a goodly number of extra men. It plans other increases by May 1.

Hazard—The Himyar Coal Co. here announces an increase in the coal tonnage from 600 to 1000 tons daily beginning Mar. 1, and the opening of an additional mine.

Madisonville—Coal business is reported as picking up and the mines at Coiltown, this county, have resumed operations with 100 miners, after a shut-down of three months. Reports from the surrounding section are to the effect that similar resumptions are in order.

Central City—Several hundred miners in the employ of the Central Coal & Iron Co. were thrown out of work when the mines of the company were closed down on Feb. 20 for an indefinite period. S. J. Gish, president of the company and of the McHenry Coal Co., said that his companies were seeking an agreement with the United Mine Workers of America whereby any differences that may arise hereafter may be submitted to arbitration.

Henderson—Local business men are very much interested in reports that the deal by which the Deep Water Coal Co. would acquire title to the greater part of the mineral land in this section of Kentucky is to be concluded in the next few weeks. It is understood that the abstracts and titles involved have been completed and proven and that H. F. Allen, president of the Deep Water Co., is now in the East where he is finishing up arrangements to finance the project. The deal would involve millions of dollars and be of much benefit to Henderson and Webster counties where most of the land lies.

Pikeville—Coal operators, the Chesapeake & Ohio R.R. and others are behind a movement looking toward the establishment of a modern hospital here. The new institution will be incorporated and will have $5000 capital. L. L. Stone, president of the Pikeville Light & Power Co., makes the announcement.

Straight Creek—The Continental Coal Corporation is to develop two new mines on Straight Creek and will remove its tipple and power plant to the new location, constructing 3000 ft. of railroad spur at a cost of $12,000 to tap the advanced work at the old mine. The company's daily output is 1000 tons and its holdings 1000 acres. F. B. Martin is president and W. L. Moss, vice-president and manager.

Whitesburg—Representative land owners, miners and lumbermen in eastern Kentucky are to assemble in Ashland, Ky., early in March to take steps looking toward conservation of the timber of this section, especially in Letcher, Knott, Perry and Pike counties, which are frequently ravaged by forest fires.

OHIO

Athens—Three of the mines of the Sunday Creek Co., located at Rendville and Jobs, have resumed operation after a long idleness. This tends to relieve the distress among the miners of that section. Word has been received in Columbus that no more donations are needed there.

Steubenville—Suit has been brought against the Blyth Coal Co., by John Blyth asking judgment for $42,000 and that a receiver be appointed for the mining property at Brilliant. This judgment was asked on a mortgage, Blyth alleging that the defendant had neglected to take any steps to preserve the property, which is being damaged by sulphur water.

St. Clairsville—The Purseglove-Maher Coal Co. has begun the shipment of machinery from the Belmont County mines to the corporation's new works in Logan County, W. Va. It is said that the firm will abandon its mines in this section because of strike troubles.

INDIANA

Petersburg—A St. Louis syndicate has leased 640 acres of coal land in the Sugar Ridge neighborhood, south of here, and, it is announced, will begin surface mining in the spring. Tests are said to have shown beds of superior coal 8 to 10 ft. thick at a depth of 28 ft. The landowners are to receive $75 an acre, the operators permitting them to remove improvements.

Sullivan—The Union mine has suspended operations, due to the depressed condition of the industry. The Rainbow mine at Caledonia closed some time ago for similar reasons.

Indianapolis—The progress of the attempted coal legislation of the Indiana Assembly now in session is as follows: The shotfirers bill, aiming to make the operators pay the cost, passed the house and is resting in the senate, with the chances agINst it. The bill for state ownership of certain mines in order to supply with coal state institutions is resting in committee, from which it may be slow of exit. The bill for codification of the mining laws of the state passed the senate and is in the house. It has its friends there. The bill to prevent strip mining has not yet been reported out of the committee to which it was referred. It may not be during the busy remaining two weeks of the session.

Brazil—The Kokomo mine, near here, which was allowed to fill with water, is being pumped out, so that it may be inspected for prospective purchasers. Owners of the mine have 1300 acres of good coal land adjoining. Plymouth No. 1 mine belonging to the Coal Bluff Mining Co. has closed down indefinitely and the electrical machinery has been removed. This puts out of employment about 300 men, most of them residents of Brazil, the center of the block coal district. The Crawford Coal Co. which recently added two new mines to its properties has scarcely had opportunity to operate them. It stands ready to put on 200 miners when the trade demands it. The Otter Creek Coal Co. has been one of the fortunates, having operated almost all season at nearly full time.

ILLINOIS

Odin—The Local Union of the Mine Workers has started a coöperative movement and equipped a grocery and supply store. It is stated that these men have succeeded in bringing about a substantial reduction in the cost of living.

Bryant—The opening of another coal mine between Bryant and Lewistown is in prospect, on land leased by John Long. Prospect drillings will begin at once.

Millstadt—The stripping operations at the High Prairie Coal Mining property near here are going on rapidly and it is figured that by July 1 this stripping proposition will have a daily output of 1500 tons.

Belleville—Operators in the Fifth and Ninth Districts of Illinois are trying to devise means whereby they can eliminate the destructive competition that has existed in the past in these fields and yet come within the law in the marketing of their coals. It is proposed to sell the output of all the mines on different roads to one producer or jobber in St. Louis on a contract basis. This would mean about 10 distributing companies but this arrangement will probably never be consummated. In the opinion of outsiders, who are impartial to the local situation, the only solution of the problem will be the bringing under one head of all the mining operations in the two districts with the allowance of a switching charge to the railroads entering East St. Louis which control their own mining properties. Destructive competition will always exist until the industrial railroad proposition is taken care of. This one feature alone prevented the formation of a syndicate, during the past summer, to take over all the mines in the Fifth and Ninth Districts.

Sparta—Serious trouble confronts the miners' organization at this point on account of miners from several of the idle mines insisting that the miners divide with them the working time at the mine of the Illinois Fuel Co. here. This mine runs three and four days a week and the regular miners insist upon working their full time. The tonnage of some of these local mines was removed to Percy and Willisville by the operating company, with the result that nearly one half of the mining population of Sparta is nearing a crisis.

Winkle—On orders supposed to have been issued by the State Board of the United Mine Workers, the mine here has been closed down for an indefinite period of time. This is one of the largest coöperative pits in the southern Illinois field and investigation developed the fact that the miners were receiving 38c. a ton and often less for mining coal off the solid where the regular scale is about 60c. to 62c. Competition against this wage was impossible by operators paying the full scale to their miners and men, it is understood, who worked in operator's mines, that could not compete against the coöperative pit, declared their intention of seceding from the union unless the coöperative mines were closed. There is much ill feeling on both sides in union circles.

MISSOURI

Rich Hill—Five miners were killed by a mine explosion at the workings at the Atlas Coal Mining Co. near here Feb. 18. These men had just entered the drift to begin work when the explosion occurred. No one else was in the mine at the time.

COLORADO

Denver—Payment of strike benefits to union miners in Colorado will shortly cease according to an announcement by John McLellan, president of District 16, United Mine Workers of America. The organization will continue to supply the necessities of life to the most needy ex-strikers, but payment will not be in the form of regular strike benefits. Strike benefits which have been paid since April 1910 have reached a total of approximately $4,000,000.

WASHINGTON

White Salmon—White Salmon and Bingham are excited over the discovery of a coal bed. C. A. Rogers while drilling a well on the property of John Tamms at Bingham struck this coal measure. Options are being taken on the property in the vicinity.

PERSONALS

F. S. Peabody was recently elected chairman of the board of the Pennsylvania Coal & Supply Co. B. E. Schrage was elected treasurer.

Neil Robinson has been appointed receiver for the La-Follette Iron Co., of La Follette, Tenn. Mr. Robinson is also receiver for the La Follette Coal, Iron & Railway Co. of the same place.

James Mitchell, of London, head of Sperling & Co., promoters of the Alabama Power Co. and a party of financiers are expected to make a tour of inspection of the company property shortly.

Louis H. Smith, who has been connected with the Spring Valley Coal Co. for a number of years, was recently made General Manager of the firm to fill a vacancy made by the death of S. M. Dalzell.

George H. Meuller, assistant sales manager of the Jeffrey Manufacturing Co., has been made manager of the New York office of the company. He became affiliated with the Chicago office of the company in 1906.

Charles Cohenour, receiver for the Maple-Gallia Coal Co., is negotiating privately for the sale of the properties of the company, consisting of two mines at Nelsonville and Clarion, Ohio. The attempt to sell the properties at auction at the court house in Columbus failed because of lack of bids. Receiver Cohenour will likely ask the court to fix a minimum price at which they can be sold at private sale.

OBITUARY

Richard Fell, aged 69, retired mine operator in Shelby and Winston counties, Alabama, died recently. He came to Birmingham from Charleston, S. C., and operated mines in this state up to a few years ago, retiring on account of health.

Peter Dawson, a well known colliery operator with a mine at Stewartsville, west of Bellaire, Ohio, recently succumbed to heart failure in the city of Wheeling, being found dead on the street by a motorman. He is survived by a wife, two sons and one daughter.

Michael J. Finnegan, for 25 years secretary of the Central Coal & Iron Co., with offices at Louisville and mines at Central City, Ky., died at his home in Louisville, on Feb. 18, after a week's illuess of pneumonia. His wife, five sons and two daughters survive him.

William S. Thiesing, of Covington, Ky., 25 years old, a traveling expert electrician for the Goodman Manufacturing Co., Chicago, was recently killed in the mine of the Woolley Coal Co., at Paxton, Ind. He had just ended a trip of inspection of the motors in the mine, recently installed by his company and was crossing the tracks in one of the entries on his way to the cage, when he was struck by a string of cars making a running switch.

CONSTRUCTION NEWS

Athens, Ohio—The laying of track by the Hocking-Sunday Creek Traction Co. from Nelsonville to Athens has progressed to a point where the city of Athens has been reached. The line will tap a rich coal field.

Whitesburg, Ky.—The South East Coal Co. as a public improvement will build several miles of roads around the new plant near Kono, Ky., in the Boone's Fork coal fields. The grade work is to start at once.

Marion, Ill.—The Illinois Central has built an extension from its Johnson City branch to the mines of the Big Muddy Fuel Co. near here, enabling that property to get it's coal into the West and Southwest.

Huntington, W. Va.—Workmen in the employ of the Lorain Coal & Dock Co. are now pushing work on the company's recently acquired field at Craneco, on Buffalo Creek. It is hoped that the work of mining will start by spring.

Herrin, Ill.—An extension of 3½ miles is now under way by the Illinois Central leading to Mine B of the Chicago-Carterville Coal Co., on the Franklin County line. At the present time the only connection with this mine is that of the Burlington.

Washington, D. C.—The appropriation of $350,000 for the Bureau of Mines Building at Pittsburgh was assured when the Senate on Feb. 20 passed the Sundry Civil Appropriation Bill. As soon as the President has signed this bill and the supervising architect of the treasury approves the plan, the work of construction will be expedited.

Paducah, Ky.—It is announced that on Mar. 1 the West Kentucky Coal Co. will begin construction of 27 coal barges for its own use at its Mechanicsburg plant. A contract let to the Langstaff-Orm Co. calls for 1,300,000 ft. of Oregon fir to be used in the barges which will be of the standard type used by the Pittsburgh Coal Co., 135 ft. in length, 26 ft. wide and 8 ft. in depth.

Edwardsville, Ill.—According to present expectations, work on the washer to be erected by the Mount Olive & Staunton Coal Co. will be begun in a few days. When completed this washer will handle coal from the Edwardsville, Staunton, and Mount Olive mines of the company. All are located on the main line or spurs of the Litchfield & Madison road, which passes close by the washer.

Pittsburgh, Penn.—The Pittsburgh, Chartiers & Youghiogheny Coal Co., which is controlled by B. S. Hammil, general manager of the Meadow Lands Coal Co. at Pittsburgh, has contracted with the Fairmont Mining Machinery Co. for a cable retarding conveyor about 600 ft. long and tipple equipment to be installed at Thornburg, Penn., on the Pittsburgh, Chartiers & Youghiogheny R.R., Thornburg being a suburb of Pittsburgh.

Steubenville, Ohio—According to an unconfirmed rumor, the Carnegie Steel Co. is contemplating the construction of a number of coke ovens at its Mingo mill. It is also rumored that the company has for a long time been seeking to cut down the heavy cost of transportation on its coke supply, and has at last conceived a plan which if carried out will reduce this expense. It is believed that the coke ovens will be erected on the company's property on the river front, south of the present works.

NEW INCORPORATIONS

Lexington, Ky.—Under amended articles of incorporation, the Kentucky Union Co. reduces its capital stock from $500,000 to $450,000. This company owns a number of coal and timber properties in the eastern portion of the state.

Dover, Del.—The Hillville Coal Mining Co. of Irwin, Penn., was recently chartered to acquire and develop coal mines. The capital stock is $50,000 and the incorporators are J. T. Davis, of Irwin, Penn., W. W. Kiehl, of Knoxville, Penn., A. W. Williams, of Fredell, Penn.

Charleston, W. Va.—The Catherine Coal Co. of Gilmer, was recently granted a charter. This firm has a capital stock of $20,000 and the incorporators are W. J. Colbern, of Burnsville, T. M. Bennett, of Glenville, J. B. Bolden, R. G. Walsh, and B. B. Truslow, of Charleston.

Terre Haute, Ind.—The Indiana Coal, Coke and Gas Co. was recently organized with a capital stock of $10,000. The purpose of the company is to operate coal mines, oil and gas wells, clay and other mineral deposits. The directors are Paul M. Bogart, Samuel D. Royse, M. E. Bradley, Leon Stern, W. J. Gillespie, John Duncan, and Ora D. Davis.

Marpleton, W. Va.—The Marpleton Coal Co. was recently chartered. It will have its chief works in Webster and Braxton Counties of W. Va., and is capitalized at $200,000. The incorporators are Theodore Switzer, of Plymouth, Penn., Joseph Bittenbender, Fred Bittenbender, Theodor Bittenbender, also of Plymouth, Penn., and L. O. Knipp, of Philadelphia.

INDUSTRIAL NEWS

Birmingham, Ala.—Fire did considerable damage recently to the infirmary of the Tennessee Coal, Iron & Railroad Co. at Ensley. The roof and second floor were burned, but the patients were removed to the first floor and were not hurt.

Kenton, Ohio—In an effort to break up a gang of coal thieves, Big Four R.R. police recently placed nine men and boys under arrest. The police claimed that thefts of many tons of coal at a time had been made, the fuel being sold.

South Bethlehem, Penn.—The second battery of 106 coke ovens, which are part of the 424 ovens being built at the Lehigh coke plant, were charged for the first time Feb. 19. The first battery of 106 ovens was put in operation about a week before.

Pittsburgh, Penn.—The Pittsburgh Coal Co. has authorized the sale of 11,530 acres of coal land to the Monongahela Consolidated Coal & Coke Co. for approximately $9,343,300. It is expected that the transfer and payment will be completed before July 1 next.

Baltimore, Md.—As the result of a wage dispute approximately 1000 miners went out on strike last week in Marion and Preston counties of West Virginia. Strikes are not of particular interest to the trade just now, because it is more of a question of disposal of product than one of getting coal to meet obligations.

Wellsville, N. Y.—The Kerr Turbine Co. announces the appointment of John S. Huey, 418 Hibernia Bank Bldg., New Orleans, La., as its district sales agent for the states of Louisiana and southern Mississippi. Mr. Huey was formerly connected with the Allis-Chalmers Co. and more recently with Woodward Wright & Co.

St. Louis, Mo.—At the engineering department of Washington University, the Smoke Abatement Committee of the Civic League is running tests on all kinds of fuel to determine which is best adapted to make St. Louis a smokeless city. All grades of bituminous, anthracite and smokeless coals as well as coke and briquettes are included in the list of tests.

Jeffersonville, Ind.—The Monongahela River Consolidated Coal and Coke Co. has reestablished its landing on this side of the Ohio River and is storing coal in barges a little above the city. The equipment had been moved to the Louisville side to let the high water scour out the harbor on this side, where the dead water due to the dam below the city tends to cause the harbor to silt up.

St. Louis, Mo.—According to the statistics compiled by the Merchants Exchange during the year 1914, there was received in St. Louis 8,051,088 tons of coal in 1914 against 8,925,579 tons in 1913 and 9,220,555 in 1912. The anthracite tonnage in 1914 was 174,694 tons. The anthracite for 1913 was 274,423 tons, showing a loss for 1914 of approximately 100,000 tons. Of the coal carrying roads, the Illinois Central led with a tonnage of 1,513,210 tons.

Toronto, Canada—The Canadian Freight Association, acting for the railways, has made application to the Canadian Board of Railway Commissioners for permission to make a general advance in freight rates—the proposed increase of coal freight charges is 10c. per ton. A similar application in November was refused. Coal companies are preparing to offer a strong opposition to the proposal, which it is understood will come before the Commission on Mar. 1.

Spokane, Wash.—Thousands of dollars are being poured from the Inland Empire into the Crows Nest district of British Columbia for coal which can be brought across the line for about 35c. a ton less than it can be hauled from Roslyn, on account of an alleged discrimination in rates, according to John Ryezek, manager of the Roslyn-Cascade Coal Co. The ultimate result it is alleged is that American miners are not getting as much money as they would if the rates were adjusted. The railroads are getting less for the haul from Canada, and the money goes to the Canadian miners.

Pittsburgh, Penn.—Coke requirements under contracts already closed are increasing somewhat. The Youngstown Sheet & Tube Co. will shortly blow in a third of its four stacks, taking a correspondingly larger tonnage on its two contracts made in December. The Allen Wood, Iron & Steel Co., of Philadelphia, is blowing in one of its two furnaces, to take coke on a contract made in November. The Buffalo Union Furnace Co. is blowing in an additional furnace, the coke being already contracted for. Nearly all the steel works are increasing their operations and shipping more coke from their own ovens.

Coal Trade Reviews

General Review

Anthracite steam sizes moderately active but domestic grades completely demoralized. Bituminous markets still crowded with coal. Interest centering on new contracts. Current business continues under heavy pressure.

Hopes of any improvement in the anthracite market during the balance of the season have been definitely abandoned by even the most optimistic, and the agencies are concentrating their efforts on cleaning up the surpluses now on hand, before the April discount goes into effect. As a result of the exceedingly light call for the prepared grades, and consequent restricted operations at the collieries, the output of steam sizes is falling somewhat behind consumption, and there is a moderate activity in this branch. On the domestic grades the situation has seldom been worse. Reductions down to the full April circular are obtainable without any difficulty, while large accumulations are reported, and dealers are buying only when accumulated requisitions amount a full car.

The opening of negotiations on new contracts is creating some activity in bituminous circles, though the current business continues as dull and flat as ever. The movement out of the Virginia terminals has been somewhat larger than usual, but there is evidence of a large accumulation, and the outlook for anything like a generally active market is negative. Shippers and agencies are canvassing aggressively for business, and purchasers are exceedingly slow in responding; prices are reasonably well maintained on the better grades, but the poor qualities are subject to heavy cuts, and especially so when it becomes necessary to free cars on demurrage.

In the Pittsburgh district the situation on new contracts is still indeterminate, though the general opinion indicates a concession on last year's figures. Some of the more optimistic agencies appear to be withdrawing from the contract market for the time being in anticipation of better conditions later in the season. On current business the market is almost at a standstill, with mining operations at about half capacity. The heavy drain of the European war upon Canada, involving expenditures already aggregating one hundred million dollars, together with the casualty lists which are now beginning to come in, have created a distinctly adverse sentiment in that direction, which is plainly observable in the fuel consumption.

Steam business in Ohio is down to an irreducible minimum, and though it is generally agreed that there must be more cold weather before the winter is over, the domestic trade continues exceedingly weak, dealers being loath to place additional orders and cancellations becoming more and more frequent. What little interest there is in the market is confined entirely to negotiations on requirements for the new coal year. Current production is at a low point, but in spite of this there is considerable demurrage coal reported in different directions.

Operations in the Middle Western field have been restricted down to about half capacity, with many mines shut down completely; in spite of this curtailment new record low prices are noted and the situation is becoming most distressing. The mild weather has completely paralyzed the domestic trade, while the West Virginia product is bringing unbelievably low prices in this market. The situation shows no improvement in any direction.

ATLANTIC SEABOARD

BOSTON

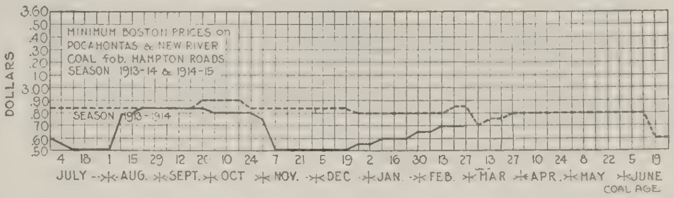
Only a few contracts under consideration. No developments in market for either Georges Creek or the Pennsylvania grades. Anthracite now waiting for spring orders.

Bituminous—There is almost no news to report on Pocahontas and New River. Receipts here are still restricted by the lack of orders, although in scattered instances there is still an impetus to contract demand due to old prices expiring Apr. 1. This latter is not general, however, although later there may be a wider development of it. Spot inquiry is very light, and accumulations continue large at the Virginia terminals. The prospect for anything like an active market for a long time to come is rather poor.

The bids to furnish 12,000 tons to the Boston Navy Yard by May 1 were opened early in the week and disclosed a new low price on a standard Pocahontas coal. The proposals ranged from $3.49@3.88 delivered alongside, the lowest bid apparently being figured at $2.85 f.o.b. Norfolk, plus a 64c. water freight, not including insurance. If prices like this continue to be named the outlook is not hopeful for remunerative figures later.

For inland delivery there is only a mild demand; $3.85@3.90, on cars, Boston, is still the basis for contract, with spot sales averaging 5@10c. higher.

All the Southern shippers are actively canvassing for business but buyers are slow responding; there is a general feeling that prices will settle down by May or June and there are only a few contracts now under consideration. The amount of transportation offering lately has helped to encourage buyers in their attitude.



Georges Creek shippers are still confining themselves to present obligations. With them there is also a dearth of spot business and there is an ample supply of coal at all the distributing and loading points. Delivered prices for the year beginning Apr. 1 have not so far been named, for these interests like others are waiting to see how the coastwise freight situation develops.

There is some current business on the Pennsylvania grades in anthracite transportation but mostly in cases where buyers are postponing a decision on yearly contracts; the demand therefore is only of the hand-to-mouth kind. Prices are being reasonably well maintained on the better Somerset and Cambria grades, but there are reports of heavy discounts in order to free cars on demurrage at the loading piers. The cheaper grades are having only a very light business.

Water Freights remain at $1, Hampton Roads to Boston, although there is an ample supply of tonnage for what trade there is. There have been rumors of rates less than $1, but so far they have not been verified. Occasional charters are still being made to South American ports, and at uniformly high rates; $960 was recently paid on a prompt steamer from Hampton Roads to Buenos Aires.

Anthracite is still extremely dull. The mines are all under heavy restrictions and in some cases orders for special lots have to wait until coal is mined. The mild weather is enabling retailers to continue on present stocks without replenishing.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*	2.15@2.75	2.40@2.90	2.92@3.02	
New York*	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.70@2.75
Boston†	....	....	....	3.85@3.95
Providence†	....	....	....	3.68@3.83

* F.o.b †On cars.

NEW YORK

Bituminous continues dull and heavy with agencies concentrating their efforts on new contracts. Anthracite dealers pushing hard to clean up their stocks before the April discount becomes effective.

Bituminous—There is little change in the local situation. The weather conditions, which have so seriously affected the anthracite trade, have also had their effect on the bituminous market; in consequence of the warm weather, manufacturers have not been called upon to heat their plants.

Railroads are not hauling as much freight, and the consumption is also lessened in that direction.

While there is no new business of importance to report, there have been a number of inquiries from consumers down East, due to the high water freights on Southern fuels, but up to this time little coal has moved in that direction. Most of the larger companies are making strenuous efforts to renew contracts on last year's basis, and in a number of cases have been successful. There is a disposition on the part of some consumers, however, to withhold signatures until later in the season when they expect to be able to drive better bargains.

The demand for bunker coal continues fair, and would probably be larger if more vessels were available for the export trade offering. Stocks at Tidewater are large and practically no sales of spot coal are being made; prices, however, continue on the same basis as previously quoted, excepting in cases where it has been necessary to sacrifice coal in order to save demurrage, and we continue the market as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The trade continues abnormally dull. Warm weather has not been conducive to buying nor has it increased the consumption. Dealers throughout the country are now worrying for fear they may have to carry over stocks purchased on the high circular. The only shortages of coal are on the sizes used for manufacturing gas and steam.

Broken coal is the most active and slightly short. Egg is easier than it was a week or two ago with prices at the circular and a little below. Stove and chestnut sizes are in plentiful supply and ranging all the way from the April to the winter circular, the companies holding firm to the winter schedule. In pea coal, there is no large demand nor are prices reduced so far as can be learned. All sizes of steam coals are short of requirements but not to an extent that warrants any high price. Without colder weather there will likely be little or no change in the market situation until April.

Quotations are as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	4.85@5.35	5 30	4.80@5.30
Chestnut	5.60	5.10@5.60	5.55	5.05@5.55
Pea	3.55	3.40@3.55	3.50	3.30@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.90@2.25
Barley	1.80	1.70@1.80	1.75	1.30@1.75

BUFFALO

Slackness in Canadian markets has an adverse effect. Prices on new contracts indeterminate. Mine operations curtailed. Anthracite dull.

Bituminous—As the contract season approaches, the shippers are at a loss what to ask; they cannot see how they can do business at lower prices and yet the consumer often refuses to close unless they can secure a reduction of 10 to 15c. a ton. A larger number of shippers than usual will stay out of the contract trade for the present, though they have small hopes of getting their prices later on.

The extreme slackness of the Canadian trade still tells on Buffalo shippers. It is plain that Canada is not going to have any surplus money for coal and the manufacturers do not show any increased activity. Canada has already spent $100,000,000 on the war, which is intensified by reports beginning to come in of casualties in the field. There is some report of new cutting of prices, but that is to be expected where it takes a good salesman to maintain a fair tonnage. Reports from the mining districts are not favorable to improvement. The mines run about half time and where most of the coal has to be sold in the open market it is no easy matter to do even that.

Bituminous prices are still at the bottom, being quoted at $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack doing better than sizes. Allegheny Valley prices are 25c. below Pittsburgh.

Anthracite—The trade is called dull, but there is generally a good volume of business. Some of the smaller towns are cutting prices and making matters much worse than they otherwise would be, but there is no report of this in Buffalo. Western movements are not fast and it looks as if there would be more left on the Upper-Lake docks than was at first expected. A good amount of extra sizes are going into Lake vessels for shipments in the spring at the shipper's option; so far 18 cargoes have been loaded.

The winter loading has proved expensive to the insurance, as some of the bottoms were punctured in low water and two have been unloaded. It is expected that this loading will be kept up till the Lakes open. The vessel owners are likely to hold the cargoes here as long as the shippers will permit because Lake commerce is so dull.

PHILADELPHIA

No improvement in anthracite and open weather reduces demand. Dealers placing few orders and bituminous still lacks tone.

Anthracite—The season is so far advanced that dealers, in most cases, feel that if they dispose of the coal now on hand, they will have accomplished all that can be expected. Orders for new supplies have practically ceased. Dealers hesitate to take on a full car load of coal, fearing they will not be able to dispose of it, and it is only when the accumulated requisitions approximate a full car that they place an order.

The individual operators, and it is rumored some of the large companies, are shading prices to a considerable extent. Pea coal is quoted as low as $2 and egg and nut at the April circular or thereabouts. It is understood that there are large accumulations of stove size at Tidewater, but this will only be temporary; there is no size in more active demand in the early spring months than stove, and this year is likely to be no exception.

Dealers are already talking April prices, and salesmen find hard work in getting an order at the current circular. Buckwheat and rice situation is the only bright spot in the market, offerings being well taken care of, and circular prices maintained.

Tidewater prices rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.80@4.90
Stove	5.00	4.90@5.00
Chestnut	5.25	4.90@5.00

Bituminous—In some quarters better call for certain brands is noted, but as a whole, the market remains without feature. Contracting still continues, with the same indifferent attitude on the part of the purchasing agents. Prices are on a parity with last week, and the inducement of a slight cut appears to offer little incentive to buying.

BALTIMORE

Operators busy on new contracts. On lower grade coals there is a possibility of reduced prices. Anthracite sales drop off.

The trade is devoting its attention almost exclusively to arranging new contracts. In some cases there is a disposition to renew at practically the same figures as obtained last year, but in others there is a strong inclination to hold out for lower prices. It seems entirely likely, from the present outlook, that contracts for some of the lower grade fuels will be made at slightly less rates than obtained last spring.

Warm weather is causing the anthracite trade to fall off. Except for isolated calls the trade has settled down to that period of waiting that always preceeds the regular contracting season and the time when the householders put in orders to take advantage of the lowest prices of the twelve months.

Export business is moving along at a brisk pace, and the prospects for late February and early March loading are excellent. The following charters were announced here this week: Italian steamer "St. Fillans," Naples; British steamer "Bedeburn," Italy; British steamer "Allanton," Sardinia; British steamer "Iddlesleigh," Italy; American schooner "Mary E. Palmer," Rio Janeiro; Norwegian steamer "Port Antonio," Guantanamo; American schooner "Stanley M. Seaman," Cienfuegos; American schooner "Lizzie M. Parsons," Cienfuegos, and American schooner "Charles T. Schull," Porto Rico.

HAMPTON ROADS

Movement for the week shows up well. Government loads both collier and barge tonnage. Demand improving somewhat and there is a brighter outlook for the February tonnage.

The dumpings from Hampton Roads piers for the week have shown up well considering existing conditions. In addition to shipments coastwise and foreign the government loadings have helped considerably to swell the week's movement, the U. S. Collier "Cyclops" alone taking 11,800 tons. Export cargoes have gone to Cristobal, Georgetown, Rio de Janeiro, Port of Spain and Havana. Of the coal exported Cristobal has taken the greatest percentage, three large cargoes having been consigned there.

The demand has improved somewhat on both the high volatile and New River and Pocahontas and there have also been some spot sales of prepared coal. With the coal already dumped and the amount of vessel tonnage due, the outlook for the month of February is perhaps somewhat better than was anticipated at the beginning.

Hampton Roads shippers were awarded a government contract for the delivery of 12,000 tons Navy Standard coal to Boston and about 1000 tons to Port Royal. The complete list of bidders and awards on this deal will be found under Contract No. 125 on p. 400.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Mary E. Palmer		Norfolk	Rio Janeiro	1377	
Mount Hope		Philadelphia	Key West	989	
Edwin R. Hunt		Philadelphia	Porto Rico	1005	
Ruth E. Merrill		Baltimore	Boston	2309	
Port Antonio	Norwegian	Baltimore	Guantanamo	717	
Rob Roy		Baltimore	Mayport	684	
A. M. Carlisle		Philadelphia	Charleston	302	
Mantanza (bark)		Philadelphia	Cadiz	929	$6.75
Wm. E. Downes		Virginia	San Juan, P.R.,	639	2.40

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN FREIGHTS

Further advances and coal charters are even more difficult to negotiate.

The general freight market remains firm at the high levels reached last week, except to West Indian ports, which rates have advanced slightly, and it is very difficult to interest steamship owners in export coal due to the great demand for steamers for other trades.

We chartered several boats during the past week, and would suggest your communicating directly with us if you desire any steamers for export coal.

To	Rate	To	Rate
Havana	**$3.00**	Guantanamo	**$3.75**
Cardenas or Sagua	**3.75**	Demerara	5.50@6.00
Cienfuegos	**3.50**	Bermuda	3.75@4.25
Port of Spain, Trinidad	**3.50**	Vera Cruz	**3.50**
St. Lucia	**3.50**	Tampico	**3.50**
St. Thomas	**3.50**	Rio	**9.60**
Barbados	**3.50**	Montevideo, Buenos Aires or La Plata	**9.00**
Kingston	3.50@3.75	Mediterranean	**11.40**
Curacao	**3.25**	Valparaiso	**7.20**
Santiago	**3.75**		

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OHIO VALLEY

PITTSBURGH

Mild weather and decreased demand. Mining continued at about 55% capacity, and more free coal than ever, with somewhat deeper price cutting.

The weather has been remarkably mild and the retail coal trade is almost at a standstill. Variations in domestic coal demand on account of temperature are particularly wide in a natural gas district like this because in many dwellings the rooms are heated normally with gas, this being supplemented, in cold weather only, by a coal-fired furnace. There has been no further increase in demand from railroads or manufacturers, but the consumption remains heavier than in December.

Mining operations being at the rate of about 55% of capacity there is more free coal than ever and prices remain quite irregular, odd lots occasionally going at a dollar or less for mine-run. There is still no interest being taken in Lake coal and it is generally accepted that prospects for the Lake trade are poor. Operators who two months ago thought they would not be satisfied to make contracts at $1.15 for mine-run would now probably be glad to accept that figure. We quote asking prices for best grades, usually shaded for prompt, unchanged as follows: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

TORONTO, CAN.

New tariff on bituminous now in effect. Anthracite quiet and demand easier.

The market is quiet and featureless with a lessened demand for anthracite. Last week the new tariff went into effect, increasing the duty on bituminous 7½%, the rate on anthracite remaining unchanged. So far the increase has had little effect on prices. Quotations are as follows: Retail anthracite, egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.25@4.50; domestic lump $6; cannel, $7.50; wholesale f.o.b. cars three-quarter lump $3.78; screenings, $3.

COLUMBUS

The long continued warm weather has had a distinctly adverse effect upon the domestic trade. Slowness characterizes the entire business and there is little hope for revival before the stocking-up period.

The domestic trade in Ohio has been rather weak during the past week, due to the continued high temperatures. It is believed that there will still be some cold weather before spring, but dealers are loath to increase their stocks at this time and cancellations have been frequent. In some cases where orders were not canceled, they have been held up indefinitely and will only be effective in case of a long cold snap.

Retail prices are still rather firm as dealers are not inclined to cut when there is practically no demand. Pocahontas and West Virginia splints are still favorites among the domestic consumers although there is quite a sprinkling of orders for Hocking.

Steam business is practically dead; manufacturing is quiet and requisitions for steam consumption are decreasing rather than increasing. Railroad fuel business is fairly active as they are taking a larger tonnage. In other lines there is no disposition to accumulate stocks and many of the users are content to buy in the open market so that the work of renewing steam contracts is most difficult. The demand for the small sizes is still rather strong because of the small amount of lump being produced.

Some attention is now being given to the Lake trade although it is still too early to predict as to the volume which will be required in the Northwest. A small amount of coal has already been loaded on vessels.

Production in Ohio fields is at a very low point. The Hocking Valley is estimated as producing about 30% of normal and the same figures are reported in the Jackson and Cambridge districts. In the Massillon field the output is about 40% and the Pomeroy Bend about 50% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.60	0.65	0.55
Coarse slack	0.50	0.55	0.45

CLEVELAND

Spring weather keeps the market stationary. Consignment coal a drug on the market. Considerable anthracite being loaded on Lake vessels at Buffalo.

Retail trade is much below normal and dealers are neither ordering new coal nor moving stocks on hand. The weather is so warm that domestic fuel for the large consumers, such as apartment houses and blocks, is barely moving. The weather is also having its effect on the steam trade as factories use a large amount of additional fuel in cold weather to warm the shops.

The smaller sales have not resulted in a material change of prices, but have kept the brokers and operators active to avoid car service. Brokers have been asked to aid in cleaning up coal on track, but the larger agencies have had all the coal they could handle without taking on more. Consignment coal is a drug on the market; this is largely three-quarter, and the coarse coal market is much depressed. Last fall the gas well drillers were the principal consumers of surplus coarse coal, but of the 80 to 100 rigs that were at work at that time, more than 75% are now idle or working in territory where they can get gas. Slack sells at $1.65 to $1.70 with West Virginia three-quarter at $1.80 on track here.

Anthracite—Buffalo anthracite shippers are taking all the vessel tonnage available for coal. As fast as ships unload grain they are chartered, the coal shippers paying the expense of moving the vessels to the docks. The contracts also call for delivery of the coal not earlier than one month from the date navigation opens, Apr. 15, or as soon thereafter as ice moves out of the harbor. The coal shippers do not need the coal at the Upper Lakes until late in the summer and the steamship business has not shown any indication of opening early; for this reason owners will not charter until they know they can hold the boats in port until down cargoes can be procured.

The market continues quotable as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.60	......	......	......	......
Lump, 6 in.	......	......	$2.35	......	......
Lump, 1½ in.	......	......	2.20	$1.95	......
Lump, 1¼ in.	......	$2.35	......	......	......
Lump, ¾ in.	......	2.25	2.10	1.90	$2.05
Egg	3.60	......	......	......	......
Egg, 6 in.	......	......	2.00	......	......
Mine run	2.60	2.15	1.90	1.85	1.95
Slack	......	1.80	1.75	1.70	1.75

CINCINNATI

Some contract business closed. Prompt market dull and operators are restricting production.

With generally mild weather the feeling is growing that there is little use to look for any more winter business, and attention is now devoted to the beginning of the spring season. The movement of prepared sizes for the domestic trade is extremely slow, dealers buying only for immediate needs, and many of them having coal to carry over. A very slight improvement in the local steam market is noted, but not enough to create any marked stimulation to business.

The logical course of restricting production is being followed by some operators. There is still some little distress coal available and buyers are consequently holding off in hopes of picking up bargains. Even the smokeless producers have been affected by this, prices having broken somewhat as compared to the usually steady market for Pocahontas. Reports of possible trouble in several of the West Virginia districts this spring are expected to have a stimulating effect on the market.

LOUISVILLE

Prices ease off still further and now range at less than summer figures. Additional restrictions in working schedules.

Prices are even lower than the usual summer schedule and such contracts as are being renewed are ranging from 10 to 15c. below the previous figures. Operations are on a dwindling basis also, western Kentucky being the first to feel the slump.

Asking prices, which are purely nominal, range from $1.50 to $1.60 for block, though sales are being made as low as $1.25; lump is offered at $1.30 to $1.40; round at from $1.25 down, while nut and slack top prices are from 50 to 65c., with very little demand for the lower grades; these prices are f.o.b. mines. The operators usually keep going as long as they can realize cost of production but when that fails the mines are closed down.

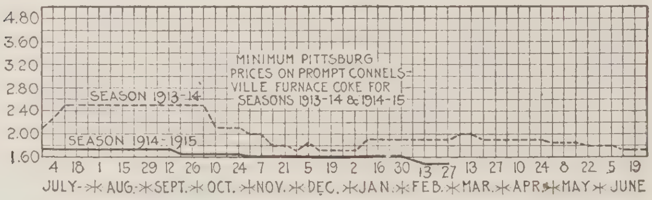
COKE

CONNELLSVILLE

Coke market stagnant and contract coke available at lower prices than under recently made contracts. Production and shipments substantially unchanged.

The coke market continues stagnant. The furnaces in operation seem to be well provided with coke and no additional furnaces are going into blast that would need to buy. Prices are not well developed as there is no inquiry but it is certain that purchases could be made for delivery to July 1 at least at a lower level than when contracts were being made two or three months ago. We quote: Prompt furnace, $1.50@1.55; contract furnace, first half, $1.65; year, $1.75; prompt foundry, $2@2.35; contract foundry, nominal, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 13 at 250,855 tons, a decrease of 5503 tons, and shipments at 249,543 tons, an increase of 1696 tons.



Buffalo—There is still report of a better movement of coke at the oven centers and it must be that someone is making more iron that formerly. Whether this really means the beginning of a return to iron activity remains to be seen, but as a rule the shippers do not look for it yet. They say that the showing is more accidental than otherwise. There is no increase in the prices of coke, best 72-hr. Connellsville foundry selling for $4.25 and stock coke at $3.30.

Chicago—The demand for furnace and foundry coke is slow with prices irregular. There is some increased buying of domestic coke, but in general the expected improvement has not materialized. Prices are as follows: Byproduct, $4.75@4.95; Connellsville, $4.65@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4.10@4.25; furnace, $4.50@4.65.

THE STEEL INDUSTRY

Steel mills maintain their increased schedules, but the outlook is still indeterminate. Railroad buying continues unsatisfactory.

February is enjoying a heavier daily percentage of specification on contracts than did January, a condition reflected in the higher rate of operations of the steel mills, and March will be materially helped by the fruition of contracts of quite some volume on which figuring has been going on this month. There are numerous negative influences which tend to chill the enthusiasm for the immediate future, but confidence in continued steady, if slight, improvement persists. Nothing has happened to shed light on how well March advances for finished steel will be held, but it is to be remembered that the bulk of the normal consumption is under contract and will not be pressing the market.

The Carnegie Steel Co. is operating at 65% of capacity, the American Sheet & Tin Plate Co. at 95% of capacity, with independent tin-plate makers ranging from 75 to nearly 100%, and the plate mills of the United States Steel Corporation at Homestead are turning out over 75% of their capacity, largely for pipe work taken a short time ago by the National Tube Co.

While railroads are still slow in deciding on bridge work and car builders have inquiry now for not more than 2400 cars, both freight and passenger, to encourage them, some rail purchases are to be noted, including 8000 tons for the Soo Line, 6000 tons for the Southern and 5000 tons for the Baltimore & Ohio. It is estimated that 15,000 tons of girder rails have been sold in the last two or three weeks. China is asking for 9000 tons of rails.—"The Iron Age."

MIDDLE WESTERN

ST. LOUIS

Quotations off to new record low levels. Many mines shut down. Conditions fail to show improvement in any direction.

The local coal market is in a most distressing condition; what was supposed to be the bottom of the market a few weeks ago was eclipsed during the past week when it came to low prices. In some instances Carterville coal got down to $1.10 for egg and $1.15 for lump, while nut went at $1, screenings at from 60c. to 70c. and mine-run was plentiful at 90c. Many mines in the field shut down rather than put their coal on the market at these figures and there was even some question as to whether coal could be marketed at these prices, in view of the large over-production coal that went on demurrage at many points.

In the Standard field 2-in. lump went down to 90c. with screenings at 50c. and 6-in. lump at $1.10 to $1.15. With very little chance of much colder weather there is little hope for any good prices on domestic sizes; this means that with any demand at all for steam coal, these prices will advance rapidly from now on. However, the business depression is not bettering in this section, despite rumors to the contrary and a lot of boosting both privately and publicly. A local ice plant contracted for Mt. Olive 2-in. screenings during the past week for 50c. a ton at the mines, this coal taking a 57½c. freight rate. The contract price on this grade of coal during the past year was from 62½c. to 65c. at the mines.

There is a small movement of anthracite coming in and a very small tonnage of smokeless.

CHICAGO

Apathy dominates the market with prices declining. Illinois and Indiana coarse coals weak. Smokeless situation depressed. Steam coals soft.

The market is decidedly weak and uncertain for all grades. This is due mainly to the continuance of warmer weather and the inability of producers to curtail their production in conformity with the demand, or perhaps the unwillingness of some shippers to restrain the forwarding of consignment coal. Retailers' stocks are more than ample for current needs, and they are not inclined to increase them; a number of them already have stocks which will be carried over until late next summer at the present rate of absorption. The contract period is now approaching, but retailers show no inclination to obligate themselves on future business because of the bitter experience during the past season.

Steam coals for manufacturing and industrial plants show no betterment. Some districts report slight improvement in the demand for screenings, but on the whole any considerable increase is not discernible. Indiana and Illinois mines are operating approximately one-half time, and curtailment of tonnage does not seem to help quotations.

Franklin and Williamson County operators issued a new circular this week reducing the price on lump, egg and No. 1 nut to $1.50. There is an immense quantity of the smaller sizes on hand unsold, with little business offered.

The domestic demand from the Indiana mines is nil, and what little coal they are producing is for steam purposes. Three important producing mines have been permanently abandoned during the past three weeks, two of which have been operating for ten years past. The steam coal prices are unchanged, but with a weakening tendency.

In the Springfield district, the domestic demand is very light, and prices for steam coals remain about the same; railroads are taking their minimum contract requirements from this section.

An increasingly wide variation in prices is noted on eastern Kentucky grades, and the idea seems to be to sell the coal at most any figure in order to dispose of it.

Hocking shipments to this territory have been curtailed and prices are improved as a result; most sales are around $1.35 to $1.50.

Splint coals are a drug on the market at prices ranging from 35c. to 50c. below the normal level.

As an indication of the shattering of prices in smokeless coals, a representative of one of the prominent shippers recently offered 50 cars of smokeless mine-run at a price of 70c. and found but few takers. There has been a decided slump in the demand for smokeless coal, and spot sales are made at almost unbelievable prices.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.35@1.50	$1.25@1.40	$1.35@1.75	$1.35@1.50	$1.40@1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	....	....	....	....
2½-in. lump.	....	....	1.25@1.40	....	....
1¼-in. lump.	....	....	1.20@1.35	....	....
Mine-run...	1.05@1.15	1.00@1.05	1.05@1.10	....	....
Egg........	1.25@1.50	1.25@1.40	1.15@1.35	1.15@1.35	1.30@1.65
No.1washed	....	....	....	....	1.25@1.50
No.2washed	....	....	....	....	1.20@1.40
6x3-in. egg.	....	....	....	....	....
Nut.......	....	1.15@1.25	1.10@1.25	1.15@1.25	....
No. 1 nut..	1.25@1.40	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	0.65@0.75	0.55@0.65	0.65@0.75	0.65@0.75	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.50	$1.40@1.65	$1.50@2.00	$1.50@2.00	....
1¼-in. lump.	....	1.35@1.50	....	....	$1.25@1.50
Lump & egg	....	....	....	....	....
Mine-run...	1.05@1.10	....	1.15@1.25	1.05@1.25	1.15@1.25
Egg........	1.25@1.50	1.10@1.25	1.75@2.25	1.65@2.25	....
No. 1 nut..	1.35@1.50	....	1.40@1.75	....	....
No. 2 nut..	1.30@1.35	....	....	....	....
Screenings..	0.55@0.70	....	....	....	....

Knox and Greene County 5-in. lump, $1.35@1.50; 3-in. lump, $1.25@1.35; 5-in. egg, $1.20@1.35; 3-in. egg, $1.20@1.35; mine-run, $1.50@1.10; screenings, 60@70c.

INDIANAPOLIS

Weather against an active coal trade. Mines on half time. Screenings not plentiful and price has stiffened. The block coal field reports a poor season.

The weather has been almost spring-like, cutting down the demand for all kinds of coal, particularly domestic lump. About the only hope for betterment is a larger demand for steam grades from factories and this is slow to materialize. Mines are on half-time. Those in the block field report that the winter season now closing has been about as poor as any in the history of the district; only a few of the mines have had a steady run and then only for short periods. The medium-size mines of the state have been the chief sufferers. There have been no changes in prices, either at the mines or retail yards, and the trade has given up hope of any advance the remainder of the season. Owing to the lessened production of other grades, slack is getting scarce and some companies announce sales at a premium.

KANSAS CITY

Retailers are buying little and market is sluggish. Mild weather continues.

A slackening of trade was felt among the retail dealers during the last week because of the mild weather, but the first sign of lower temperatures is expected to cause a rush from buyers whose supplies become depleted at this season of the year. The retail yards have enough tonnage on hand to care for present needs, which makes trade slow for the wholesale men.

PRODUCTION AND TRANSPORTATION STATISTICS

THE COAL CAR SITUATION

After having discontinued the publication of car surpluses and shortages since Nov. 1, 1914, the American Railway Association has once more resumed issuing these statements although in a somewhat abbreviated form. The initial report shows the situation on Feb. 1, covering 159 railroads as compared with 192 railroads on the date of the last statement. The gross surplus of idle coal and gondola cars on Feb. 1, of the current year, was 133,200 and the shortage 201.

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports of the United States for December, 1913-14, and for the twelve months ending December, 1912-13-14, in long tons:

	Twelve Months			December	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	8,697	6,141	27,421	812	10,992
Canada........	1,404,139	1,096,924	1,050,592	116,944	112,759
Japan..........	30,621	117,483	75,109	18,046	19,170
Australia and Tasmania....	162,671	188,613	219,941	27,859	25,114
Other countries	2,222	4,696	2,253	1,400	.....
Total.......	1,608,350	1,413,857	1,375,316	165,061	168,035
Exports:					
Anthracite					
Canada........	3,615,530	4,083,333	3,767,774	219,422	182,349
Brazil..........	....	....	6	....	......
Uruguay.......	....	84	....	84	......
Other countries.	73,259	70,969	62,464	6,885	2,118
Total.......	3,688,789	4,154,386	3,830,244	226,391	184,467
Bituminous					
Canada........	10,433,010	13,496,190	9,170,901	746,890	428,777
Panama........	486,309	489,761	267,598	37,210	15,800
Mexico.........	302,487	477,046	359,802	37,619	35,266
Cuba..........	1,152,004	1,275,538	1,074,825	74,580	62,733
West Indies....	651,268	608,762	552,600	60,308	28,596
Argentina......	....	70,048	241,248	....	9,305
Brazil..........	....	279,933	278,026	29,270	17,090
Uruguay.......	....	16,858	76,088	11,695	....
Other countries.	1,434,900	1,272,621	1,780,762	132,404	98,997
Total.......	14,459,978	17,986,757	13,801,850	1,129,976	696,546
Bunker coal....	7,340,100	7,700,520	7,266,002	607,249	490,931

NORFOLK & WESTERN

Destination of shipments over this road for January of this year, the twelve months of last year and the year before were as follows, in short tons:

	January		Twelve Months	
Coal	1914	1915	1913	1914
Tidewater, foreign.......	151,315	104,250	1,542,950	1,904,306
Tidewater, coastwise.....	337,654	260.551	3,805,847	3,763,420
Domestic..............	1,476,845	1,522,137	19,512,118	19,804,243
Coke				
Tidewater, foreign.......	......	414	31,082	1,415
Domestic..............	118,745	69,801	1,567,323	1,017,196
Total...............	2,084,559	1,957,153	26,459,320	26,490,580

FOREIGN MARKETS

ENGLAND

Markets in the most acute condition in the history of the country. Inadequate car supply the main trouble.

London, Feb. 12—There is little doubt that the coal industry as a whole has fallen into a state of chaos without precedent in its history perhaps. The conditions prevailing during the Boer War and the last great strike were by no means so bad as those of today, and it has been a blessing to the house coal trade that the winter has been of the mildest character so far. As it is, the demands for coal of all descriptions and in all directions is much in excess of the available supply. Transport difficulties are accountable for more than half the trouble, but it is impossible to get anyone connected with the railways to admit any such contention. Nevertheless, we have well authenticated cases of wagons taking a couple of months to perform the double journey from the colliery to destination and back. That this has been quite unavoidable owing to transport of troops and war stores of all descriptions does not alter the fact, and with the general public clamoring for the Government to regulate the price of coal and works of all descriptions at their wits' end to get in adequate supplies, it is only bare justice to the whole trade that the actual facts should be made known.—"The Iron & Coal Trades Review."

Feb. 12—There is a strong demand for all classes of coal for March loading. Prices show a further advance and are approximately as follows:

Best Welsh steam.......	$5.28@5.40	Best Monmouthshires....	$4.74@4.80
Best seconds...........	4.92@5.16	Seconds..............	4.56@4.68
Seconds...............	4.86@4.98	Best Cardiff smalls.....	4.08@4.20
Best dry coals..........	4.80@5.04	Cargo smalls..........	3.60@3.84

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport both net, exclusive of wharfage.

Freights—Owing to difficulty in arranging loading turns chartering is slow. Rates are approximately as follows:

Gibraltar.........	$4.80	Naples	$7.68	Las Palmas......	$5.16
Malta............	....	Venice, Ancona...	10.20	St. Vincent.......	5.52
Marseilles........	5.79	Alexandria.......	7.20	Rio Janeiro......	6.72
Algiers...........	5.40	Port Said........	7.20	Monte Video.....	5.76
Genoa...........	7.68			River Plate......	6.00

Note—These quotations are based on an exchange rate of one shilling equals 24 cents.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

No. 67—Schenectady, N. Y.—The local city government will be in the market for about 4730 tons of anthracite stove and egg coal, Mar. 1 (p. 275). The contract is usually closed at about $6.50 per ton. Address Board of Contract and Supply, Franklin St., Schenectady, N. Y.

No. 75—Ottawa, Can.—The Canadian Department of Public Works has asked for tenders until Mar. 1 for supply of best quality steam coal to be delivered in quantities, and at places specified (p. 275). Address Secy. R. C. Desrochers, Department of Public Works, Ottawa, Can.

No. 77—Rochester, Ind.—The Rochester Electric Light, Heat & Power Co. at this point will be in the market for 7000 tons of Indiana mine-run coal on Mar. 1 (p. 275). The contract is to run over one year and it is usually closed at $2.10 per ton. Address Rochester Electric Light, Heat & Power Co., Rochester, Ind.

No. 78—Detroit, Mich.—The Municipal Electric Light Plant will be in the market for 1800 tons of Youghiogheny dock-run coal on Mar. 1 (p. 275). This coal laid down at Detroit usually costs $5 per ton and deliveries are to be made over the next year. Address City Clk. E. J. Bestick, Detroit, Mich.

No. 85—Baltimore, Md.—Henry Sonneborn & Co., Pratt and Paca St., Baltimore, will be in the market about Mar. 1 for 3500 to 4000 tons of standard mine-run coal (p. 318). Address Pur. Agt. A. Mainzer, Baltimore, Md.

No. 86—Hinsdale, Ill.—The Municipal Electric Light Plant, at this place, will be in the market about the first of next month for 4000 tons of screenings (p. 318). The approximate cost is 90c. per ton at the mine and Purity coal is commonly used. The contract is let on a competitive basis. Address Mgr. H. H. Bristol, Municipal Electric Light Plant, Hinsdale, Ill.

No. 87—New York, N. Y.—The bids on this contract (p. 318), which provides for furnishing and delivering anthracite and semibituminous coal, were as follows, per gross ton:

	Semibituminous			Buckwheat No. 3			Pea	
Name of Bidder	600[1]	75[2]	150[3]	2300[1]	425[2]	850[3]	1200[4]	500[5]
Empire C. Min. Co.	$3.08	...	...	$2.14	...	...	$3.76	...
Gavin Rowe	2.98	...	...	1.87	$2.89	$2.87	3.85	$3.89
Meeker & Co.....	...	...	...	2.31	...	...	3.69	3.69
Lineaweaver & Co.	2.87	...	...	1.81	...	...	3.53	...
John W. Peale...	3.05	...	4.60	2.00	...	2.65	3.72	3.72
J. E. Schmadeke.	...	...	3.99	...	...	2.85	...	...
Bacon Coal Co...	...	$4.43	4.31	...	3.38	3.18	...	...
G. A. Harris & Co.	3.15	...	...	2.20	...	...	3.85	3.85
Wm. Farrel & Son	3.20	4.40	3.75	1.78	3.35	3.50	3.74	3.74
C. D. Norton Co..	2.98	...	...	1.88	...	...	3.74	3.74
Penn Fuel Co....	3.25	...	...	2.20	...	...	4.05	4.05

[1] Delivery at Harts Island. [2] Delivery at city prison, Manhattan. [3] Delivery at city prison, Brooklyn. [4] Delivery at penitentiary on Blackwells Island. [5] Delivery at workhouse, Blackwells Island.

Address Comr. Katherine Bement Davis, Department of Correction, Municipal Bldg., New York.

No. 92—Kennebunk, Maine—The electric light department at this place will be in the market about Mar. 1 for 375 long tons of Georges Creek coal (p. 318). The usual contracting figure is about $5 per ton. The award is made on a competitive basis. Address Supt. I. H. Wells, Electric Light Dept., Kennebunk, Maine.

No. 103—Ottawa, Ont., Can.—Bids will be received until 4 p.m., Mar. 1, for furnishing a supply of steam coal for the departmental dredges (p. 356). R. C. Desrochers is Secretary of the Department of Public Works, Ottawa. Address Dist. Engr. John Sweeney, Winnipeg, Man., Can.

No. 117—Boston, Mass.—This contract (p. 357) will be closed during March instead of April as previously announced; deliveries are to be in proportionate amounts each month at Tidewater, Hampton Roads, Va. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

No. 122—St. John, N. B., Can.—Sealed tenders will be received until 4 p.m., Mar. 1, for furnishing coal for the Departmental Dredges for Nova Scotia and New Brunswick (p. 357). Address Supt. of Dredges J. K. Blenkinsop, Dept. of Public Works, St. John, N. B., Can.

No. 136—Sandusky, Ohio—Sealed bids will be received by the city government until noon, Mar. 1, for furnishing about 3000 tons of bituminous mine-run coal (p. 357). Address Dir. of Pub. Ser. John J. Molter, Sandusky, Ohio.

No. 137—Ellensburg, Wash.—Bids will be received up to 8 a.m., Mar. 1, for furnishing steam coal for Kittitas County at the following places: Heating plant at county jail, at Shoskins and Holmes Spur and at such places in Ellensburg as required (p. 357). Delivery is to be made in carload lots. Address County Audr. W. G. Damerow, Ellensburg, Wash.

No. 142—Poughkeepsie, N. Y.—Bids will be received until 10 a.m., Mar. 2, for furnishing one year's supply of anthracite coal for the Hudson River State Hospital. Specifications may be obtained on application (p. 358). Address the Purchasing Committee, Capitol Bldg., Albany, N. Y.

No. 143—Buffalo, N. Y.—Bids will be received until Mar. 3 for furnishing the annual supply of anthracite and bituminous coal for the schools and other public buildings of the city (p. 358). Deliveries are to be made in such quantities and at such times as specified. Each bid must be accompanied by a check for 10% of the total bid, and bonds for 50% will be required. Address Comr. Francis G. Ward, Dept. of Public Works, Buffalo, N. Y.

No. 150—Boston, Mass.—The United States Post Office and Sub Treasury Building here, will receive bids until Apr. 1 for furnishing coal during the fiscal year ended June 30, 1916. Bids are requested on 1800 tons of anthracite screenings and 1300 tons of bituminous mine-run coal. Deliveries are to be as required. Address, Custodian Wm. F. Murray, United States Post Office and Sub Treasury Building, Boston, Mass.

No. 151—Baltimore, Md.—The Baltimore American consumes about 800 tons of soft coal per year. The present contract expires during April. Address Mgr. J. W. Stoddard, The Baltimore American, Baltimore, Md.

No. 152—Forestdale, R. I.—The Forestdale Mfg. Co. will be in the market for approximately 4000 tons of bituminous coal about Apr. 1. Address Pur. Agt. A. Grove, Forestdale Mfg. Co., Forestdale, R. I.

No. 153—West Upton, Mass.—William Knowlton & Sons will soon place a contract for 1500 tons of bituminous coal, deliveries to commence about Apr. 1. Address Pur. Agt. George W. Knowlton, Jr., William Knowlton & Sons, West Upton, Mass.

No. 154—Stamford, Conn.—The Stamford Gas & Electric Co. will be in the market about Apr. 1, for 5000 tons of gas coal. Address Pur. Agt. R. Crawford, Stamford Gas & Electric Co., Stamford, Conn.

No. 155—Boston, Mass.—Williams & Bangs, at this place, will soon be in the market for about 15,000 tons of bituminous and anthracite coal for use in various buildings in the city. Deliveries are to be as required.. Address, Daniel F. Carew, 18 Tremont St., Boston, Mass.

No. 156—Baltimore, Md.—The Baltimore Sun consumes about 700 tons of soft mine-run coal annually, the present contract expiring in April. Address Pur. Agt. Miss M. B. Koller, The Baltimore Sun, Baltimore, Md.

No. 157—Detroit, Mich.—Sealed proposals will be received up to 2 p.m., Mar. 9, by the Board of Water Commissioners for furnishing 25,000 tons of bituminous mine-run coal. The Board reserves the right to order, before Aug. 15, 2000 additional tons at the contract price. Each bid must be accompanied by a certified check of $500. Address Secy. H. A. Gilmartin, Board of Water Commissioners, Detroit, Mich.

No. 158—Newark, N. J.—Bids will be received until Mar. 3 by the Board of Chosen Freeholders for furnishing a supply of coal from Mar. 15, 1915, to Sept. 16, 1915. Address Clk. of the Board of Chosen Freeholders, Newark, N. J.

No. 159—West Fitchburg, Mass.—The Fitchburg Paper Co. at this place will contract for 1800 tons of bituminous coal, deliveries to commence about Apr. 1. Address Pur. Agt. G. R. Wallace, Fitchburg Paper Co., West Fitchburg, Mass.

No. 160—Baltimore, Md.—The Riddlemoser Bldg., Baltimore, uses from 450 to 525 tons of soft mine-run coal per year, the present contract expiring in April. Address Pur. Agt. Bagby & Baer, Room 818 Fidelity Bldg., Baltimore, Md.

No. 161—Pawtucket, R. I.—The Greene & Daniels Mfg. Co. will be in the market for about 5000 tons of bituminous coal on Apr. 1. Address Pur. Agt. A. C. Dexter, Greene & Daniels Mfg. Co., Pawtucket, R. I.

No. 162—Shelton, Conn.—The Adams Mfg. Co., at this place, will be in the market about Apr. 1 for 3500 tons of bituminous coal. Address Pur. Agt. R. F. Adams, Adams Mfg. Co., 106 Grand St., New York, N. Y.

No. 163—Boston, Mass.—The Quincy Cold Storage & Warehouse Co., at this place, are in the market for 15,000 to 20,000 tons of bituminous mine-run coal. Deliveries are to begin Apr. 1 and to be as required, but chiefly during the summer period. It is said that the company have nearly closed their contracts already. Address, Treas. & Mgr. Geo. H. Stoddard. 133 Commercial St., Boston, Mass.

No. 164—Detroit, Mich.—Sealed proposals will be received until 2 p.m., Mar. 9, by the Board of Water Commissioners for furnishing about 700 tons of bituminous and 40 tons of anthracite coal to be delivered at the storage yard, emergency station and office of the Board of Water Commissioners. Address Secy. H. A. Gilmartin, Board of Water Commissioners, Detroit, Mich.

No. 165—Stamford, Conn.—Beck & Co. will contract for 2500 tons of bituminous coal about Apr. 7. Address Pur. Agt. George F. Leeming, 206 West 29th St., New York, N. Y.

No. 166—Concord, N. H.—The Board of Education at this place will be in the market on Apr. 1 for about 1000 tons of anthracite coal. The coal is bought from local dealers, the call for bids being advertised and the customary price is $6.80 per ton. Address Finance Com., Bd. of Education, Concord, N. H.

No. 167—Exeter, N. H.—The Exeter Mfg. Co. at this place will be in the market on Apr 1. for 3000 tons of bituminous coal, deliveries to be made over the next year. For full particulars address Pur. Agt. Chester A. Hatch, Exeter Mfg. Co., Exeter, N. H.

No. 168—Bridgeport, Conn.—The Burns & Bassick Co. will be in the market about Apr. 1 for 1100 tons of bituminous coal. Address Pur. Agt. W. F. Burns, Burns & Bassick Co., Bridgeport, Conn.

No. 169—Athol, Mass.—The Athol Gas & Electric Co. will be in the market Apr. 1 for about 1700 tons of bituminous coal. Address Pur. Agt. P. B. Webber, Athol Gas & Electric Co., Athol, Mass.

No. 170—Pontiac, Mich.—Bids will be received until 1:30 p.m., Mar. 11, for furnishing the Pontiac State Hospital with a supply of coal for one year commencing May 1, 1915. The approximate quantities are 7500 tons of free-burning three-quarter lump bituminous coal and about 500 tons of anthracite coal (250 tons grate, 250 tons stove, and 30 tons chestnut). Prices must be f.o.b. hospital, and bidders must specify location of mine. Address Steward E. H. Halsey, Pontiac State Hospital, Pontiac, Mich.

No. 171—Bridgeport, Conn.—The Salts Textile Mfg. Co. will be in the market about Apr. 1 for 10,000 tons of bituminous coal. Address Pur. Agt. C. F. Steod, Salts Textile Mfg. Co., Bridgeport, Conn.

No. 172—Boston, Mass.—The Boston & Maine R.R. Co. will soon be in the market for about 1,750,000 tons of bituminous coal. Address Pur. Agt. H. A. Fabian, Boston & Maine R.R. Co., Boston, Mass.

No. 173—Indianola, Iowa—The local city government will be in the market for 2500 tons of steam and mine-run coal on Apr. 1. The coal is bought on a competitive basis, the prices ranging from $1.70 to $2.10. Address Supt. G. G. Litzenburg, Indianola, Iowa.

No. 174—Bridgeport, Conn.—The Union Typewriter Co. contracts for about 2000 tons of bituminous coal about Apr. 1. Address Pur. Agt. F. H. Willard, Union Typewriter Co., Bridgeport, Conn.

No. 175—Medfield, Mass.—The Medfield State Asylum will be in the market for 6000 tons of bituminous coal, about Apr. 1. Address Pur. Agt. F. H. Gross, Medfield State Asylum, Medfield, Mass.

No. 176—St. Joseph, Mich.—The municipal government here will be in the market on Apr. 1 for both anthracite and bituminous coal. From 800 to 1000 tons of mine-run bituminous will be required for the water department and the customary price for this grade is $3.45 f.o.b. From 500 to 800 tons will also be required for the light department, the usual price on which is $5.85. Address the St. Joseph Water Dept. and Supt. F. A. Bunks of the Light Dept., St. Joseph, Mich.

No. 177—Gillespie, Ill.—The light and power department at this place will be in the market for 3000 tons of screenings on about Apr. 1. The customary price ranges about 75c. at the mines and the business is negotiated on a competitive basis. Address, Southern Illinois Light & Power Co., Gillespie, Illinois.

No. 178—Southbridge, Mass.—The Southbridge Printing Co. will contract about Apr. 1 for 12,000 tons of bituminous coal. Address Pur. Agt. Frank Hastley, Treasurer, Southbridge Printing Co., Southbridge, Mass.

No. 179—Boston, Mass.—Williams & Bangs will soon be in the market for about 15,000 tons of bituminous and anthracite coal, to be delivered as required. Address Daniel F. Carew, 18 Tremont St., Boston, Mass.

No. 180—Walpole, Mass.—The Walpole Rubber Co. will contract about Apr. 1 for 8000 tons of anthracite and bituminous coal. Address Pur. Agt. A. J. Baldwin, Walpole Rubber Co., Walpole, Mass.

No. 181—Bridgeport, Conn.—The Canfield Rubber Co. at this place will contract about Apr. 1 for 1800 tons of bituminous coal. Address Pur. Agt. C. F. Holcomb, Canfield Rubber Co., Bridgeport, Conn.

No. 182—Niagara Falls, N. Y.—The local school board will be in the market on Apr. 1 for about 1700 tons of semi-anthracite coal. This business is usually done on contract with the summer delivery at $4.80 per ton and winter delivery $5.30 per ton. Address the Board of Education, Portage Road, Niagara Falls, N. Y.

No. 183—Shawano, Wis.—The city water and light plant at this place will be in the market for 2000 tons of bituminous coal, contract for which will be made on Apr. 1. This business is usually done on a competitive basis, the customary price ranging around $3.90, delivered. Address Supt. Paul E. Papsaw, City Water & Light Plant, Shawano, Wis.

No. 184—Providence, R. I.—The Gorham Mfg. Co. at this place will contract about Apr. 1 for 5000 tons of bituminous coal. Address Pur. Agt. C. E. Fairbanks, Gorham Mfg. Co., Providence, R. I.

No. 185—Danbury, Conn.—E. A. Malloy & Sons, Inc., will be in the market about Apr. 1, for 3000 tons of bituminous coal. Address Pur. Agt. H. B. Malloy, E. A. Malloy & Sons, Inc., Danbury, Conn.

No. 186—Natick, Mass.—The Natick Gas Light Co.. at this place, will contract about Apr. 1 for 1700 tons of gas coal. Address Pur. Agt. R. W. Harwood, Treas., Natick Gas Light Co., Natick, Mass.

No. 187—Wolfeboro, N. H.—The local electric light department will be in the market for approximately 300 tons of Georges Creek coal on Apr. 1. The customary price is $5.60, f.o.b. station. Address Supt. H. L. Miles, Wolfeboro, N. H.

No. 188—Sturgeon Bay, Wis.—The local utility commission will be in the market for about 4000 tons of coal, contract for which will be made during either March or April. Youghiogheny three-quarter coal is ordinarily used, and the price is about $3 per ton. Address Supt. James E. Johnson, Sturgeon Bay Utility Commission, Sturgeon Bay, Wis.

No. 189—Bristol, Conn.—The Bristol & Plainsville Ry. Co. will be in the market about Apr. 1 for 8000 tons of anthracite coal. Address Pur. Agt. E. Cockings, Bristol & Plainsville Ry. Co., Bristol, Conn.

No. 190—Hyde Park, Mass.—The B. F. Sturtevant Co. will be in the market for about 7000 tons of bituminous coal, deliveries to commence about Apr. 1. Address Pur. Agt. H. P. Orrok, B. F. Sturtevant Co., Hyde Park, Mass.

No. 191—Metropolis, Ill.—The local water and light department will be in the market during March or April for about 2700 tons of 2-in. screenings. This business is usually closed at about $1.60 per ton. Address Frederic N. Cover, C. E., City of Metropolis Water & Light Dept., Metropolis, Ill.

No. 192—Rockville Center N. Y.—The local city government will be in the market for about 2500 tons of bituminous coal during the latter part of March. This business is customarily done at $3.53 per ton. Address Village Clk. George S. Utter, Rockville Center, N. Y.

No. 193—Hartford, Conn.—The Pratt & Cady Co. at this place will contract for 2700 tons of anthracite coal about Apr. 1. Address Pur. Agt. John S. Camp, Pratt & Cady Co., Hartford, Conn.

No. 194—New York, N. Y.—The Atlantic, Gulf & Pacific Co. will be in the market on Apr. 1 for approximately 30,000 tons of bituminous coal. The deliveries are to be made wherever the company may be doing work. Address Pur. Agt. H. E. Shaver, Park Row Bldg., New York, N. Y.

No. 195—Holyoke, Mass.—The Valley Paper Co., Holyoke, will be in the market about Apr. 1 for 4000 tons of bituminous coal. Address Pur. Agt. Chas. B. Prescott, Treasurer of the Valley Paper Co., Holyoke, Mass.

No. 196—St. Johnsburg, Vt.—The E. & T. Fairbanks Co. of this place will be in the market for 3000 tons of anthracite and bituminous coal on Apr. 1. Address Pur. Agt. C. H. Horton, E. & T. Fairbanks Co., St. Johnsburg, Vt.

No. 197—Newport, N. H.—Dexter Richards & Sons Co. of this place will be in the market on Apr. 1 for 2500 tons of soft coal. Deliveries to be made over the next year. Address Pur. Agt. F. W. Brown, Dexter Richards & Sons Co., Newport, N. H.

No. 198—Lawrence, Mass.—The Champion International Co., at this place, will contract about Apr. 1 for 20,000 tons of bituminous coal. Address Pur. Agt. G. F. Russell, Pres., Champion International Co., Lawrence, Mass.

No. 199—Albany, N. Y.—Sealed proposals will be received until 10 a.m., Mar. 2, for furnishing and delivering 457,419,000 lb. of coal to the various state hospitals. Address Purchasing Committee for New York State Hospitals, Room 138, Capitol, Albany, N. Y.

No. 200—Topsham, Me.—The Pejepscot Paper Co. at this place will contract for 25,000 tons of soft coal for delivery over the next year, beginning Apr. 1. Address Treas. W. W. Nearing, Topsham, Me.

No. 201—New Britain, Conn.—North & Judd Mfg. Co. at this place will be in the market for 5000 tons of bituminous coal on Apr. 1. Address Pur. Agt. F. W. Holmes, New Britain, Conn.

No. 202—Portland, Me.—The Portland Iron & Steel Co. will be in the market for about 15,000 tons of gas coal on Apr. 1. Deliveries to be made over the next year. Address Pur. Agt. R. W. Boutwill, Portland Iron & Steel Co., Portland, Me.

No. 203—Revere, Mass.—The National Fire Proofing Co., at this place, will be in the market about Apr. 1 for 7500 tons of bituminous coal. Address Pur. Agt., National Fire Proofing Co., John Hancock Bldg., Boston, Mass.

No. 204—New York, N. Y.—The Boston & Albany R.R. Co. will be in the market about Apr. 1 for 700,000 tons of bituminous coal. Address Gen. Pur. Agt. F. H. Green, Grand Central Station, New York, N. Y.

No. 205—Norristown, Penn.—The local Board of Education will be in the market during the month of April for 165 tons of anthracite, egg and stove coal each, 225 tons of pea, and 150 tons of bituminous coal. Customary prices are: Egg, $6.05; stove, $6.35; pea, $4.70; bituminous, $3.50. Bids are received through the secretary of the board. Address Sec. Harry W. Akins, 717 DeKalb St., Norristown, Penn.

No. 206—Woonsocket, R. I.—The local school board will be in the market some time during April for about 1000 tons of the best Lehigh and Scranton coal. Tenders are usually invited by letter from the local dealers, and the contract awarded to the lowest bidder. Address Chn. of Com. on Supplies, T. Guerin, care of Alsace Worsted Co., Woonsocket, R. I.

No. 207—Concord, N. H.—The United Gas Improvement Co. at this place will be in the market for 1000 tons of anthracite coal, delivery to be made over the next year beginning Apr. 1. Address Pur. Agt. J. A. Pearson, United Gas Improvement Co., Philadelphia, Penn.

No. 208—St. Peter, Minn.—The local electric-light company will be in the market Apr. 1 for between 1200 and 1400 tons of Wilmington egg coal. The customary price is about $4.65 delivered. Address Supt. F. N. Wilson, St. Peter Electric Light & Water Works, St. Peter, Minn.

No. 209—Huntingburg, Ind.—The local electric-light department will be in the market for 2065 tons of coal on Apr. 1. The customary price on this business is about $1.45, and a soft grade of coal from southern Indiana is generally used. Address F. G. Kattishburg, care of Huntingburg Electric Light Co., Huntingburg, Ind.

No. 210—Lawrence, Mass.—The Geo. C. Kunhardt Co. will be in the market about Apr. 1 for 5000 tons of bituminous coal. Address Pur. Agt. A. P. Thompson, Lawrence, Mass.

No. 211—St. Albans, Vt.—The Central Vermont Ry. Co. will be in the market for 190,000 tons of anthracite and bituminous coal on Apr. 1. Address Pur. Agt. J. B. Laurie, St. Albans, Vt.

No. 212—Hartford, Conn.—The Hartford Rubber Works will be in the market about Apr. 1, for 10,000 tons of anthracite and bituminous coal. Address Pur. Agt. C. A. Emerson, 42 Broadway, New York, N. Y.

No. 213—Great Works, Me.—The Penobscot Chemical Fibre Co. at this place will be in the market for 20,000 tons of bituminous coal on Apr. 1, delivery to be made over the next year. Address Pur. Agt. E. H. Clapp, Penobscot Chemical Fibre Co., Great Works, Me.

CONTRACTS AWARDED

No. 84—New York, N. Y.—This contract (pp. 318 and 356) has been awarded to Meyer-Denker-Sinram Co., 910 East Fifth St., New York, N. Y., at $6.75 per ton. Address Contract Clk. B. Lamb, Room 1034, Dept. of Public Charities, Municipal Bldg., New York.

No. 89—Washington, D. C.—The awards on this contract (pp. 318 and 356), which provides for furnishing and transporting coal for the Navy, under bids opened Feb. 10, were as follows:

Castner, Curran & Bullitt, for furnishing and delivering 8000 tons coal at Portsmouth, N. H., $3.65 per ton.

Crowell & Thurlow, for transporting 12,000 tons of coal from Hampton Roads to Portsmouth, N. H., at $1.05 per ton.

Pocahontas Fuel Co., for furnishing and delivering 5000 tons at Key West, Fla., $5 per ton.

Pendleton Bros. for transporting 1500 tons from Philadelphia to Key West, Fla., $2.25.

Address Paymaster-General of the Navy Samuel McGowan, Washington, D. C.

No. 90—New York, N. Y.—This contract (p. 318), which provides for furnishing about 350 gross tons of anthracite coal, has been awarded to Burns Bros., at $613. The only other bid submitted was from the Jurgen-Rathjen Co., at $626. Address Chn. of the Comn., Alrick H. Man, Board of Trustees, Hunter College, Dept. of Education, Park Ave. and 59th St., New York.

No. 91—Jackson, Ohio—This contract (p. 318), which provides for furnishing coal to the electric-light plant for a period of 11 months, has been awarded to Hollberg & Law, for No. 2 mine-run coal at $1.60 per ton, and No. 2 nut and slack coal at 90c. per ton. Address Dir. of Pub. Ser. R. L. Lamb, Jackson, Ohio.

No. 120—Everett, Mass., and Providence, R. I.—The Stone & Webster Co. has placed this contract (p. 357) with the New England Coal & Coke Co. The contract involves 79,500 tons of mine-run coal, to be delivered as follows: 18,000 tons to Everett, Mass.; 26,500 tons Providence, R. I., and 35,000 tons at Pawtucket, R. I. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

No. 121—Baltimore, Md.—This contract (p. 357), of the American Tobacco Co. has been closed though terms are not available. The contract calls for 5000 tons of Orenda grade coal, instead of 3000, as stated in a previous issue. Address Pur. Agt. J. A. Powell, American Tobacco Co., Baltimore, Md.

No. 125—Washington, D. C.—Bids on this contract (p. 357), which provides for furnishing 12,000 tons of Navy Standard coal for delivery at Boston, Mass., and 1000 tons at Port Royal, S. C., were as follows:

Bidder	Boston	Port Royal
American Coal Exporting Co.	...	$4.09
Edward M. Alden Co.	$3.85	4.55
William C. Atwater	3.65	3.45*
C. G. Blake Co.	3.88	4.24
Chesapeake & Ohio Coal Agency	3.60	...
Chesapeake & Ohio Coal & Coke Co.	3.70	4.45
Castner, Curran & Bullitt	3.49*	...
Darrow Mann Co.	3.77	...
H. H. Hartwell	3.75	...
Maryland Coal & Coke Co.	3.70	3.61
Archibald McNeil & Sons Co.	3.73	4.48
Northern Coal Co.	3.78	...
New England Coal & Coke Co.	3.80	...
Pocahontas Fuel Co.	3.70	4.00
C. H. Sprague & Son	3.78	...
Smokeless Fuel Co.	...	4.11
Willett-Martin Co.	3.73	...
Willard Bros.	3.78	...
J. H. Weaver & Co.	3.45	...
West Virginia Coal Co.	3.85	4.10

*Awards: 12,000 tons for Boston to Castner, Curran & Bullitt, at $3.49; 1000 tons for Port Royal to William C. Atwater, at $3.45.

Address Paymaster-General of the Navy Samuel McGowan, Washington, D. C.

No. 141—Boston, Mass.—This contract (p. 358), which calls for 50,000 tons of New River Pocahontas mine-run coal, to be delivered at Tidewater in equal monthly proportions, has been placed with the New England Coal & Coke Co. Address R. E. Hamilton, 147 Milk St., Boston, Mass.

NOTES

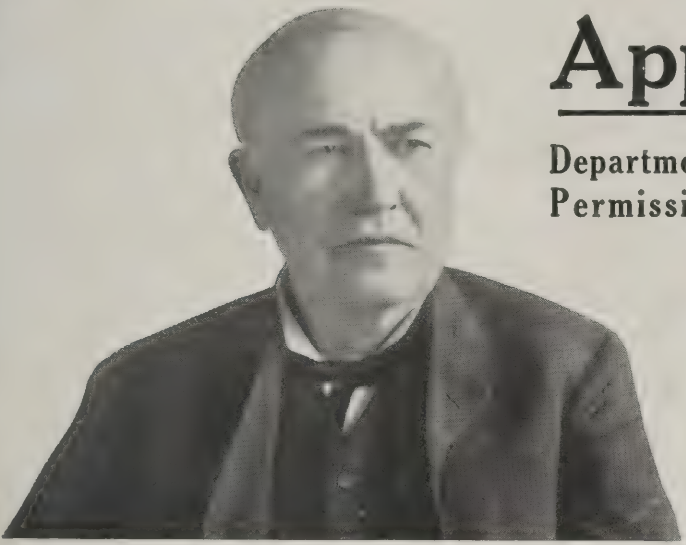
The Commissioners of Foster County, North Dakota, have awarded a contract for furnishing coal for the Court House at Carrington, N. D., to Edward Callahan, local agent for the Dickinson Lignite Coal Co.

COAL AGE

Volume 7, No. 10
Issued Every Saturday
Hill Publishing Company

NEW YORK, MARCH 6, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page



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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 11,000
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

A LOCAL "Buy It Now" crusade, which recently originated in one of our Western states, is fast developing into a big national movement.

It is a big thing for all of us, but big only in proportion to the manner in which we use it. Too long have we had the notion that trading is mere selling. We must not put all the burden on the manufacturer.

As we have said before, what makes dull times is the tendency to throttle the purchasing department at the cry of hard times. We have passed through a crisis, but this is another year and already there are indications for a big year in the U. S. A. for 1915.

This "Buy It Now" movement has already established itself firmly in seven states and the movement is only begun.

"*Associated Advertising*" tells us that the Department of Agriculture, and the Department of Commerce at Washington have been asked to further the move. Every railroad president in the country has been asked to cooperate and an appeal has been made to the governors of several states.

Fine!—But are you doing *your* part?

The readers of this paper represent an army of buyers—the *maximum* buying capacity of this big field of coal mining. And it rests with you whether or not this "Buy It Now" slogan is to be the forerunner of a big and prosperous year for all.

Read the ads—The manufacturer of coal mine equipment is making his appeal in this paper for commercial security and commercial growth.

It's your move.

COAL AGE

Vol. 7 NEW YORK, MARCH 6, 1915 No. 10

Selecting the Right Hoist

By L. F. Mitten

A resume of the progress made in the art of coal hoisting is unnecessary in view of the treatment given this subject by the various technical journals. A glimpse into the future, however, as indicated by recent developments, reveals that the trend of the times foreshadows improvements along definite lines.

* * *

So far as the engineer is concerned, it is possible to build a hoist that is faultless. Economic considerations however may demand a modification of the theorist's idealistic tendencies. In no branch of constructive industry is the statement that "engineering is the science of compromise" more thoroughly exemplified than in hoist building, and the design of a hoisting machine which gives the highest measure of success is obviously the one which results from a close coöperation between hoist buyer and hoist builder. Each is in possession of certain facts and experience which only in combination with those of the other yield a maximum of satisfactory results.

The manufacturer's experience, accumulated through much building, and his records of many installations and the results which they have achieved in operation enable him to propose preliminary plans which are certain to lean toward the correct ultimate design.

The buyer, on the other hand, knows precisely the physical condition of his property, the output which the machine must elevate or haul, the time in which this tonnage must be moved a certain distance, and the maximum amount which he can afford to pay for this transportation without exceeding a predetermined gross operating expense.

Clearly, then, a careful consideration of the necessities of *both* interested parties will reveal the weaknesses, the shortcomings and misfits in the builder's original plans, while in like manner the user's ideas and premises may possibly show need of extensive alteration and revision.

It should not be deemed sufficient for a buyer to ask competitive bids on a hoist meeting specifications formulated by himself. Nor can he hope to realize the highest value of his purchase when he arbitrarily places the business with the lowest bidder. How can the buyer know that his specifications will secure him the very best equipment, mechanically and financially, that a certain appropriation can buy?

In such a case he has only his own knowledge gleaned from a limited experience upon which to rely. He foregoes the benefit of the hard experience acquired by the managers of other properties more or less remote—experience which in all likelihood would cause a modification of his specifications and give him ultimately a better equipment. This experience, wide and comprehensive, properly filed and digested, is in possession of the hoist builder who will gladly give him its full benefit in the course of coöperative consultations.

Hoist buyers are now much less prone than formerly to wire: "Quote price No. A263Z, catalog page 71, 500 volts d.c. at once." They are beginning to realize that the only advantage in this method of buying lies in a quicker delivery—perhaps—while among its manifold disadvantages is almost certain inefficiency, which in the end means expensive hoist performance.

The more recent procedure in hoist buying is rather along the lines described in the article on page 402, where the duty required of the machine was first definitely specified and the 23 limitations or safeguards of performance agreed upon.

Coöperation between builder and buyer here begets a thoroughly satisfactory product. Utmost economy is realized under the specified conditions, a minimum of weight is secured through a judicious distribution of metal, least current or coal consumption is attained because of carefully planned proportions and ratios. The haulage cost per ton of coal is low since the machine admirably meets the demands made upon it. A maximum output is possible, since every contingency has been regarded as a certainty and provision therefor embodied in the design.

Hoist buyers and builders are getting together. It is more than possible that the future may disclose a more universal recognition of the advantages that accrue through their closer coöperation.

Electric Shaft Hoists Installed by the Lehigh Coal & Navigation Co.

By R. E. Hobart*

SYNOPSIS—After a careful test of a steam mine hoist it was decided that if the manufacturer's guarantees could be realized electric hoisting would be a paying proposition. An electric hoist built to exacting specifications was accordingly installed. This machine has proved entirely satisfactory from every standpoint.

The advantages inherent to power produced in large quantities at or adjacent to coal mines have been readily conceded. The cost of thus manufacturing energy should be extremely low, and mining regions as a rule usually use large quantities of power.

General View of Surface Plant at No. 11 Shaft

The vital question to the Lehigh Coal & Navigation Co. was whether or not it would pay to purchase power, or to continue in the time-honored custom of the generation of steam and its utilization at individual boiler plants.

This company owns and operates a number of anthracite mines throughout the Panther Creek Valley, situated in Carbon and Schuylkill Counties, Pennsylvania. The gross output for the year 1914 was 4,240,777 tons. To produce this amount of coal required the consumption of 494,481 tons of fuel in the company's various boiler houses. This large consumption of boiler fuel is the result of a poor load factor per individual boiler plant, and, due to the extent of the operations, a central boiler plant and pipe-line transmisison would be out of the question.

As the Lehigh Coal & Navigation Co. was contemplating the development of a number of new operations, and the modernizing of some of its old plants, it decided to investigate the savings claimed for the use of electricity. The steam and power consumption of the majority of the individual operations in and around the mines could be easily determined. The question, however, of the power used by large hoisting engines was one on which no reliable information could be found. The opinion of various engineers differed to such an extent that it was decided to conduct a test under actual operating conditions at one of the collieries.

In order to do this, the coal hoist at No. 10 shaft was selected for the test. This engine is a first-motion 30x60-in. piston-valve machine, of the most modern type and comparatively new. The boiler plant from which this hoist received its power is of 4800 hp. capacity, carrying 125 lb. steam pressure. The hoist is located approximately 600 ft. from the boiler plant and is fed by a 10-in. steam line protected with magnesia pipe covering.

To prepare for this test the company had two batteries of boilers, aggregating 1200 hp., cut off from the main boiler plant. Steam auxiliaries, such as feed-water pump, blowers, etc., were fed by the boilers in the test and their consumption charged against the hoist.

A barrel weighing device was installed to accurately weigh the consumption of water. The fuel, No. 3 buckwheat, was weighed in the ordinary manner for boiler trials. All the usual precautions in connection with such tests were taken, and the company feels that the results obtained were fair indications of the operating conditions at its various collieries.

---

*Master mechanic, Lehigh Coal & Navigation Co., Lansford, Penn.

Throughout the test a careful record was kept of the consumption of fuel during the working and idle time. The hoist was not operated between the hours of 5:30 p.m. and 6:30 a.m. The actual working time was 64 hr. and idle time 104 hr., for the week.

During the week 1705 trips were made from a depth of 581 ft., and the total coal consumed was 228,025 lb., of which 108,075 lb. were used in idle time, and the remainder during working hours.

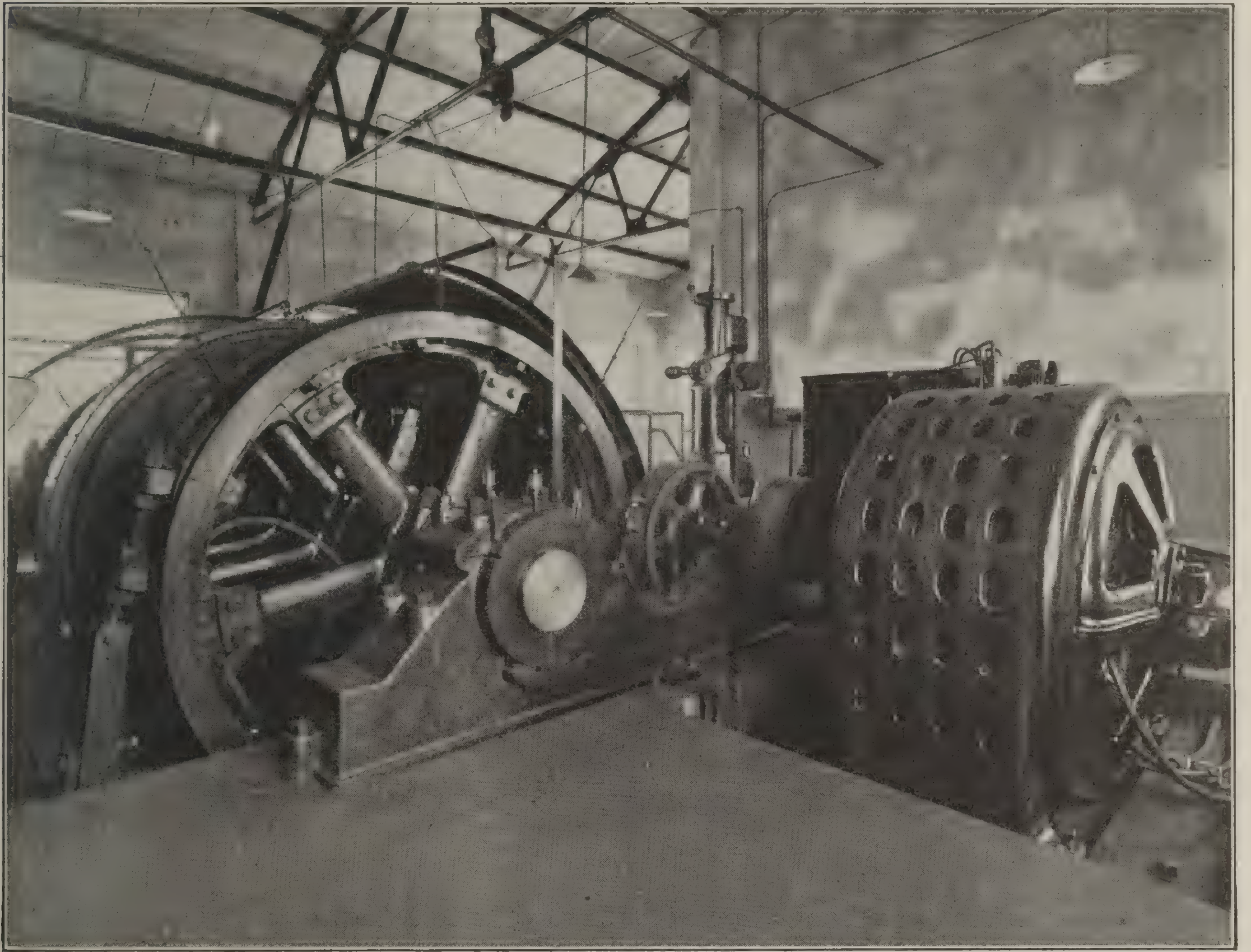
Electric Hoisting Would Pay if Guarantees Could Be Realized

From the results obtained the Lehigh Coal & Navigation Co. felt that electric power for hoisting purposes would be a paying proposition, if the guarantees made by the electrical engineers could be lived up to.

For local reasons it was decided to electrify the old No. 4 plant. This necessitated the electrification of No. 5 shaft hoist, as it was operated by steam from No. 4 boiler house, which will eventually be abandoned. The company also decided to use electricity for operating the hoist at the new No. 11 shaft.

As soon as this decision was reached and a definite cycle of operation determined, the question was turned over to the various electric companies and hoist manufacturers, and alternative proposals called for on three methods of electric hoisting; namely, the slipring induction motor with single-geared reduction, the direct-current hoist motor with synchronous motor-generator set and generator field control and, finally, the Ilgner system.

Specifications were received covering these three methods of hoisting, and after careful consideration, it was decided that the induction motor with single-geared reduction was best suited to meet the conditions.

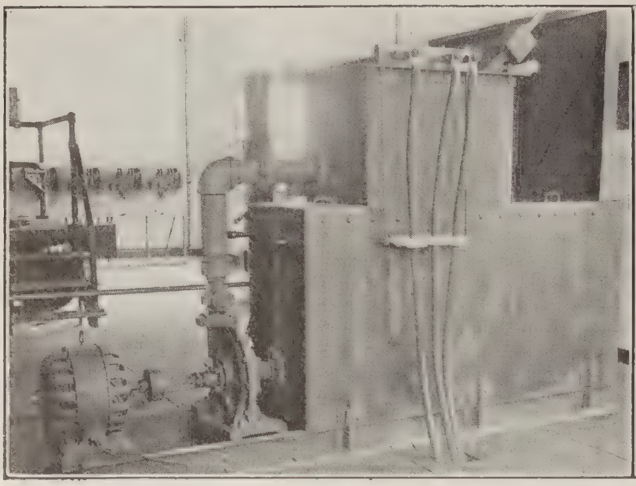


Hoisting Equipment at No. 5 Shaft

The duty to be met by this hoist is as follows: Depth of shaft, 486 ft.; weight of coal per trip, 11,500 lb.; weight of cage, 11,000 lb.; weight of empty car, 5500 lb.; diameter of rope, 1½ in.; rest between hoists, 15 sec.; cars per hour, 80.

The specifications called for a motor of sufficient size to operate the hoist unbalanced if necessary, the motor to be designed of sufficient capacity to meet this condition without injury. This required a 750-hp., 300-r.p.m. slipring induction motor of particularly rugged construction operating on a 2200-volt, three-phase, 25-cycle circuit.

The selection of the proper size of motor to meet the service was comparatively easy, but the choice of the



Liquid Rheostat at No. 11 Shaft

No. 5 Shaft Hoist House

proper control to meet all the varied conditions of hoisting was a subject that required considerable thought.

It was realized by the engineers of the Lehigh Coal & Navigation Co. that no time or money should be spared to make the control of the contemplated electric hoist as perfect as it was possible to build.

The 23 Necessary Requirements

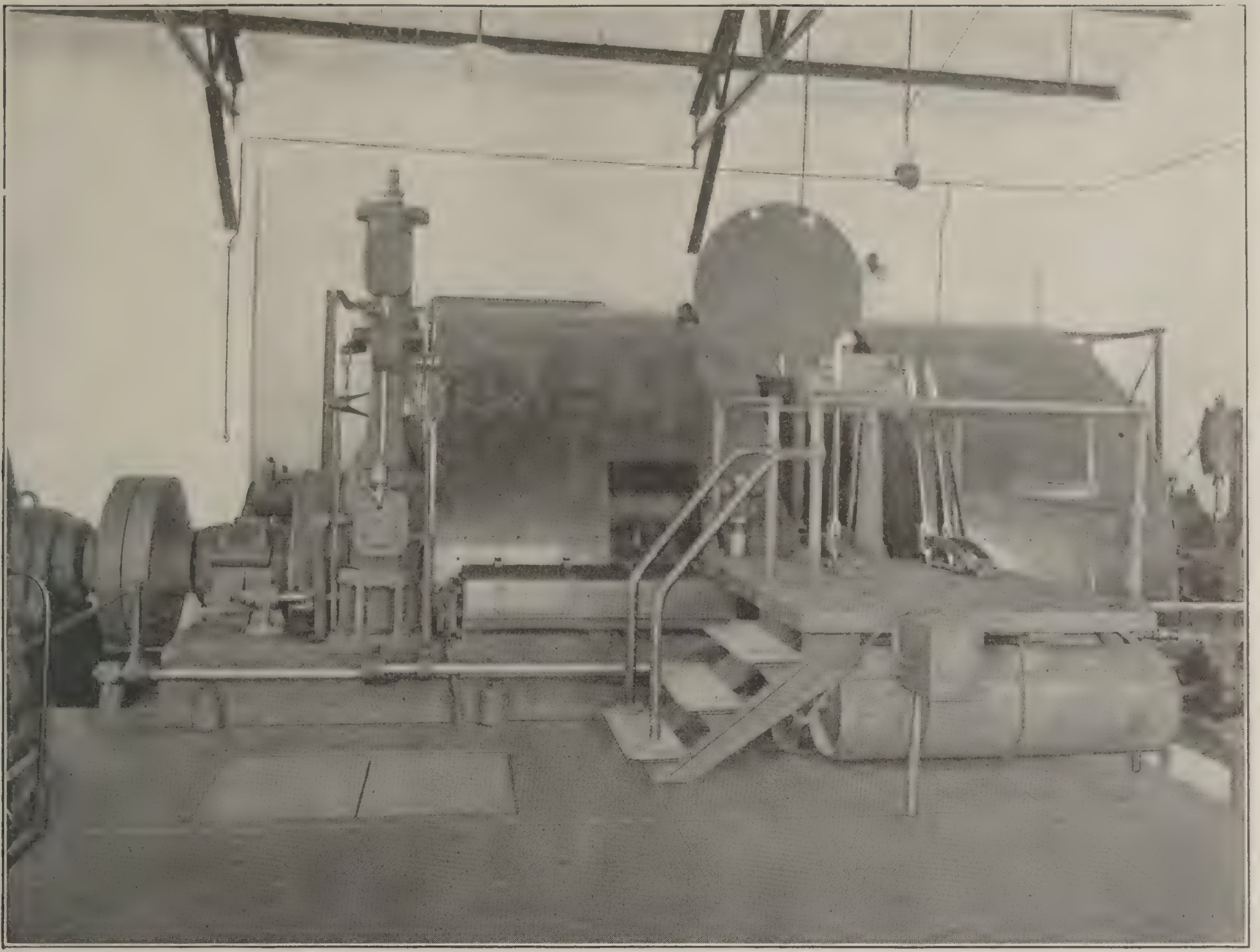
The company therefore insisted that the following 23 features should be embodied in the control of this hoist:

1. Hoist must not over-travel in either direction.
2. It must be impossible for the operator to start the hoist in wrong direction at either limit of travel.
3. Hoist must not back away due to failure of power or overload.
4. Protection must be provided against overspeed, due to any cause whatever in any position of travel.
5. Emergency brake must set and power be interrupted if operator fails to retard hoist approaching landings. This performance to be graduated and the braking effect must be adjustable to meet conditions.
6. Hoist must not start if upon return of power operator has carelessly left lever in "on" position.
7. If control circuits become grounded hoist must stop.
8. If operator fails to keep power brake in proper adjustment, emergency brakes must set and power must be interrupted, and remain so until operator has readjusted brake.
9. Hoist must be brought to rest and brake applied on loose drum before clutch can be disengaged.
10. It must be impossible to release brake on loose drum while clutch is disengaged.
11. A pawl must be provided, interlocking with clutch engine lock, this pawl to engage with loose drum before clutch can be released.
12. Inability to operate hoist unless clutch is full "in" and locked.
13. Air reservoir must not be drained due to emergency stopping of hoist.
14. There must be no delay in operation of hoist due to emergency stopping.
15. It must not be necessary for operator to call assistance in case of emergency stop, over-travel, or otherwise.
16. For operating hoist a multiplicity of levers must be avoided; two will be allowed, *i.e.,* brake and control.
17. Hoist operator must not be endangered by flying levers in emergency stopping of hoist.
18. No safety features can be dependent on the will of the operator.
19. A switch must be provided on operator's platform for an emergency stop if necessary.
20. Travel limits and speed ranges must be easily adjustable.
21. Current input to and acceleration of hoist motor must be governed automatically.
22. Hoist must start from rest gradually without excessive jerk and come to rest smoothly, and must be under control of the operator at all times.
23. The speed of the hoist must be varied by cutting the resistance into or out of the rotor circuit. The rheostat must be of the liquid type and of ample capacity to meet all operative conditions.

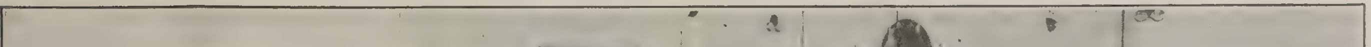
New Fireproof Hoist House Erected by L. C. & N. Co., Lansford, Penn.

From information the company had acquired on the use of oil-immersed contactors, it was decided that the hoist should be equipped with an air-break primary reversing switch.

In connection with the hoist proper it was necessary to provide a loose drum. It is a well known fact that numerous accidents have occurred while changing levels, due to either poor brakes or the failure of the engineer to place the cage on the landing fans while changing levels, and in view of this fact, the specifications for this hoist called for an interlocking device between the clutch engine and the pawl on the loose drum. This makes it impossible for the loose drum to move when clutch is released.



View of Hoisting Installation at L. C. & N. Co.'s No. 11 Shaft



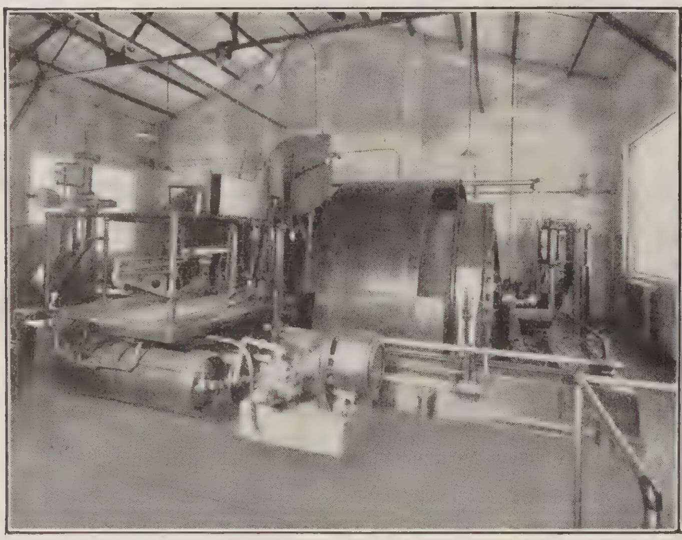
Another View of the Hoist at No. 11 Shaft

The hoist being of the single-reduction geared type, it was decided to equip it with cut-steel Wuest herringbone gears.

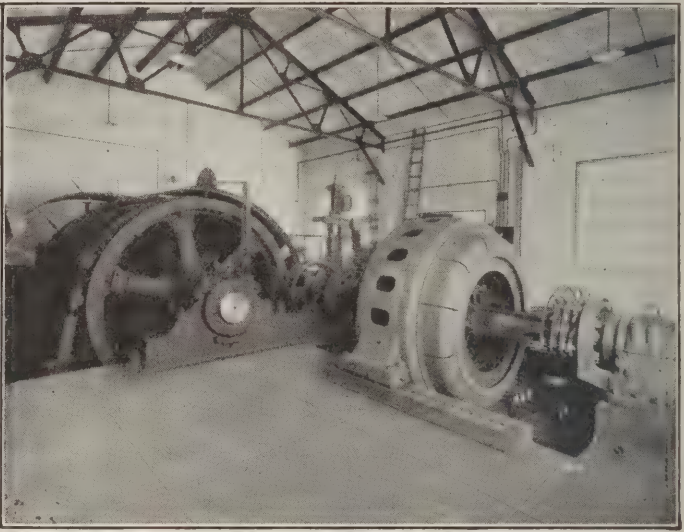
A brake on the pinion shaft was specified, this brake to work in connection with the main service brake, which was to be gravity actuated and power released. This auxiliary brake was so designed, however, that it would be impossible for it to take the full braking effort in the event of brake shoes wearing unevenly.

An auxiliary hand brake was furnished for use in case of emergency and a flexible coupling was provided of the Baehr type for connecting the motor with the pinion shaft.

Under these specifications the contract was awarded to the Vulcan Iron Works, Wilkes-Barre, Penn., and the General Electric Co., the Vulcan Iron Works furnishing the hoist proper with special control features, and the General Electric Co. the electrical equipment.



No. 5 Shaft Hoist



No. 11 Shaft Hoist

This hoist was delivered and placed in operation on Nov. 9, 1914.

The Change of Hoists Was Made in Two Days

It might be interesting to note that the old steam hoist which had been used for this operation was situated between the new electric hoist and the shaft. On Saturday afternoon, Nov. 7, 1914, on the completion of the day's work, it was decided to change from the steam to the electric hoist. To do this it was necessary to completely dismantle the 28x60-in. hoisting engine and remove not only this machine from its foundation, but the house also, as it was directly in line with the ropes to the new hoist. This was accomplished and the new hoist placed in service at 7 o'clock Monday morning, Nov. 9, 1914.

Due to the inexperience of the operators in handling the new equipment, the output on Monday was slightly curtailed, but since that time the hoist has fulfilled all expectations, and up to the present has operated without any delay.

The control features as outlined in the specifications to the builders have been met in every particular. As it has been the practice of the company to keep an actual account of coal and rock hoisted, but not the miscellaneous trips, such as inspections, men, timber, etc., the number of these miscellaneous trips can only be estimated; however, these extra trips average about 75 per day, which for the 23 days this hoist worked in November, 1914, would be 1725 trips. The number of cars of coal and rock hoisted, which were accurately counted, was 7704, making a total number of 9429 trips. The total input to the hoist was 37,500 kw.-hr., which would make an average per trip for the month of November, 1914, of 3.9 kw.-hr.

This result is most gratifying to the company when it is considered that to operate a hoisting engine for this duty would necessitate a boiler capacity of approximately 800 hp. This boiler would require at least three firemen and three ashmen every 24 hr., and under operating conditions for this region, the labor cost for firemen would be $167.76, and for ashmen, $135, making a total of $302.76 per month. This figure of course does not include fuel, boiler maintenance and repairs, nor depreciation on the boiler plant.

In addition to this installation a duplicate hoist was ordered for No. 11 shaft, the specifications being identical with the No. 5 hoist. This hoist with control features was built by the Vulcan Iron Works, and the electric equipment was furnished by the Westinghouse Electric & Manufacturing Co. The hoist has been installed and tested and will be put in service shortly.

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Anthracite Output Small

February was a second successive month of low anthracite production on account of the continued high temperature, which was about 6 deg. above the normal daily average for the month. As February was also a warm month of low output last year, it is probable that the amount of coal mined last month was approximately equal to that of February a year ago. The Bureau of Anthracite Coal Statistics reported shipments of 4,121,451 tons in February, 1914.

A period of heavy water has added to the expense of operating the mines, and as the warm weather has decreased the consumption of anthracite, the hard-coal industry suffers both ways. The quantity of water that must be pumped and hoisted out of the anthracite mines of Pennsylvania has increased nearly 10 per cent. in the last decade.

Determination of the Weight of Mine Locomotives

By Graham Bright*

SYNOPSIS—The material composing the tread of the driver as well as the grades traversed and load handled have a considerable bearing on the necessary weight of a mine locomotive. The speed of acceleration and retardation may also be important considerations.

The weight of a mine locomotive is determined by a somewhat different set of conditions than its equipment, and the object of this article is to present some simple rules and formulæ so that a person with a fair knowledge of mining conditions can readily determine the proper locomotive to use to meet a certain set of circumstances.

The determination of the weight of a mine locomotive is a comparatively simple matter, and depends upon the loads to be handled, the frictional resistance of the cars, the length, value and direction of the grades, the rate of acceleration, the kind of wheels used, the size of the rails, the wheel base of the locomotive, and the height of the drawbar.

Where possible an actual test should be made in order to determine the average frictional resistance of the cars. This test can be made by pulling a car at a constant speed on a level track or on a track of a known grade and measuring the pull by means of a spring balance. Another method which will give the approximate friction is to find a grade down which a car will coast slowly at a constant speed without tending to increase or decrease its velocity. If this grade is say 1 per cent. then the frictional resistance of the car would be 1 per cent. of 2000 or 20 lb. per ton.

When the frictional resistance of the cars is not given it should be assumed at 30 lb. per ton unless they are newly equipped with roller bearings of an approved make. Roller bearings when installed and looked after properly, will no doubt give frictional resistance ranging from 15 to 20 lb. per ton. The writer, however, tested a number of roller bearings about three years ago which had been neglected and not properly lubricated. In this case the average resistance of several cars was 36 lb. per ton.

Friction Greater When Pushing Than When Pulling

On account of the short wheel base of a mine car the friction may be considerably higher when pushed than when pulled. When a string of cars are pushed they are liable to wobble more or less, and considerable binding of the flanges against the rails may take place. When the cars are pulled they are stretched out straight and but little wobbling will take place. The frictional resistance of new cars will largely depend upon the type of bearing, while for the old cars it will be decidedly influenced by the manner in which the bearings are kept up.

The locomotive resistances will range from 12 to 20 lb. per ton. It is safe to take 15 lb. as an average since the friction of the locomotive is such a small percentage of the total tractive effort, and a change of several pounds in either direction will not affect the weight of the locomotive appreciably, and the effect on the capacity of the motors will be negligible.

The effect of the frictional resistance of the load will vary with the length and severity of the grades. If the track is practically level throughout, then a small change in the frictional resistance may have considerable effect on both weight and equipment. If, however, the grades are long and severe the effect will be small.

When a locomotive is operating at a constant speed on a straight, level track, the drawbar pull available for hauling a trailing load (provided there is sufficient motive power) is limited only by the adhesion that can be obtained between the driving wheels and the rails. When starting, the drawbar pull available is reduced, depending upon the rate of acceleration. As this rate is seldom more than 0.2 to 0.25 mi. per hour per second, the drawbar pull will be reduced from 19 to 24 lb. for each ton weight of locomotive.

If there are no grades the weight of the locomotive will be affected considerably by the rate of acceleration. With heavy grades, however, the acceleration will have little effect since the rate can be kept low if it becomes necessary to start on the heavy grade. Accordingly with the low rate of acceleration common to mine service this factor can be considered negligible as regards the weight of the locomotive, in view of the fact that a greater percentage of adhesion can be allowed for starting by the use of sand.

Drawbar Pull with Cast-Iron and Steel Wheels

It has been found in practice that with cast-iron wheels a running drawbar pull equivalent to an adhesion of 20 per cent. of the weight on the drivers can be obtained with clean dry rails on level track, without the use of sand. A steel-tired or rolled-steel wheel seems to obtain a better grip on the rails, and a drawbar pull equivalent to an adhesion of 25 per cent. can be obtained under the same conditions. When starting heavy trips and when on steep grades it is permissible to use sand, in which case a drawbar pull equivalent to 25 to 30 per cent. for cast-iron wheels and 30 to 33⅓ per cent. for steel wheels can be expected.

Where grades are short the higher rates of adhesion may be used, but for long grades it is not the best practice. The writer has obtained by dynamometer tests adhesion values as high as 40 to 45 per cent. by the use of sand. The average of the tests was, however, much lower so that it is not good practice to count on such high values. These high percentages require the liberal use of sand on both rails, a practice which should not be encouraged as the sand increases the frictional resistance of the locomotive and cars, and tends to work into the bearings and gears.

Where no grades exist the weight of the locomotive should therefore be five times the drawbar pull for cast-iron wheels and four times for steel wheels, unless the

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*Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Penn.

rate of acceleration is such that additional weight is required. When, however, a locomotive with a trailing load is ascending a grade the drawbar pull is necessarily greater than that required to overcome the friction of the trailing load as the weight of the load has to be lifted up the grade. For every one per cent. grade 20 lb. per ton should be added to the drawbar pull required on straight level track since 20 is one per cent. of 2000 lb.

The effect of the grade on the locomotive as well as on the load must be considered. The heavier the grade the less will be the drawbar pull of a locomotive. This becomes evident when an abnormal grade is considered on which a locomotive will be barely able to propel itself, and if any trailing load is added the wheels will slip. The greater tendency for the wheels to slip on a grade is due to the increased tractive effort necessary to propel the locomotive itself and the weight transfer due to grade.

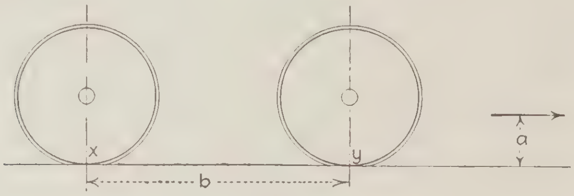


FIG.I.

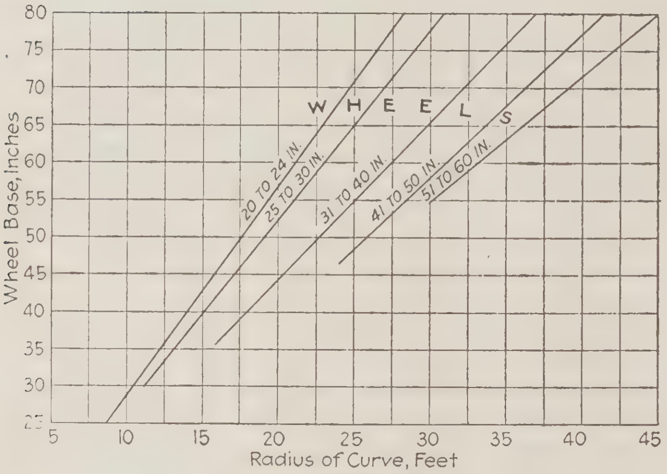


FIG. 2.

FIG. 1. ILLUSTRATES HEIGHT OF DRAWBAR AND WHEEL BASE. FIG. 2. SHOWS RELATION BETWEEN WHEEL BASE AND RADIUS OF CURVATURE

The weight transfer due to grade will depend on the wheel base and height of the center of gravity. With a short wheel base and a high center of gravity the weight transfer will be considerable. The modern mine locomotive is, however, constructed with a low center of gravity and a fairly long wheel base so that with the ordinary grades encountered the weight transfer is not serious.

The weight transfer due to height of drawbar will also affect the drawbar pull if the wheel base is short and the drawbar high. In Fig. 1 a represents the height of drawbar and b the wheel base. A horizontal force at the drawbar will act as on a bell crank one of whose arms is a and the other b. If the horizontal force represented by the drawbar pull is in the direction of the arrow, an upward force will be exerted at x and a downward force at y. If the drawbar pull is represented by D then the moment about y will be Da. This moment divided by b will give the lifting force at x. The adhesion of the wheel x will of course be lessened by the lifting force.

Assume a locomotive weighing 12 tons with a wheel base of 5 ft. and the height of drawbar 10 in. At 25 per cent. adhesion Da will be $6000 \times \frac{10}{12} = 5000$ ft.lb. The upward pull at x will be $5000 \div 5 = 1000$ lb. The normal weight at x is 12,000 lb. therefore the weight when the drawbar pull is 6000 lb. will be 11,000 lb. so that the adhesion will be ${}^{3000}/_{11000} = 27.2$ per cent. It is thus to be seen that with the ordinary height of drawbar and wheel base the drawbar pull is not seriously affected. In metal mining a much higher drawbar is sometimes required so that the wheel base must be lengthened to lessen the tilting effect.

By tieing the axles together by means of side rods, chains or gears the effect of weight transfer due to grade and height of drawbar can be eliminated, but these devices have not proven successful from an operating standpoint.

HOW TO DETERMINE THE WEIGHT OF A LOCOMOTIVE

Since the weight of the locomotive must be known before the amount necessary to add to the tractive effort for acceleration and grade can be figured, it is best to use a simple formula to determine the weight of the locomotive:

$$W = \frac{5 \times FA}{2000} = \frac{FA}{400}$$

for cast-iron wheels on a straight level track.

$$W = \frac{4 \times FA}{2000} = \frac{FA}{500}$$

for steel wheels on a straight level track.

$$FA + 20 \times G \times A + 20 \times G \times W = 400\ W$$

for cast-iron wheels on a grade.

$FA + 20 \times G \times A + 20 \times G \times W = 500\ W$ *for steel wheels on a grade.*

W = Weight of locomotive in tons.
A = Weight of trailing load in tons.
G = Grade in per cent.
F = Frictional resistance of trailing loads in pounds per ton.

In the above equations the term FA is the drawbar pull on straight level track; $20 \times G \times A$ is the added drawbar pull of the trailing load due to grade; $20 \times G \times W$ is the added tractive effort of the locomotive due to grade and the drawbar pull of the locomotive is lessened by this amount when compared with level track; $400\ W$ and $500\ W$ represent 20 per cent. and 25 per cent. adhesion for cast-iron and steel wheels.

The application of these equations can be better understood by considering an actual example. Assume a trip of 30 cars weighing 4 tons each including the load. The trailing load will therefore be 120 tons. Assume the frictional resistance of the cars to be 30 lb. per ton. Then on a straight level track:

$$W = \frac{30\ A}{400} = \frac{3600}{400} = 9 \textit{ tons for cast iron wheels}$$

$$W = \frac{30\ A}{500} = \frac{3600}{500} = 7.2 \textit{ tons for steel wheels}$$

On a one per cent. grade the weight will be:

$$30 \times 120 + 20 \times 1 \times 120 + 20 \times 1 \times W = 400\ W$$

or $W = 18.4$ *tons for cast-iron wheels.*

$30 \times 120 + 20 \times 1 \times 120 + 20 \times 1 \times W = 500\ W$
or $W = 14.6$ *tons for steel wheels.*

On a 3 per cent grade the weight will be:

$30 \times 120 + 20 \times 3 \times 120 + 20 \times 3 \times W = 400\ W$
or $W = 31.7$ *for cast-iron wheels.*

$30 \times 120 + 20 \times 3 \times 120 + 20 \times 3 \times W = 500\ W$
or $W = 24.5$ *for steel wheels.*

The above figures show a decided advantage of steel wheels over cast iron, and is one of the reasons why they are becoming more popular. Steel wheels cost more than cast iron and should have a little more clearance allowed to take care of the wear. The extra cost is, however, more than compensated by the added adhesion available. Steel-tired wheels may be trued up about two times before it becomes necessary to replace the tires.

The above figures also show that grades may become the principal feature in determining the weight of the locomotive. For this reason the length and percentage of each grade should be determined and also the length of the cars. Mine cars will range from 7 to 10 ft. long so that a trip of 70 to 80 cars will range from 500 to 800 ft. in length. In many instances severe grades are only 200 to 300 ft. long, in which case only a portion of the load may be on the grade at one time, consequently a much lighter locomotive could be used than if the steep grades were as long or longer than the trip.

In some cases the operating conditions are such that loads are handled down the grade, while the cars are always empty on the return up grade. This often means that safe braking conditions require a heavier weight of locomotive than is necessary to ascend the grade with the empty cars. If the grades are short and without sharp curves at the base it is not so important to figure closely. However, when the grades are long and severe or have sharp curves at their base, the weight of locomotive should be figured in a manner similar to that in the above formula, except that the formula will be modified to subtract the frictional resistance of the load, since it assists the braking. The formula will then be:

$20 \times G \times A + 20 \times G \times W - FA = 400\ W$ *for cast-iron wheels.*

$20 \times G \times A + 20 \times G \times W - FA = 500\ W$ *for steel wheels.*

In case the grade, curve and track conditions are very bad, and the question of safe handling down the grade is paramount then the adhesion factors of 20 per cent. for cast-iron wheels and 25 per cent. for steel wheels should be decreased to suit the particular case. Fairly safe figures to use are 15 per cent. for cast-iron and 18 to 20 per cent. for steel wheels.

SHORT RUNS REQUIRE A HEAVIER LOCOMOTIVE

Occasionally a locomotive is required for service which consists of short runs with quick starts. In this service, the weight of the locomotive will have to be increased.

The unit of acceleration is generally taken at an increase in speed of one mile per hour for each second of time; i.e., if the rate of acceleration is 0.5 mile per hour per second, the increase in speed at the end of ten seconds will be 5 miles per hour. To accelerate a ton of dead weight at the rate of one mile per hour per second, a force of 91.3 lb. above the frictional resistance must be applied.

This figure is obtained as follows: The force of gravity accelerates a given weight at the rate of 32.2 ft. per second per second. A rate of one mile per hour per second, is equivalent to 1.46 ft. per second per second. It will therefore require a force of $1.46 \div 32.2$ times the weight of a body to produce an acceleration of one mile per hour per second, or $1.46 \div 32.2 \times 2000 = 91.3$ lb. per ton.

Since a locomotive has rotative as well as translative inertia the value 91.3 will be increased by an amount depending upon the speed and radius of gyration of the rotating parts. A safe figure to use for a mine locomotive and trip of cars would be about 95 lb. per ton. In mine and industrial work where the speeds are from 6 to 8 miles per hour, the rate of acceleration is, as a rule, taken at from 0.1 to 0.2 miles per hour per second.

If high rates of acceleration and retardation are to be used the weight formula will be as follows:

$FA + 95\ B\ (A + W) = 600\ W$ *for cast-iron wheels on level track.*

$FA + 20\ G\ (A + W) \times 95\ B\ (A + W) = 600\ W$ *accelerating up a grade.*

Bringing trip to a stop on a down grade,

$FA + 20\ G\ (A + W) + 95\ B\ (A + W) = 400\ W.$

Here B is the rate of retardation in miles per hour per second.

For steel-tired wheels, 666 W can be used on level and up grades, while 500 W should be used on down grades. The values 400 W, 500 W, etc., should be selected according to the service conditions.

The resistance of curves can be neglected, as a rule, unless they are long or have a short radius. Ordinarily only a small portion of the train will be on the curve at one time so that the drawbar pull to be added should be calculated on the basis of the number of cars that can be placed on the curve simultaneously. The number of pounds per ton to be added for curves will average 0.5 lb. per ton per degree (about 0.3, however, for short curves with the gage spread). The value of a curve in degrees can be obtained by dividing 5730 by the radius of the curve in feet.

Care should be taken that the wheel base is not too great for the curve of the track. Fig. 2 shows the relation between wheel base and radius of curvature and from this curve one can readily determine the minimum curve that a locomotive with a given wheel base can safely negotiate.

Sometimes the weight of the locomotive figures out much too heavy for the weight of rails used in the proposition under consideration. If it is impractical to change the rails, the alternative is to reduce the number of cars per trip, so that the weight of the locomotive can be reduced. A larger number of locomotives of the smaller type will then be required, but the cost of operation may be reduced by coupling them in tandem so that only one operator is required for two machines. In this way full trips can be handled.

The following table gives safe practice regarding the proper weight of rail which should be used for various weights of locomotives:

Locomotive Weight on Two Pairs of Wheels, Tons	Weight of Rail, Lb. per Yard
4 to 6	16
6 to 8	20
8 to 10	25
10 to 13	30
13 to 15	40
15 to 20	50

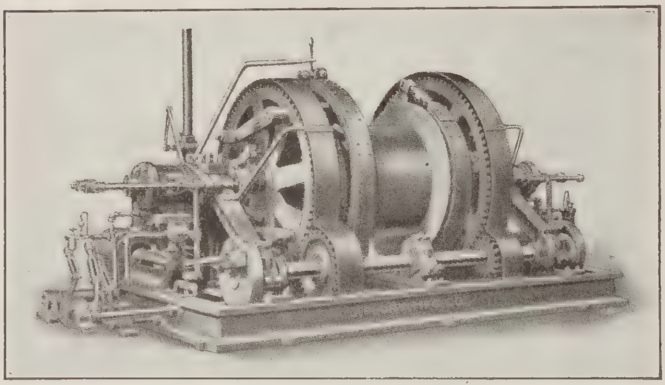
An Improved Type of Two-Speed Hoisting and Haulage Engine

By J. E. Werner*

During the many years that hoisting and haulage engines have been in use, manufacturers have made many kinds of machines to meet the various requirements. These hoists may be classified according to the relation of the drum location to the driving mechanism, that is, direct drive, single geared, compound geared and two speed. They may be driven by steam, air or electricity.

In numerous mining and contracting operations, it has become necessary to install two-speed hoists, in order that the same machine may be used for pulling loads over different grades. The load on a hoist increases as does the pitch of the grade. In order to maintain the horsepower constant an abrupt increase in grade should be accompanied by a decrease in the rope speed so that a change of gear ratio is desirable.

Until recently, this change of speed was made by means of sliding pinions, or jaw clutches engaging in pinions, the latter driving the drum gears. In order to shift these pinions or clutches, thereby increasing or decreasing the rope speed, the revolving parts are entirely stopped, or moved slowly, so that these parts may be properly engaged. This causes loss of time and also requires skill on the part of the operator.



A Flory Hoist Designed for Coal-Mining Service

In view of the fact that delays and experienced operators are important factors in production costs and that users of hoists aim to reduce expense to a minimum, an improved type of two-speed hoist has been put on the market, which eliminates jaw clutches, sliding pinions, extra shafts, bearings, etc. permitting the speeds to be changed instantly and requiring no experienced operator.

This improved type of hoist as illustrated herewith is built both for steam and electric power. It is a combination of two Werner type band friction clutches operating on the same drum shaft. The two-speed arrangement is made by means of two different-sized gears driving the drum and meshing in relative sized pinions.

Since the speed of rotation of the pinion shaft remains constant, the operator at will can increase or decrease the revolutions per minute of the drum by throwing the friction clutches on the small or large gears, respectively.

The construction is simple, easily adjusted, and operated with slight exertion on the part of the driver. The friction bands are thrown on or off by means of steam- or air-cylinder thrusts controlled by a slight movement of levers placed in a battery. These thrusts are actuated by regulating valves, while the speed of the piston travel in the cylinder is governed by small exhaust check valves.

The principal advantage of the Werner type band friction clutch is that the stress from the drum is transmitted through the bands directly to the teeth of the gears, instead of through the drum shaft, as is the usual practice. The torsional stresses set up in the drum shaft are thus eliminated.

The heavy-duty gear is secured to, while that for light duty revolves on the drum shaft. These gears with their corresponding frictions are controlled by separate levers, so that either clutch can be thrown on or off while the gears are in motion, thus saving time in stopping and starting. Users find this feature both advantageous and economical.

The friction-clutch combination is simple, consisting of a sliding sleeve on the drum shaft, connected by links to two sliding crossheads fitted in guides, so that by moving the sleeve parallel to the shaft the crossheads move at right angles to the same.

These crossheads are connected to a series of levers, two moving on trunnions, and two keyed to rocker shafts. One end of the rocker shaft carries a double stub, to which the friction bands are fastened. By moving the sleeve in or out along the drum shaft, the bands are thrown on or off.

This type of two-speed hoist, which is built by the S. Flory Manufacturing Co., Bangor, Penn., has been on the market for several years and has proved itself to be highly efficient for mining and contracting operations.

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*Chief draftsman, S. Flory Mfg. Co., Bangor, Penn.

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Extracts from a Superintendent's Diary

A weary, dejected Belgian came into my office today and insisted that our company was badly in need of his services at the coke ovens, in spite of the fact that our coke-oven foreman had told him that he was laying off men every day and could positively not think of employing new men. The man was so persistent in his efforts to obtain an interview with me that I could not refuse him a hearing in spite of the apparent hopelessness of his case.

Judging by his English, he had been in this country several months at least, as he had little trouble in making himself understood.

Without wasting any time on preliminaries, he informed me in the most brusque manner imaginable that we needed him to lute our oven doors. He said that we didn't have a man on the job who knew the first thing about luting ovens, and for that matter he hadn't seen one who did since he left Belgium. Then he went on to explain that luting ovens in Belgium was only intrusted to men who had been trained to the work from childhood, generally by their fathers who had been luters also.

A man fitted for a life work under such conditions took great pride in his work; for example, if several luters were employed on one battery, each man carried a marking stick to put a distinguishing mark on each door, so that if a question ever arose as to any particular door he could protect himself. During his recital I tried to imagine one of our door daubers resenting an accusation that one of his "buddies" was doing better work than he, but I couldn't stretch my imagination that far.

Then he went on to say that he had been to several byproduct plants in this country and found that they used expensive doors that didn't require skilled luters, and when he had inquired into the reason for such unnecessary expenditures, he was told that they could not use the simpler doors so successfully used in European byproduct practice because they could not get the right kind of men to handle them. One very frank superintendent, who had traveled much in Europe, had informed him that the mechanical labor-saving inventions, so common in America, were a matter of necessity and in reality should be considered as a reflection on the skill of American workingmen.

This intimation that European workingmen can accomplish tasks beyond our own men aroused my curiosity, and I could not resist the temptation to send for our coke-oven foreman and request that he reconsider the Belgian's application. I want to see what effect common everyday American clay, hand mixed for daubing purposes, will have on a true artist.

The Belgian's advent recalled to my mind an experience we had with a dauber several years ago. The fellow came into my office after wandering around the camp and suggested that he could increase our coke yield by improving our system of drafting. We employed him and gave him a free hand. After a few days he decided that the clay which we had been using was not suitable, and he experimented with various nearby clay banks. Six months passed and then he suddenly disappeared. Shortly thereafter a farmer entered a suit against us for using clay from his farm without his permission or knowledge. Our legal department settled the suit out of court by agreeing that clay taken under such circumstances should be considered almost as valuable as gold.

We never were able to learn whether the mysterious dauber got any of the settlement money, but if he didn't, we certainly owe his memory an apology.

Mining Fatalities in West Virginia Show Decrease

The list of fatalities in the coal mines of West Virginia during the month of January has just been issued by the Department of Mines, and shows that 22 workmen were killed during the month, as compared with 37 in January, 1914, and 29 during the preceding month. Of this number two died from injuries received in previous months, reducing the total to twenty.

While the usual percentage of deaths was due to carelessness and disobedience to mine rules, the decrease is most gratifying, and especially in McDowell County, the heaviest coal-producing county in the state, where only three fatalities were reported during the month. Of the others, five were reported from Fayette County, three from Marion, two each from Mineral, Raleigh and Logan, and one each from Brooke, Kanawha, Mercer, Mingo and Upshur counties.

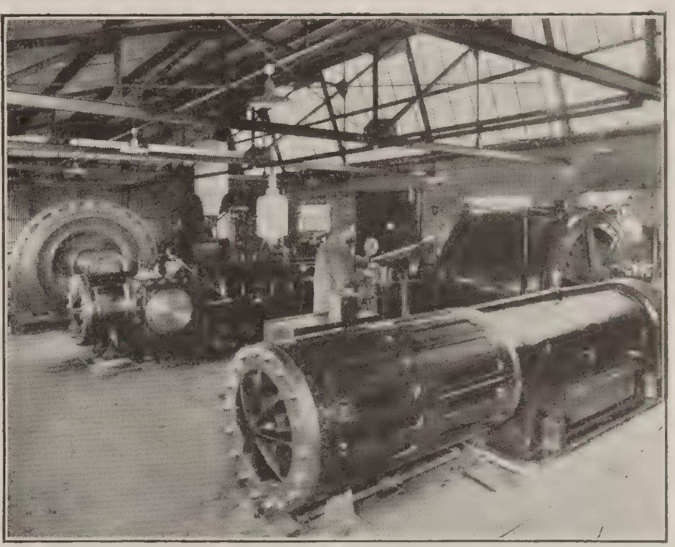
A classification of the fatalities shows that 11 met death from falls of roof and coal, 2 from railroad cars, 4 from mine cars, 1 from locomotives, 1 from a monitor, 1 by electrocution, 1 by explosives and 1 from an unclassified cause. Four occurred outside the mines. Of the men killed 14 were Americans and 8 foreigners.

A New Hoisting Engine

To meet the ever increasing demand for greater output in coal mining and to lessen the manual labor of handling the heavier machinery required therefor together with increased weight and strength to resist the shock to which mine hoists are always subjected, a new hoisting engine has been introduced by the Crawford & McCrimmon Co., Brazil, Ind.

In this design the important parts exposed to excessive stress are made of steel, while the valves and valve gear are of an improved type in which the valves are perfectly balanced and at the same time free to tip upon a slight back pressure, thus relieving the cylinders from the danger incident to a slug of water which may be pulled over from the boilers.

The hard work devolving upon the engineer in handling large engines of the ordinary type with their heavy link motions and balance weights is largely mitigated in this design by the application of a new link motion which embodies a stationary link not shifted on reversal of the engine, but only the link block and its radius valve rod, which are light and easy to handle.



HOISTING PLANT OF AMERICAN COAL MINING CO., BICKNELL, INDIANA

The machine is provided with a steam reverse and a steam brake in addition to an emergency brake. A new throttle valve is supplied, in which a differential lever motion is employed and a toggle pressure applied in closing.

The cylinders are fitted with large ports and the main valves are double ported. The ease and freedom with which these valves may be tipped up in an emergency obviates any necessity for pop safety release valves on the cylinders.

In the makeup of the winding drums the spiders through which the whole power is transmitted are made of steel in two halves and are double keyed to the shaft. The connecting-rods are of forged steel with solid ends. The crossheads are also of steel casting. The piston rods are metallic packed and the operating levers are all conveniently grouped. The whole design is intended to make the engine not only durable in operation but easy to handle, both of which considerations tend toward large output.

Gasoline Mine Haulage as Compared with Mule Haulage

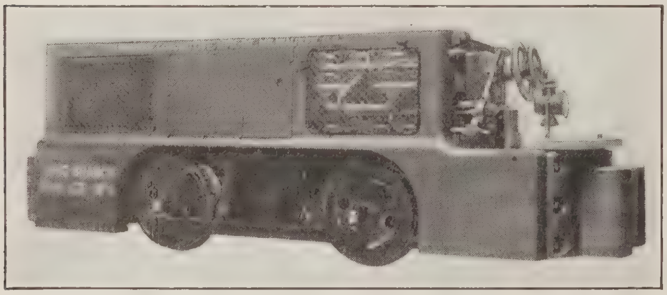
SYNOPSIS—Comparison of costs of coal transportation with mules and with a gasoline locomotive showed a difference in favor of the mechanical haulage of 19.17c. per ton mile. The yearly saving effected is estimated as $3372 while the output was materially increased.

The advance of mechanical equipment in the field of coal transportation at the mine is causing the mine mule to disappear, and the prediction is sometimes made that within a few years the mule will have practically vanished from the larger operations. The number of these animals now employed is already on the decrease, and the rapidity with which they are being supplanted with mechanical apparatus gives weight to the above prediction.

The mule has long been a factor in the haulage problem and one of the chief items of expense at the mines. In order to show a profit the operator must get his coal onto the railroad cars in the cheapest manner compatible with prompt shipment. The mule-drawn car is a relic of the past, and that it must go is apparent since it has been demonstrated that mechanical haulage is cheaper and, all things considered, more efficient.

A Mine Mule Now Used Only in Gathering

In the banishment of the mule from American mines, gasoline promises to be an important factor. The present is often referred to as the gasoline age, and it is certain that this fuel is coming to be one of the most generally used sources of power and locomotion.



The Gasoline Engine Employed for Haulage

One of the best illustrations of these facts obtainable anywhere is to be found in the operation of the Long Branch Coal Co. at Long Branch, Fayette County, W. Va. Here gasoline haulage has greatly reduced the expense of coal transportation even while the output has been materially increased. The mine in question is owned and operated by the above mentioned company headed by P. M. Snyder, the land being leased from the Snyder-Boom Co. It is under the direct management of L. Graney, one of the youngest men in the state to occupy the position of manager. It is a new mine, but has been placed on an effective operating basis and is now working full time whenever railroad cars can be secured.

The supplanting of the old system of mule haulage was done in 1913 with the idea of cutting down operating costs. The company purchased a Milwaukee M-35, 7-ton gasoline locomotive. This was put into service in the summer of 1913. At the end of the month of August, a comparison was made with the month of February, the most productive month during the régime of mule haulage. A summary of this comparison is given below:

COMPARATIVE COSTS OF THE TWO SYSTEMS OF HAULAGE

Total cost of mule haulage, per month	$810.00
Total cost of gasoline haulage, per month	529.63
Decrease in haulage cost, per month	$280.37
Total coal tonnage by gasoline locomotive, tons	11,601
Total coal tonnage by mules, tons	7,848
Increase in coal output, tons	3,753

The analysis of the above summary is shown by the following detail comparison between the cost of haulage by mules and by a combination of gasoline locomotive and mules for gathering.

Mule Haulage—Month of Feb., 1913

Length of haul one way, ft	2000
Maximum grade against loads, %	5.625
Average grade against loads, %	3.0
Total tonnage per month of 24 days	7848
15 mules—feed and upkeep per day @ $0.60	$9.00
11 drivers—wages per day @ $2.25	24.75
	$33.75
24 working days @ $33.75—cost per month	$810.00
Total haulage cost per ton of coal	0.103
Total haulage cost per ton mile	0.272

Gasoline Locomotive Haulage in Connection with Gathering by Mules—Month of August, 1913

Length of haul one way, ft	3000
Maximum grade against loads, %	5.625
Average grade against loads, %	3.0
Total tonnage per month of 25 days	11,601
Expense of mules and drivers for gathering, 25 working days	$313.20

COST OF OPERATING LOCOMOTIVE 25 DAYS

1 motorman @ $3.00 per day	$75.00
1 trip rider @ $2.00 per day	50.00
300 gal. gasoline @ $0.20 per gal.	60.00
38 gal. engine oil @ $0.40 per gal.	15.20
3 gal. black oil @ $0.16 per gal.	0.48
Cup grease	0.50
Waste	0.25
Repairs on motor	15.00
Total operating expense of locomotive	$216.43
Total haulage cost per month	$529.63
Total haulage cost per ton of coal	0.0456
Total haulage cost per ton mile	0.0803
Cost per ton of coal—mule haulage	0.103
Cost per ton of coal—locomotive haulage	0.0456
Saving per ton of coal	$0.0574
Cost per ton mile—mule haulage	$0.272
Cost per ton mile—locomotive haulage	0.0803
Saving per ton mile	$0.1917
On a basis of 12 months the cost by mule haulage for one year ($810 × 12)	$9720.00
By locomotive for one year ($529 × 12)	6348.00
Yearly saving	$3372.00

In short, with the gasoline haulage system the tonnage of the mine has been increased on an average of 25 per cent. per month, and the company has dispensed with 6 double teams or 12 mules and 6 drivers, a total monthly saving in expense of $496.80.

The hauling is not yet entirely accomplished by gasoline motors, as the mules are still used for gathering. The mine tracks are to be extended, in order that the more satisfactory and cheaper service of the locomotive can be taken advantage of to the greatest possible extent.

So satisfactory were the results with the gasoline locomotive that the management of the company installed a second machine the following year, and now have both in operation.

The particular locomotive referred to above is classified by the manufacturers as an "M-35," 7-ton, 42-in. gage machine, and in the above work handled 8 loaded mine cars at a trip, each car carrying 1⅗ tons of coal. The coal is hauled from three partings.

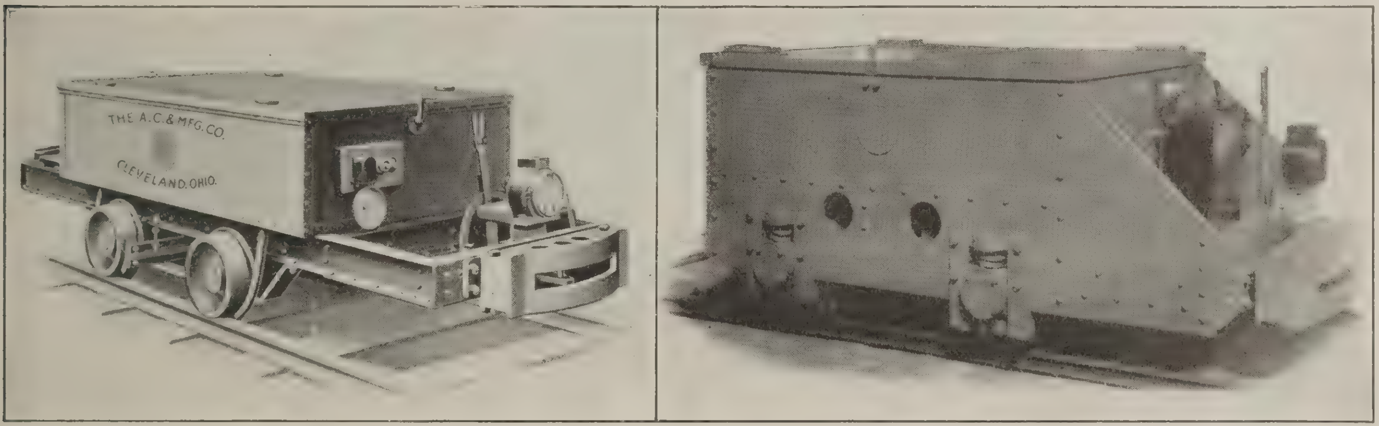
At the mouth of the mine the locomotive drops the loads at the head of a 2100-ft. incline and goes back with the empties. The incline handles 5 cars at a trip, and works on the gravity principle, the loaded cars on their descent pulling the empties back up the mountain side. At the foot of the incline the cars are taken down a tramroad, 4100 ft. to a tipple on the Virginian R.R. This tipple is capable of handling 1200 tons of coal daily.

Economy in Mine Haulage

By R. S. Richards*

SYNOPSIS—Although horses and mules have in the past been used to a considerable extent for transporting coal underground, their place is now being taken by locomotives. Storage-battery machines in this service reduce the costs of coal moving about three-fifths.

Economy in mine haulage is a subject which has been, and will continue to be, much discussed among mining men. The competition of the present day renders it imperative that the operator who would dispose of his product profitably must give transportation of coal in and around the mine his closest attention.



Two Distinct Types of Storage-Battery Locomotives

Mules and horses have long been used for the propulsion of mine cars. In the larger and more progressive mines of today, however, they have been supplanted in large measure by the locomotive. Horses and mules require feed and bedding, which is a considerable item of expense. Furthermore, they must have shoes, harness and occasional medical attention. The life of an animal in this service is limited, due to the unfavorable conditions under which he has to work, the class of work performed and the inevitable accidents. Good drivers are difficult to secure, as most competent men prefer work which returns a greater remuneration. But, above all else, the tonnage handled is not entirely satisfactory.

There are four general types of locomotives employed in and about the mines. These may be classified, according to their driving power, as steam, compressed-air, gasoline and electric. The steam-driven machine has many objectionable features which render it unsuited to employment underground, chief among these is the large volume of smoke and gas given off by the fire. Compressed-air locomotives emit no noxious gases. They are not, however, employed to as great an extent as some other types.

The gasoline locomotive has found favor in some locations, but the presence of the exhaust gases, as well as the sparks sometimes accompanying them, render their use objectionable under certain conditions. Furthermore, the gasoline engine has not yet been brought to that state of perfection where it may be absolutely relied upon under all circumstances.

Electricity is used for power or lighting in a large percentage of mines. The current may be obtained either from a private source or purchased from a central company. To extend the use of current to the propulsion of electric locomotives would not require any considerable expenditure, the bonding of the rails and stringing of the trolley wires being the most important items to be considered.

The Three Types of Electric Locomotives

Generally speaking, electric locomotives may be divided into three classes or types; the trolley type, the storage-battery and the combination trolley and storage-battery varieties. Where the mine is already provided with electric current, the trolley type is the more economical, especially on long hauls. The danger from the trolley, however, must not be lost sight of.

The storage-battery locomotives now on the market are giving excellent results and are especially desirable for remote mines where a continuous supply of electricity is not obtainable. While a current for charging the storage battery is, of course, necessary, this can be produced by a small generator, which represents only a slight investment. Where the mine is already equipped for trolley locomotives, those of the storage-battery type may in many cases still be used to considerable advantage. At those mines where the power plant is loaded well up to its capacity, the storage-battery locomotive finds its special value, as the current for driving the machines may be obtained at night or at other times when the generator is not running under full load.

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*10522 Olivet Ave., Cleveland, Ohio.

For cross-entry and room work, probably no form of haulage system can surpass for economy and convenience the storage-battery locomotive, hence, the expense and annoyance of the gathering cable are done away with. No trolley wire or other conductor is required and the bonding of rails is unnecessary.

Tests in various mines have shown that the average cost of gathering with storage-battery locomotives is about 2c. per ton as against 4 to 5c. with mule haulage. Where operators are forced to sell their product at a profit of only 5c. per ton, and many are at the present time selling it at cost, or even less, this saving is a considerable item. If the machine is equipped with a reliable storage battery and is properly constructed, the purchaser need have no fear concerning its operation. Such machines are easily cared for and are practically foolproof.

The combination type of locomotive is merely a combination of the trolley and storage-battery machines. It finds its greatest application where a general-utility locomotive is desired.

The Labor Situation

SYNOPSIS—The northeastern Ohio situation shows no change. A strike in Fayette County, the Jamison strike in Marion County, and the trouble at Ronda and Dry Branch focus attention on West Virginia. A strike in Kentucky shows signs of coming to a speedy end.

The report of D. J. Keefe and Hywel Davies on the northeastern Ohio strike apparently has been held back in the hope of a settlement. John P. White, the president of the United Mine Workers of America, William Green, the secretary-treasurer of that organization and several members of the Pittsburgh Vein Operators Association have met with Secretary of Labor Wilson, and have tried to forestall the report with a settlement. On Mar. 2 the report was formally delivered.

It is said to state that the operators offered to accept the report of the conciliators as final and binding. This the miners refused. The operators then offered to leave the matter to arbitrators, allowing the conciliators to choose the arbiters. The miners again refused, offering to arbitrate provided the mines resumed work at the increased wages demanded by the miners and that umpires be appointed by miners and operators. The operators refused to accept this arrangement, as a disagreement between operators and miners in regard to the appointment of umpires would effectually block the arbitration.

Arbitration Not Desired by Eastern Ohio Miners

The operators then offered to arbitrate, providing that the nonpartisan umpires should be selected by the judges of the northern district of Ohio. The miners again refused. The operators then proposed arbitration with umpires selected by the President of the United States. Again the miners demurred, and finally the secretary-treasurer, William Green, withdrew the agreement of the union officials to submit the differences to arbitration and stated that the only settlement that the union would accept was one which conceded the original demands of the miners. So, after all, no good resulted from a conference into which the union men never entered in good faith.

They promised the legislature when the Green bill was passed that they would not increase the price of coal. Now they are trying to increase its cost by 2.39c. per ton. The actual increase, which is larger, is, of course, difficult to gage. Its amount is dependent on the amount of slack coal which careless mining will make.

Some Believe Strike Near Settlement

There are some who believe that the strike may be settled by arbitration, despite the refusal of the miners to accept that mode of settlement. Such prognosticators draw hope from the conference now called by the Secretary of Labor. It is intimated that he will urge upon the miners the necessity for arbitration and that President Wilson may be called upon to name the arbitrators. It is understood that the proposal submitted by the operators at the last Cleveland conference still stands. This provided that the miners name three members of the board, the operators three and the judges of the federal court of the northern Ohio district the other three, the board to consist of nine members.

Some think that Secretary Wilson has not made public the contents of the report, because he believes that there is yet some chance for settlement of the strike and that the publication of the document might prejudice the situation. The proposal of the operators for arbitration follows:

> In accordance with the understanding at the adjournment last Thursday that three names be submitted by the operators of eastern Ohio to constitute part of an arbitration board for the purpose of deciding the matters in dispute which have resulted in the past ten months' strike in the mines of eastern Ohio we have selected and herewith submit the names of C. E. Maurer, S. P. Robbins and G. M. Jones.
>
> These names are submitted with the understanding that they, together with three members selected by the miners, shall choose three disinterested members, who shall constitute a complete arbitration board of nine members and that the decision of this board shall be final and binding on both the operators and miners.
>
> In the event that the members selected by the operators and miners are unable to agree on the election of the three disinterested members within three days from date, then we agree that the said disinterested members shall be appointed by the President of the United States.

As we go to press, we learn that the meeting at Washington has been held and that the conference was suspended, so that the miners' leaders might have time to return to Ohio and confer on the proposals made to them.

Three Centers of Unrest in West Virginia

The interest in the labor situation has shifted in some degree to West Virginia. Apparently the Jamison Coal Co. did not cease its practice of supplying the miners with powder without promising compensation. This is said to have amounted to 4c. on the car. Apparently the strike is not spreading as was anticipated. The authorities are working hard to reduce the illicit selling of whisky, some men having tried to smuggle in 20 gal. on Feb. 22.

The Ronda and Dry Branch strike seems to be nearing a compromise. It is only the gas coal which makes an excessive amount of slack, and it is only in regard to this that the question of scale arises.

Fifteen thousand men in the Fayetteville district are seeking a 10 per cent. increase in wages on all mining and day work, and demand that dues and assessments be checked off at the office. They also demand a 9-hr. day and the free use of a building in which to hold the meetings of the local union.

The union men deposed President L. C. Rogers and seven other officers on charges of using the funds of the United Mine Workers of America to secure their election, and for "other wrongful and fraudulent acts." The International Executive Board will investigate the charges.

Du Pont Company Arranges Its Labor Troubles

In a telegram to S. J. Gish, president of the Central Coal & Iron Co., of Central City, Ky., a Du Pont corporation, John P. White, president of the United Mine Workers of America, declares that the International Executive Board will suspend the order for the closing down of the mines of the company. This has been done because President Gish agreed to comply with the contract dated Apr. 1, 1914, between the Western Kentucky Operators' Association and the United Mine Workers of America, provided that in the settlement of disputed questions the company should appoint its own arbitrator in place of the commissioner of the operators' association.

In Colorado the men have been acquitted who were tried for shooting guards during the strike. The men killed were riding in an automobile at La Veta.

Success

The big SUCCESS number of Coal Age which will be issued Apr. 3 promises to eclipse all expectations. If you have made a practice of occasionally writing for Coal Age, your record will be incomplete should you fail to have a contribution in this particular issue. If you have been bottling up all your mining experiences, and thereby "hiding your light under a bushel," this special number of Coal Age is by all means the appropriate time for you to make your debut in the literary field of the technical world. Get busy today and start the preparation of a SUCCESS article along the lines outlined in our foreword last week.

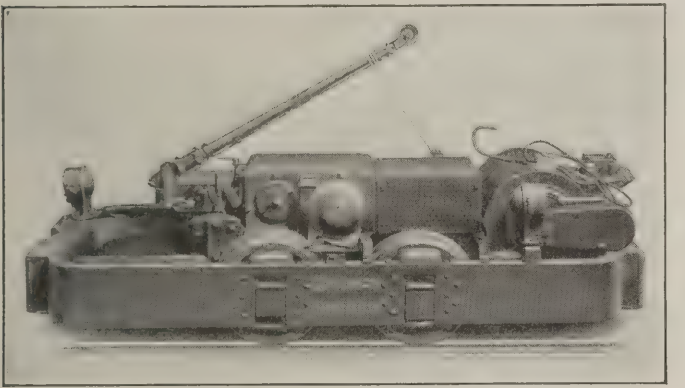
Electric Gathering Locomotives

By E. C. De Wolfe*

SYNOPSIS—In most modern mines, the gathering locomotive has replaced the mule for haulage purposes. Aside from economy considerations, the gathering locomotive is a physical necessity if large outputs are to be handled. Old mines can be equipped with such locomotives as well as newer operations. These machines have a multitude of uses.

The past ten years in bituminous mining history have been marked by no advances of greater moment than the development and wide adoption of locomotives for gathering, as auxiliary to the main haulage system in performing the "mule" service of distributing the empty cars to the miners and making up the loads into trips for hauling out. Arguments for and against the use of locomotives in gathering ceased long ago, as actual demonstration of the advantages of the new way gradually removed all basis for reasonable opposition.

Admitting the existence of possible exceptions, the statement is nevertheless warranted and easily defensible, that the mule is no longer a "necessary nuisance" in extensive or permanent service underground. Stabled in the mine he is a constant item of danger in various ways. Subject to indisposition and injury he is uncertain in regularity and length of service. A voracious consumer of feed, and requiring regular care, his "upkeep expense" goes on through idle days or weeks just the same as in production time.



Low-Vein Type of Gathering Locomotive

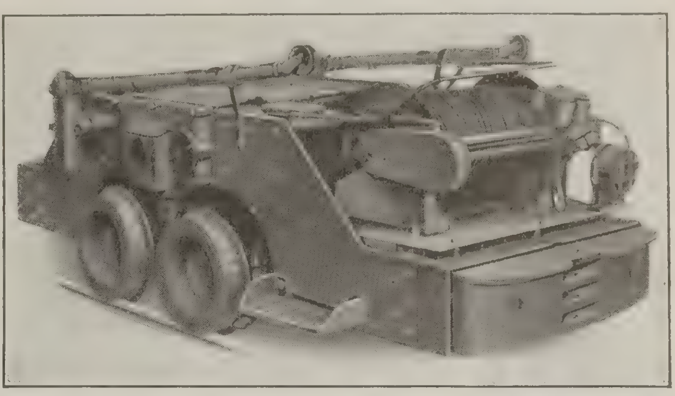
Animal haulage is not economical, either in first cost, operative expense, life of useful service or salvage return on disposal. Why, then, the mine mule?

For modern mines of large production, the gathering locomotive proposition bursts all bonds of relative economy considerations and takes rank as a physical necessity. None of the recent top-notch records in rapid development of new mines to large productive capacities could possibly have been made without organized mechanical systems of car handling from the face to the dump. For these operations there is no question as between mule and motor, but only as to what methods of locomotive gathering and haulage will be best, and what types of locomotives will be most suitable.

Gathering locomotives, generally speaking, are of small size and light weight as compared to locomotives for main haulage service. Hence they are admirably adapted in a most natural way to the development requirements of any mine, small or large, from its early days to its period of maximum tonnage and greatest haulage distances.

Some Mines Never Employ a Mule

One highly successful mine manager has illustrated his belief in early installation of locomotive haulage by saying that when he opens a mine and has room for a rail-length of track he puts in a pit car, and when he can double this length of track he puts in a small locomotive to haul the car, adding cars then until a second locomotive is called for by considerations of cars to handle, distances to run, divergence of entries, and advisability of having spare equipment to insure against possible interruption of the work. Certain it is that there are many mines in which no mule or horse has ever worked and where the haulage has been mechanical from the beginning.



Gathering Locomotive with Two Trolley Poles

The first locomotive—of gathering type, even though not at first equipped as a full-fledged gatherer—does all the haulage work. A second is added later to assist. A third and possibly others also divide the same work as the development progresses, all of them doing combination gathering and haulage work, or some of them serving only to gather, making up light trips which the others handle as haulage locomotives.

When later conditions call for the installation of a heavy locomotive for regular main haulage work, the lighter locomotives are all released for strictly gathering duty and the haulage becomes automatically a comprehensive system, which has grown in economical fashion with the needs of the work at costs consistent with the advancement of the development and output.

New and Old Mines

The new mine can readily be laid out and advanced with direct reference to the most effective operation of a complete system of mechanical haulage. Entry widths and spacing, room depths and necks, track character and curvatures, rail weights and bonding, switch locations and lengths, etc., are easily arranged to suit the plan of haulage which is to be used, and changes of the development plan can be made as experience or unforeseen conditions may dictate.

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*537 South Dearborn St., Chicago, Ill.

Nor does the older mine often present serious difficulties in the economical installation and in the operation of a gathering system. Of course the older the mine and the more modest its past methods, the more care is called for in the selection of a suitable locomotive equipment for working to the extremities of the development. In all but mines of most indifferent management and lax methods, the change is entirely practical and by no means prohibitive in cost.

For electric locomotives, the entry tracks must be bonded, and trolley wire hung. If the locomotives are to work into the rooms, the use of wood rails should be discontinued and steel laid, though not necessarily bonded, as the fishplates furnish satisfactory bonds for the short distances represented by maximum room depths. If duplex cables are used on gathering reels, the room tracks are not depended upon for current return.

Tracks must be laid and maintained more carefully than for mule gathering, for only by having fairly secure tracks can the advantage of the greater speed of the locomotive be realized dependably and with proper safety to men and equipment.

Goodman "Universal" Gatherer Pulling Loaded Car from Room

Room curves sometimes have to be changed, and rib corners cut away for proper clearance, though certain available types of strictly gathering locomotives in small sizes can usually be operated through the same clearances as the mine cars already in use. Minor alterations are necessary in various items of mine condition and operation, but all are in the direction of improvement and are well repaid independently of the advantages to be derived from the new gathering system itself.

However, where conditions are exceptionally bad, or local exhaustion not far ahead, or other aspects reasonably oppose the installation of the locomotives, such parts of the mine can best be continued on the old basis, while newer territory is changed to the better way, and all advancement work planned and operated similarly from the start.

So the operator with a new property has no monopoly of opportunity for enjoyment of the advantages and economies of locomotive gathering.

Three Methods of Gathering

Gathering methods are as variant in details as any other phase of mine operation, but in a general way they fall under three broad classes, applied singly or in combination.

1. *Entry Gathering*, wherein the miners push the empty cars from the entry to the face and return the loads to the room neck or onto the entry. The locomotive in this work usually operates on some plan whereby it distributes the empties of an in-trip to the room partings along one entry and goes at once to another entry to make up an out-trip of loads already pushed out by the miners. Local conditions or personal preferences determine whether the locomotive (a) pushes the trip of empties up to the head of the entry and drops them off at the rooms on the return, leaving itself a free way out to the main or side entry and to another room entry where the loads there waiting can be bumped ahead to make up a trip, which then is pulled to the main haul siding; or (b) pulls the empties in behind and drops them off at the rooms, crossing to the parallel entry to make up the load trip to push out to the siding.

The locomotive for this work may be of simple haulage type, in suitable weight, and requires no special features other than provisions for rapid handling and close control. If the miners leave the loads in the room necks and the locomotive has no electric conductor cable for enabling it to depart from the trolley wiring, it works with a car or two always ahead to reach the cars in the room necks without itself leaving the entry track.

Even for this plan of gathering it is well to have available the "gathering reel" of electric cable for enabling emergency operation into rooms or beyond the end of the trolley wiring on the entry.

Working into the Rooms

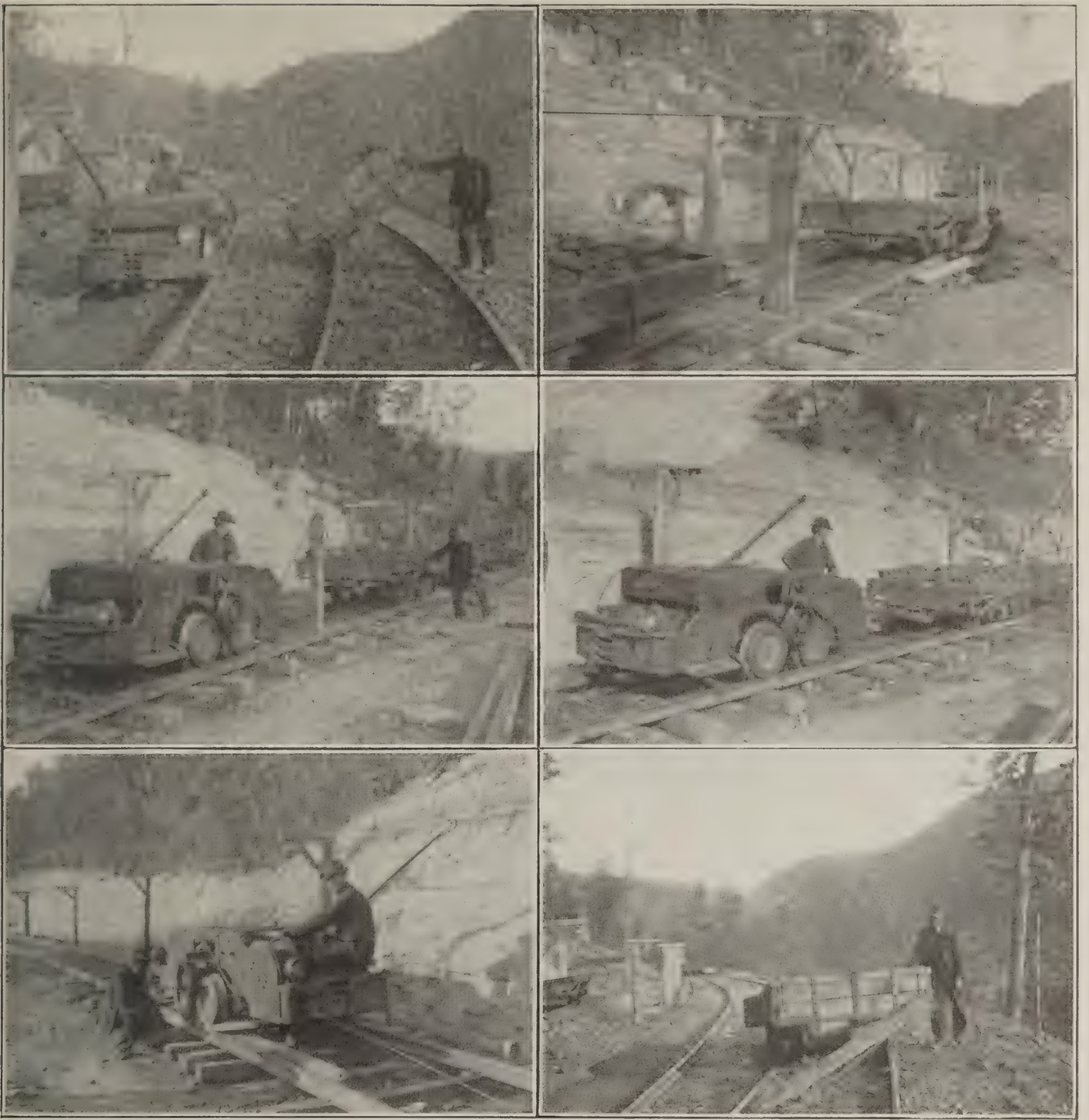
2. *Face Gathering*, wherein the locomotive regularly works into the rooms, hauling the loads from the face, and usually placing the empties in loading position for the miners. For this service the locomotive is equipped with a reel of electric cable, single or duplex, whose terminal or terminals are attached to the trolley wire, or trolley wire and track, on the entry to maintain the electrical connections for the locomotive as it works into the room. The cable is handled automatically by the reel, from which it pays off as the locomotive enters the room, and onto which it is wound again as the locomotive returns. A 500-ft. length of cable permits working full depth about three 300-ft. rooms, and proportionately more rooms of less depths, with one attachment of the terminals on the entry.

The trip rider or brakeman attaches the terminals of the cable, usually remains by them while the locomotive does all it can with that setting, and then moves them up to another setting and sees that the cable is properly reeled in when the work in that entry is completed. The reel is always on the "outward" end of the locomotive, opposite to the motorman, who therefore is in front as he enters the rooms and can readily couple on the loads.

Gathering on this plan usually starts at the head in the entry and the loads as successively brought out may be coupled up at once, the trip being then complete when the last car is brought out and coupled on, or they may be dropped at intervals along the entry as brought out and then bumped back to make up the trip as a whole after they are all "reeled out."

Single- and Double-Room Tracks

In some mines the men push their empties to the face, the locomotives entering the rooms only to pull the loads. In others the miners are forbidden to move a car and



Showing Special Uses to Which the Crab Reel May Be Put

From Top to Bottom, First Column: Overturning Car for Repairs; Rerailing First Car in Trip; Rerailing the Locomotive Itself. Second Column: Rerailing Last Car in Trip; Rerailing Any Car in Trip; Straightening a Car Slewed Crosswise

the locomotives do all the work of placing and pulling. A still further refinement of room management is practiced in mines where intensive production is desired and physical conditions permit. Where rooms are cut wide enough to make the laying of double room tracks advisable or practicable as an assistance to rapid work in car loading, the rapidity of loading is further assisted by eliminating waits for cars on the part of the loaders. The gathering locomotive bringing in a trip of empties places them on, say, the left-hand tracks in the rooms, then at once or later pulls the loads from the right-hand tracks. Thus the miners always have cars and lose no time in idleness between the pulling of a load and the placing of another empty, as is unavoidable with single track. An approximation to double-track advantages is possible, however, where conditions permit, by pairing adjacent rooms and handling their cars alternately as on double tracks in single rooms.

Using the Crab Reel

3. *Face Gathering from Entry,* is designed for mines or local territories where for any reason it is impractical or undesirable to operate the locomotives into the rooms, as in pitching seams with rooms turned to rise or dip, or rooms in very low coal off entries brushed for good haulage height, or in old areas where tracks are too light or too poorly laid for reasonable safety of locomotive operation, etc. For this work the locomotive is equipped

with a "crab" reel, or power-driven drum and wire rope, with which it may reach long distances for cars to which it cannot go itself.

The locomotive remains on the entry and the trip rider goes into the room with the wire rope, whose end ring he couples to the car to be brought out. With a wag of his head he signals the motorman, who starts the drum drive and so draws the car to him. As it rounds the room curve he starts the locomotive also and, passing the latch, pulls the car out onto the entry track for coupling to the trip he is gathering.

For rooms to a steep rise the rope is operated through a snatch block anchored or secured to a jack at or near the face, thus serving to haul an empty in and lower a load out. For this work the length of rope must be at least twice the maximum room depth or other working distance.

FOR UNIVERSAL SERVICE

A locomotive equipped with both electric conductor cable and wire rope reels is fitted to perform any single gathering duty, or to operate in combinations of any or all the foregoing systems. Such a locomotive is of truly "universal" class and is so designated. It may do entry and switching duty, work into rooms, or reach with its wire rope. It may run to the length of its electric cable away from the trolley wiring and then reach on to the length of its wire rope for whatever it may be desirous of securing from such combined distances.

The crab reel is also of service in numerous miscellaneous and emergency ways, which alone are important enough to warrant the presence of the universal equipment on at least one locomotive at every mine.

The wire rope is useful in rerailing derailed cars, or even the locomotive itself. Broken cars may be overturned off the tracks at any point inside the mine or outside, or at the shop where repairs are to be made. Obstructing timbers or other heavy objects may be removed from the track or dragged wherever wanted. Rails, props or other material may be recovered from abandoned rooms or from under falls of roof. Methods of performing several of these "stunts" are shown in the accompanying figures.

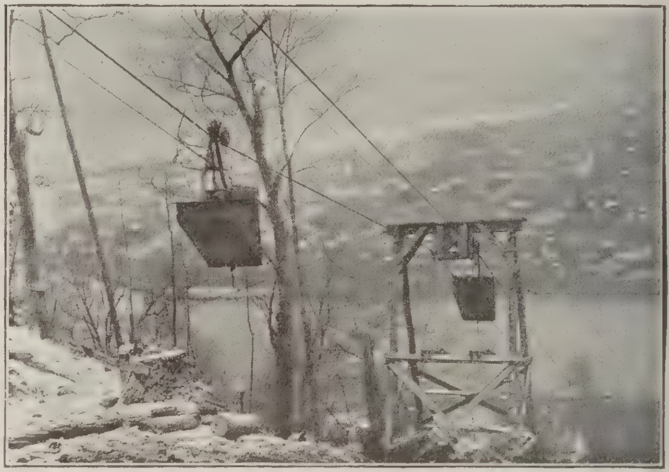
The gathering locomotive, in design and equipment, should be built as a gathering locomotive from start to finish—it must not be an adaptation of some regular main haulage type, with nothing to classify it as a gatherer but its light weight and the attachment of a reel of electric cable.

Utmost success in gathering by locomotives is dependent upon proper consideration of local conditions, proper decision as to the system of handling to be applied, proper selection of the right type of gathering locomotive, and proper operation of the equipment. Some mines fail to realize what they expect, and might readily secure, because they fail to realize first that the system and equipment cannot run themselves. Thorough organization of a comprehensive haulage system is essential to top-notch results, and of course the maintenance of tracks, wiring, cars and locomotives in good shape for reliable and continuous operation is equally necessary.

With these matters given due attention—as of course they should be under any circumstances and for any sort of equipment—the gathering locomotives, and the entire haulage for which they are the feeders, will render good account of themselves on the record sheets.

An Aerial Tramway for Handling Coal

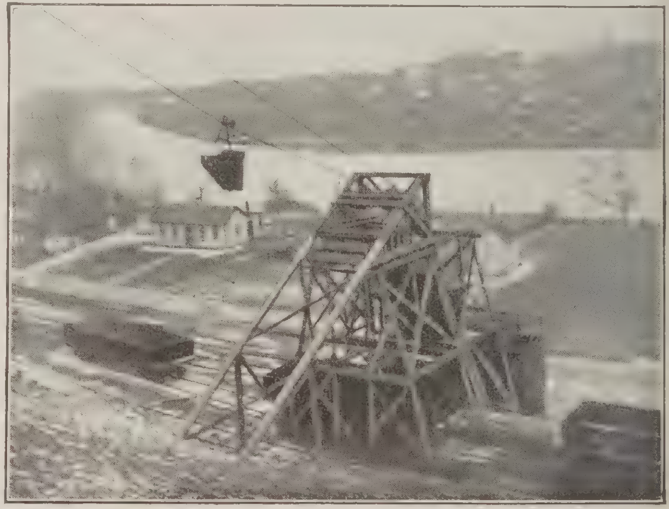
The accompanying illustrations show the loading and discharging stations of an aërial tramway installed by the Broderick & Bascom Rope Co., of St. Louis, Mo., at the mine of the Harlan Home Coal Co., at Harlan, Ky, This property is, however, now being leased and operated by the Republic Coal Co.



TRAMWAY SHOWING LOADED AND EMPTY BUCKET

The tramway is of the two-bucket or jig-back type. The length is 900 ft. with a fall of 430 ft. in this distance. The maximum capacity of the tramway is 45 to 50 tons per hour, each bucket carrying 2700 lb. of coal.

One attendant only is required for the operation of the tramway. This man is located at the loading station and controls the gate levers for filling the buckets as well as the brakes regulating the speed of the line. At the discharge end, the buckets are tipped and dumped automatically.



THIS VIEW SHOWS THE DUMPING TERMINAL WHERE THE COAL IS LOADED INTO RAILROAD CARS. NO DUMPERS ARE NEEDED AT THIS DISCHARGE TERMINAL

The track cables on this equipment are 1⅜ in. in diameter, while the traction rope is ⅝ in. in diameter. The installation has been in operation for four months.

Coal Transportation in Eastern Kentucky Mines

By Martin Prehn

SYNOPSIS—An attempt to show how conservation and organization can effect big operating savings through the judicious selection and use of equipment. Roller-bearing wheels enabled a saving of more than 1c. per ton.

One of the newest of the big coal developments in Kentucky is that of the Elkhorn Mining Corporation, with mines at Fleming, Haymond, Hemphill, Garrett and Wayland. The company's mines in this district—which takes its name from Elkhorn Creek—are served by the Baltimore & Ohio and Louisville & Nashville R.R. A rather exhaustive description of the manifold activities of the company appeared on p. 1041 of the June 27, 1914, issue of Coal Age.

The Elkhorn district is new, and for that reason presented a wonderful opportunity for the development of an intensely modern and up-to-the-minute plant. Every possible contingency was looked upon as a sure-to-come occurrence; it can, therefore, be imagined how complete are the appointments, and in how many ways—physical and social—the property has been protected to safeguard income for all time.

It was sought to increase the efficiency of employees (and, directly, that of the equipment they handle) by caring for their welfare. To this end, unusually comfortable dwelling houses, of 6 and 8 rooms each, were erected; churches, schools, municipal buildings, stores, etc., were supplied. In short, the company built 5 actual towns—Fleming, Haymond, Hemphill, Garrett and Wayland—and provided them with comforts usually unsought in mining communities, simply to get "spirit" *into* its men and more efficient work *out* of them.

This insistence on practical efficiency went beyond the personal element in that its tests were applied rigidly to all parts of the mechanical plant before these were finally approved and standardized.

Power Purchased from Outside Company

Therefore, in order to prevent loss of interest and tying-up of capital, a private power plant was not built. Instead, current is purchased on contract from the Consolidation Coal Co., of Jenkins, Ky., whereby total power expense is said to have been much reduced. And where rates for electricity are reasonable, this method appears to be efficient and economical for various excellent reasons.

Of course, it is one of the elementary principles of economics that anything idle produces waste. That draws the line tightly and it is naturally impossible to keep everything going at capacity all the time; but electrical energy, when furnished by central stations, works very closely to that point. There is no outlay for prime movers or generating equipment (and the interest on such investments is saved); there are no standby losses, which must otherwise occur about every mine, however well regulated or organized it may be; only the power used is paid for; the voucher charge represents money that is being spent for a live purpose; and there are *no* power expenses when power is not being used in doing useful work.

But we are not arguing for the central station, nor for the isolated plant. The endeavor is simply to show how the Elkhorn Mining Corporation manages to mine coal cheaply, sell it cheaply and earn a good profit—the one combination of circumstances that does most to discourage inexpert governmental interference.

Just as railroading is the biggest single industry next to agriculture in the nation at large, so in mining, transportation is the biggest single item, aside from the actual extraction of coal.

An examination of the Elkhorn Mining Corporation's transportation plant should, therefore, lead to interesting and instructive conclusions, especially because the prime aim throughout centers about the ratio of investment to return—and none but the most favorable ratio possible is accepted.

Where Two Mules Hauled 28,000 Lb. The Cars Had Roller-Bearing Wheels

Advantage was taken of every feature that would in any way aid in the reduction of costs, or the increase of efficiency. It was sought to reduce first cost and its constantly accruing interest for the entire transportation plant by adopting a liberal policy in the purchase of the details of the equipment.

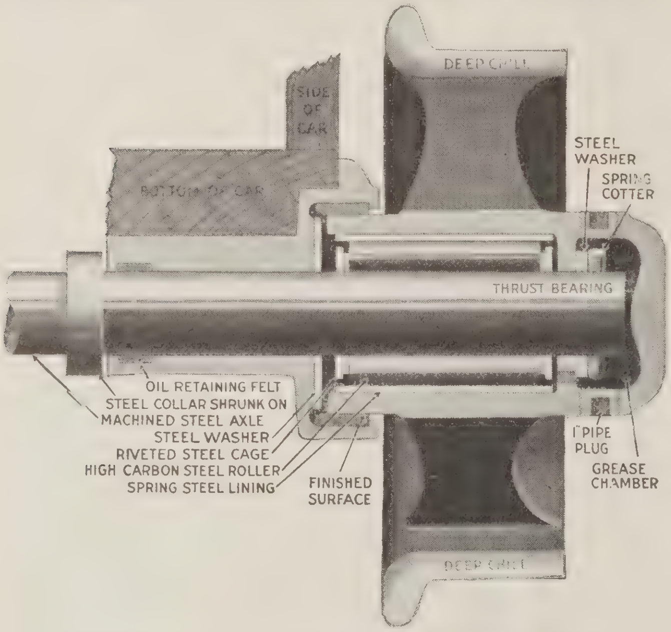
This was done by making a careful survey of the situation in the usual manner and then arriving at the highest-profit-producing equipment by a process of elimination. Take locomotives, for instance. Naturally, the number and size of locomotives were determined, first, by the average 24-hr. tonnage; secondly, by the total resistance of cars at the most difficult part of the track; thirdly, by the average speed and the average number of daily train movements.

In such cases, figuring should be liberal, and allow a fair margin for overload, extensions to plant or unexpected increases in output. By this process a gage may be secured on the first cost of locomotives (and cars). Such a careful plan will also give an approximate cost for curved and tangent rail, ties, switches, crossovers, targets and other track appurtenances, since the weights of these things are generally determined by the loaded-axle weights of the locomotives.

This is the crucial point at which a decision one way or the other determines for all time whether or not the transportation plant will be economical—a payer of good dividends—or wasteful, in the modernly accepted sense of the word.

DECIDING ON A TYPE OF WHEEL

The extensive experience of the deciding powers of the Elkhorn Corporation caused them to weigh carefully the question of car wheels. Many severe tests were conducted to ascertain, if possible, if any existing type of wheel would be able to so reduce the resistance of cars equipped with it, that it would enable lighter rail, lighter locomotives and less electrical energy to handle the given tonnage in the given time. It is perfectly obvious that the discovery of such a wheel—even if its own first cost were very high—would be an extremely economical and profitable investment, since, by permitting the use of lighter apparatus, it would materially reduce the first cost of the system as a whole and make additional and continuous reductions in operating costs by reducing maintenance and current consumption.



SHOWING DETAILS OF THE ENTERPRISE WHEEL

The widespread use of roller-bearing wheels of various kinds suggested a possible solution. Certain types were found to be particularly well fitted for the condition in hand, and after further tests revealed decided operating savings of a most important nature.

It was found that a given locomotive could haul a train equipped with roller-bearing wheels over a given piece of track in half the time and with half the power consumed for a similar train equipped with plain-bearing wheels. Getting down to a dollar-and-cent basis this shows an average saving, for power alone, of one-third cent per ton of coal hauled, when the price of current is 1½c. per kw.-hr. To this must be added the savings for which certain features of the type of wheel that was finally chosen are wholly responsible.

The Elkhorn Mining Corporation finally chose as standard the Enterprise wheel, made by the Enterprise Foundry & Machine Works, of Bristol, Virginia-Tennessee. The wheel is of the same general design as all roller-bearing wheels made by this company and had the benefit of individual metallurgical treatment by Asa W. Whitney, the Enterprise works' car-wheel metallurgist.

THE OPERATION OF THE WHEELS PRODUCED MATERIAL SAVINGS

By enabling a locomotive to handle double tonnage, the same tonnage at twice the normal average speed; or normal tonnage at half the usual current consumption, virtually 50 per cent. of the normal locomotive equipment may be released for other service, or resold at second-hand value. It is also true that with proper wheels, lighter (and cheaper) locomotives may be purchased, followed by a lower investment right down the line. At any rate, the natural reduction in maintenance and operating expenses by far offsets any higher first cost of the wheels.

It was found, also, that to the savings already shown must be added a substantial reduction in labor charge, made up as follows: Release of 50 per cent. of trip crews, which amounts to doubling the tonnage per man, without affecting his original daily wage; the elimination of oil boys, resulting from the fact that lubrication no oftener than twice a year has proved ample. And another saving, not too insignificant to be overlooked, is the use of the lubricant itself, due to its enforced economical use.

A detailed analysis of the cost sheets would be burdensome; but a summary of the savings in lubrication, power, motor-crew expense and wear and tear on motor and other equipment was found to average from 1¼ to 1½c. per ton of coal mined.

And since this saving affects only one department—transportation—it will be realized how extensive it may become when the same scientific methods are applied throughout all the workings, as in the case of the Elkhorn Mining Corporation.

Graded Schools and Kindergarten at Mount Hope, W. Va.

Few towns in any community can boast of a better school system than that found in Mount Hope, a mining town in Fayette County, West Virginia. With a population of about 2500 this town has a handsome new high-school building, a large graded school and a kindergarten with a total enrollment of 750 pupils and an average attendance of over 600. Most of them are children of the workmen employed in the mines in that section. Taken altogether, it is about as healthy and comfortable-looking a bunch of youngsters as could be imagined. They are children of various nationalities, as their builds and countenances indicate. The mines at Mount Hope are operated by the Mount Hope Coal & Coke Co.

A Record Output

The Ebensburg Coal Co.'s No. 1 mine at Colver, Penn., broke all its previous daily records for production on Feb. 25, the output being 4524 net tons.

Notable Hoisting Installations

By R. C. Greenfield

SYNOPSIS—A description of some radical departures in the design and operation of mine hoists. One of the plants is capable of handling 4000 tons of coal in 8 hr. from a depth of more than 400 feet.

The subject "Electricity in its Relation to Mine Hoisting," has been reviewed each year with increasing interest, due to the wonderful advancements that have been made in the electrical field.

The interest displayed in the past year's review is only more marked than that of former years; because of the fact that the advancement in mine hoisting exceeded that of previous years.

Among the interesting and without doubt the most notable installations of the year are the two hoisting plants installed by the Illinois Midland Coal Co., at Kincaid, Illinois.

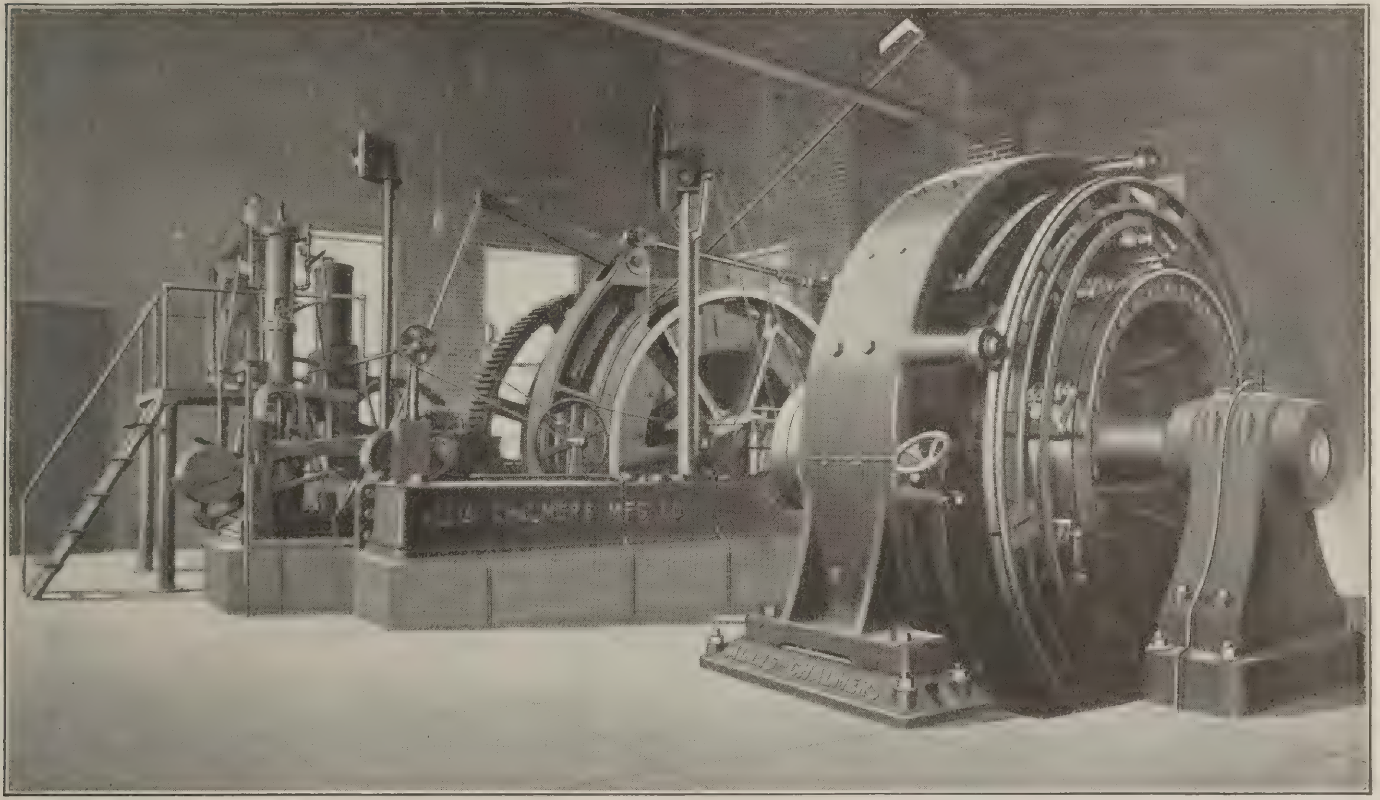
These plants are duplicate installations, and one of them will be found illustrated in the accompanying cut. Each plant is designed to handle 4000 tons of coal in 8 hr. from a depth of 410 ft. A short description of one of the plants will suffice for both.

The hoist motor is of the slow-speed type operating on continuous current at 500 volts and at 65 r.p.m. and is rated at 675 hp. It is controlled by the Ward-Leonard system.

The flywheel set consists of a wound rotor induction motor rated at 450 hp., a direct-current generator rated at 550 kw. and an 8-ton steel flywheel. The set also has a direct-connected exciter rated at 22½ kw. The hoist is designed to operate normally in balance. The maximum rope pull on one rope is 20,000 lb. and the maximum rope speed 1660 ft. per minute.

One of the many interesting features of this installation is the auxiliary alternating-current motor drive which was furnished for hoisting men and supplies.

This auxiliary motor drives the hoist through a set of double-reduction gearing, the main pinion of which is provided with a shifting mechanism which allows of its being thrown both in and out of mesh and locked in either position. When it is desired to handle light loads or men, the flywheel set can be shut down and the hoist operated by means of this auxiliary motor, thus obtaining greater economy in operation. When the auxiliary motor is not required the pinion is thrown out of mesh and the gearing stands idle. The complete equipment, including hoist, motor, motor-generator flywheel set, switchboards, and auxiliary apparatus was designed and furnished by the Allis-Chalmers Manufacturing Company.



Hoist and Motor Installed in Plant of Illinois Midland Coal Company

Another Interesting Installation

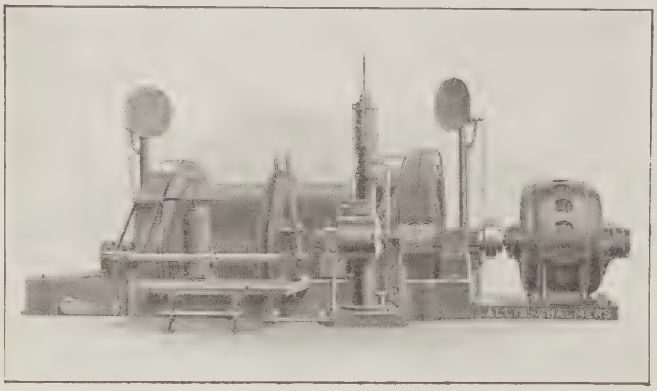
No less interesting are the hoisting equipments furnished another mining company during the past year.

These consist of three Allis-Chalmers double-drum electric hoists, two of which were designed to have a maximum load of 16,880 lb. and a maximum speed of 680 ft. per minute; the third has a maximum load of 14,900 lb. and a maximum speed of 1000 ft. per minute. These hoists are driven by 250-hp. and 300-hp. alternating-current motors, respectively.

Each installation consists, in addition to the hoist and motor, of an Allis-Chalmers liquid controller operated from the operator's platform, dial indicators provided with safety overwind switches and governor-operated slow-down devices. These latter work in conjunction with the brake engine and controller and operate to slow down and stop the hoist, should it exceed the speed limit, or attempt to overtravel and carry the cage into the sheaves.

The overwind switch operates in connection with the dial indicator and is so arranged that at a predetermined amount of overtravel the switch will open and cut off current from the hoist motor and from a solenoid-operated valve located on the brake engine, which automatically applies the brake at a speed regulated by the setting of the valve.

The slow-down device consists of a flywheel governor driven from the drum shaft by a chain in order to secure positive action, and of a solenoid-operated valve located in the controller tank operating in connection with the governor. In case the operator fails to slow down the hoist, when approaching the end of travel, the valve automatically operates and slows down the motor. The operation of this valve is dependent on the position of the cage and also on the speed of the governor.



DOUBLE-DRUM ELECTRIC HOIST BUILT FOR DAVIS COAL & COKE CO.

THE HOISTING PLANT OF THE DAVIS COAL & COKE CO.

Another characteristic and noteworthy installation is the hoisting plant of the Davis Coal & Coke Co.

This installation consists of a double-drum electric hoist, a 300-hp., 550-volt, 60-cycle, 3-phase, 600-r.p.m., variable-speed motor and a magnetic-type controller operated from a master drum. The hoist is designed to operate normally in balance. The maximum rope pull is 16,900 lb., and the maximum rope speed is 1300 ft. per min. One of the drums is keyed to the shaft while the other is driven by a multi-tooth type jaw clutch made of cast steel. The drums are carried on a common shaft.

Each drum is served by a powerful brake of the band type. Dial indicators are provided as also overwind devices. The hoist is operated by a variable-speed motor through a single reduction of "Wuest" double-helical cut gears.

The complete plant, including hoist, motor, switchboard and auxiliary apparatus was also designed and built by the Allis-Chalmers Company.

Recent Legal Decisions

Duty to Insulate Electric Wires—A coal operator is liable for injury to a miner caused by his coming in contact with an uninsulated electric wire on stepping aside in a mine passage to permit a mule and car to pass. (Michigan Supreme Court; Hazzard vs. Consolidated Coal Co.; 149 Northwestern Reporter, 991.)

Carrier's Liability for Discrimination—Suit against a railway company under the laws of Ohio to recover damages for discrimination in furnishing switching facilities must be brought within six years after the cause of action accrues. (United States Circuit Court of Appeals, Sixth Circuit; Hocking Valley R.R. Co. vs. New York Coal Co.; 217 Federal Reporter 727.)

Phases of Coal Sales Contracts—Under a contract for a sale of fuel to be delivered in carload lots and paid for on receipt of each car, the mere fact that the seller returned a check for a shipment on the mistaken ground that it did not cover the agreed price did not constitute such breach as entitled the buyer to rescind the contract, the seller having later admitted the mistake. But the buyer's failure to pay for 15 cars delivered was a breach which entitled the seller to rescind as to further deliveries. (Michigan Supreme Court; Stevens vs. Forrest; 149 Northwestern Reporter, 982.)

Duty to Miners' Loaders—Loaders employed by miners who have a contract with a mine operator for the widening of an entry and removal of coal and slate at a stated price per ton for coal mined, are employees of the operator in the sense that he is under legal obligation to use an ordinary degree of care to provide such loaders with a reasonably safe place of work; they being paid by the operators, although their wages are deducted from the amount due the contracting miners. Kentucky Court of Appeals, Bon Jellico Coal Co. vs. Murphy, 171 Southwestern Reporter 160.)

Responsibility for Death of Miner—A Colorado coal operator is liable for death of a coal miner, killed while on the slope of a mine when struck by a runaway car, if the accident is directly attributable to failure of the operator to provide places of refuge along the slope and proper safety devices at the head of the slope to avoid cars running away, and to negligent failure of another employee to properly couple the car to other cars before starting it down the slope. (Colorado Supreme Court; Taylor vs. Parkdale Fuel Co.; 144 Pacific Reporter, 1138.)

Authority of Officer of Corporation—Validity of Contract—One who is secretary, treasurer and general manager of a coal corporation has implied authority to bind it by a contract to buy coal within the scope of the company's business. When it appears that two parties have agreed through correspondence upon a contract of sale on certain terms, it will be deemed to be mutually binding, although one of them afterward refuses to sign a formal contract embodying the terms of the agreement. (United States Circuit Court of Appeals, Third Circuit; New York & Philadelphia Coal Co. vs. Meyersdale Coal Co.; 217 Federal Reporter 747.)

Damages in Condemnation of Land—In a suit by a coal company to recover for damages to land caused by condemnation of a strip by a railroad company to widen its right-of-way, it is held that the damages are to be measured by the depreciation in the market value of the whole tract caused by the taking. In determining the value of the land immediately before the condemnation, it is proper to consider the purposes for which the land was adapted, such as the operation of a coke plant in connection with an existing furnace plant. (Pennsylvania Supreme Court, Marine Coal Co. vs. P. M. & Y. R. Co.; 92 Atlantic Reporter, 688.)

Pennsylvania Statute Concerning Boreholes—Rule 18 of Article 25 of the Pennsylvania Bituminous Mining Act of June 9, 1911, reads: "In the cutting of clay veins, spars or faults, entries or other narrow workings, going into the solid coal, in mines wherein explosive gas is generated in dangerous quantities, a borehole shall be kept not less than 3 ft. in advance of the face of the work, or 3 ft. in advance of any shothole drilled for a blast to be fired in." Held, that enactment of this rule constituted a proper exercise of the legislature's power to provide for the safety of miners. Compliance with the requirement is necessary, although clay veins, spars or faults are not being cut, and are not known to exist in the place, and although there may be an honest difference of opinion as to the benefits to be derived from enforcement of the rule in a particular instance. (Court of Quarter Sessions, Fayette County; Commonwealth vs. Halvert; 42 Pennsylvania County Court Reports, 545.)

Reliable Inclined-Plane Equipment

In many portions of the coal fields of the United States, particularly western Pennsylvania, West Virginia and eastern Kentucky and Tennessee, the coal deposits lie in such a position that it is necessary to lower the output of the mine down a hill to the point of shipment. Under such conditions the force of gravity is often taken advantage of for the operation of the haulage equipment, and what is known as a self-acting inclined plane installed.

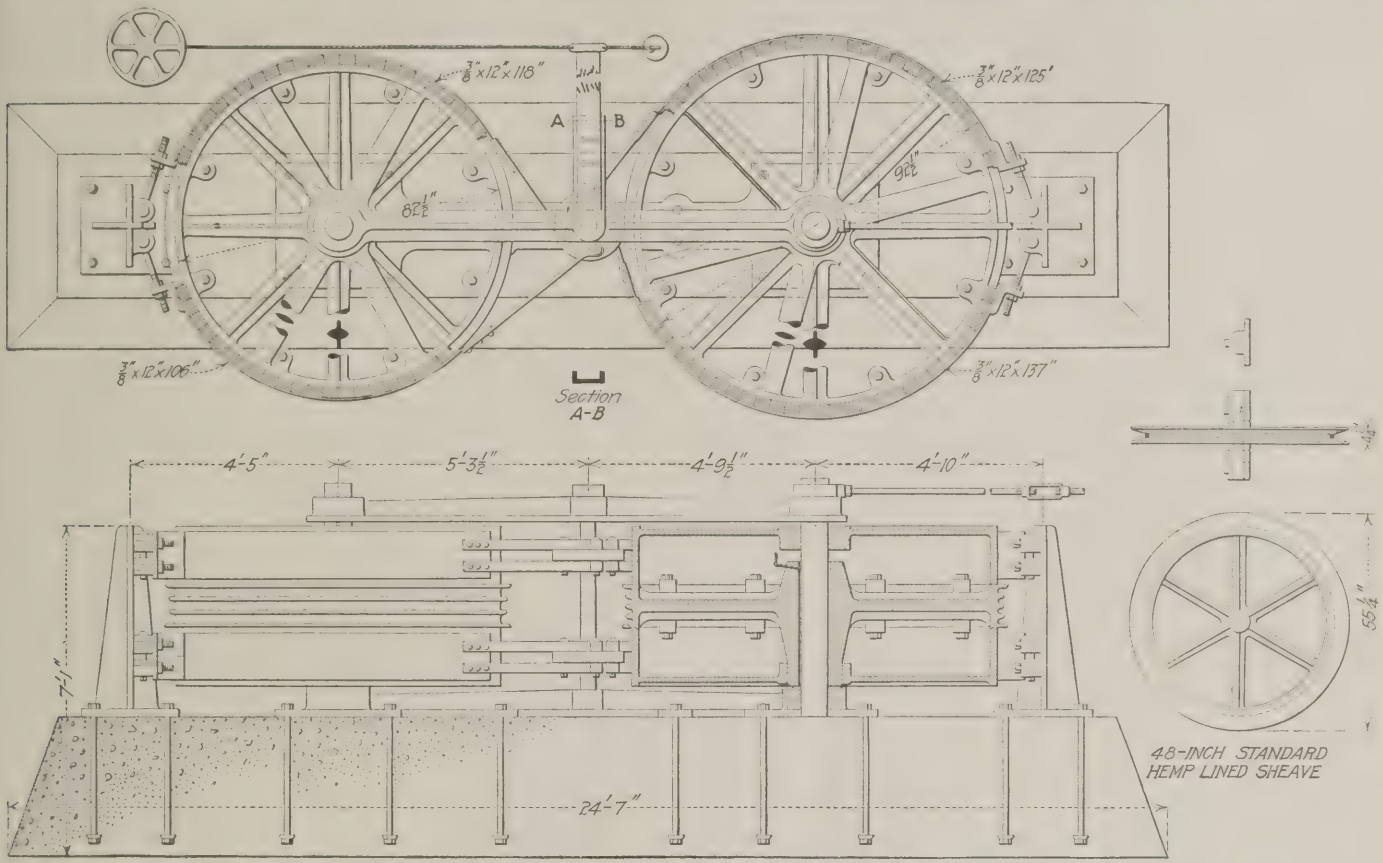


Fig. 1. A No. 16 Special Inclined-Plane Machine

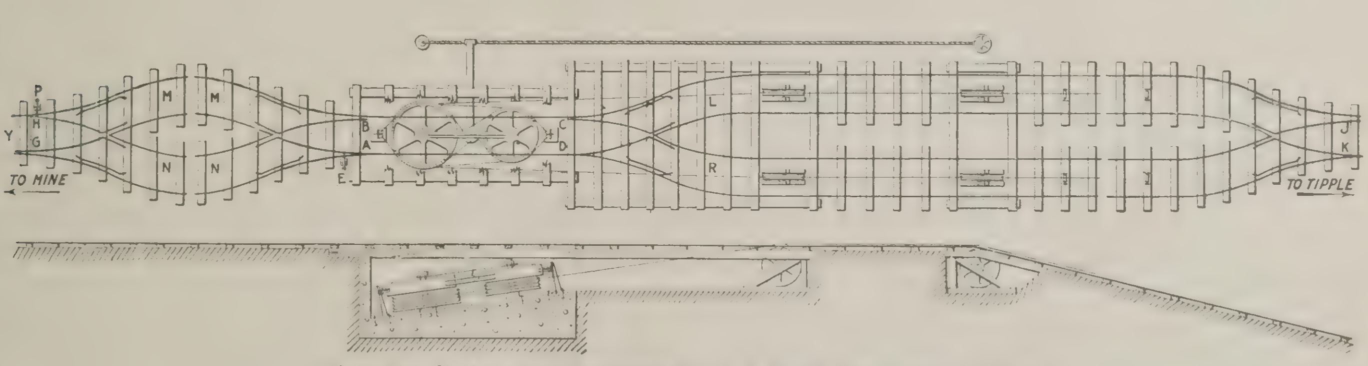


Fig. 2. Plan and Section of a 4-Rail Inclined Plane

The installation of this type of haulage, while apparently extremely simple, requires considerable care in the selection of the most advantageous location for the inclined plane and a thorough study of the topography of the ground traversed. It is highly essential not only to secure the most advantageous loading and dumping facilities, but also to provide proper machinery for perfectly controlling the loads and empties under all conditions. Such a machine must be abundantly strong to withstand exceptional stresses, and also have ample braking surface in order to control, check or stop each trip at any point on the plane with but slight exertion on the part of the operator.

The J. C. Stine Co. of Tyrone, Penn., which makes a specialty of coal-mining equipment, manufactures no less than 16 sizes of inclined-plane machines, all of which are similar in principle but differ in details of construction.

In this type of machine, which may be built either vertical or horizontal, the cable, which is continuous, passes back and forth between two pulleys, each provided with a series of rope grooves.

As is well known the resistance of a rope to slipping on a pulley increases directly with the square of the number of turns, thus, two complete coils of the rope upon the sheaves have a grip equal to four times that of one coil. Three coils have a holding power equal to nine times that of one coil, and so on. The result of this is that with but a few turns of the rope around the two pulleys an enormous holding power is secured, sufficient to carry any load which it may be desirable to handle upon the inclined plane.

In the machines manufactured by the above named company careful provision is made for braking. The brake wheel or wheels, as may be observed in the accompanying drawing, which shows a No. 16 special machine, are cast independent of the grooved wheel, thus relieving the latter of the stresses incident to braking. The brake bands, which are lined with renewable maple blocks, are so arranged that all are operated at the same time by the manipulation of a single lever.

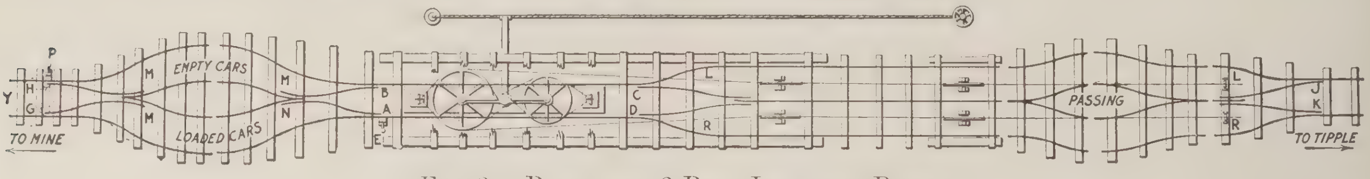


Fig. 3. Plan of a 3-Rail Inclined Plane

So far as the inclined plane itself is concerned one of the most difficult tasks confronting the person who contemplates the installation of one of these devices, is the track layout. The accompanying illustrations, Figs. 2 and 3, show two typical arrangements, one for a three-rail and the other for a four-rail incline. These layouts, however, are susceptible of many variations, as the inclined-plane machine may be placed either as shown below the track level or may be raised to the level of the ground between the tracks or placed to one side as the circumstances of the individual case show to be most desirable.

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The Kentucky Compensation Act

By A. L. H. Street*

Several weeks ago I referred to a decision of the Court of Appeals of Kentucky holding certain features of the compensation act of that state to be unconstitutional. The decision seems to have created some general misapprehension as to the validity of the law, for the Court of Appeals has just handed down a supplemental opinion to make the original opinion more explicit. The court now makes it clear that the law is to be deemed invalid only so far as it purports to limit the amount which may be recovered for injury to an employee who has not expressly elected to come within the provisions of the law, and so far as the act provides for payment into the state compensation fund of any part of compensation due for death of a man who leaves no dependent relatives. The supplemental opinion reads, in part:

"First—The provisions of the present compensation act, as far as they affect the employer, are unobjectionable, as they do not conflict with any provisions of the Constitution.

"Second—Any employee coming within the provisions of the act may voluntarily agree to accept its provisions fixing and limiting his recovery in case of injury.

"Third—He may likewise voluntarily accept the provisions of the act fixing the amount that shall be recovered in the event of his death, and said sum should be paid to his dependents, if he leaves any, and, if not, to his personal representative. The legislature has no power to direct that this sum shall in any event be paid into the compensation fund."

Suggesting amendment of the law, the court adds:

"Fourth—Some provision should be made in the act whereby the employee signifies his acceptance of the provisions of the act by some affirmative act on his part. Silence on this subject should not be construed into acceptance.

"Fifth—Provision should be made in the act for appeal to a court of competent jurisdiction for review in all cases where compensation is denied, or where a less sum is allowed by the board than that claimed by the injured employee." (State Journal Co. vs. Workmen's Compensation Board, 172 Southwestern Reporter 674.)

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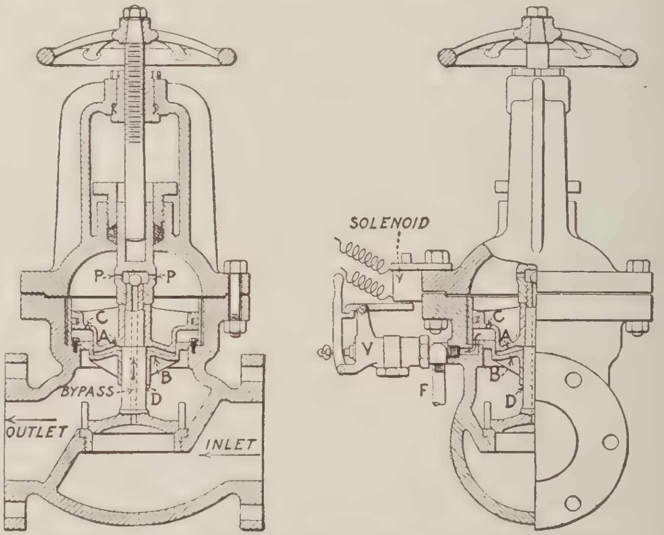
A Remote-Control Valve

An examining board in conducting a license examination for stationary engineers once asked the question: "What steps would you take in case the governor belt on the engine broke?" To this one of the applicants replied: "Unless I was within reach of the throttle I would take the engine-room steps three at a time."



Sectional Views of Emergency Trip Valve

When the power plant is running smoothly and each machine is faithfully performing its allotted function a multiplicity of safety devices is a superfluity. But when machine parts fail and the entire plant is threatened with disaster or destruction the most effective means of averting trouble is none too good. The first and most important lesson which the careful horse trainer impresses upon the colt he is breaking is implicit and unfailing obedience to the command "Whoa." In like manner the power-plant designer takes careful cognizance of the fact that the occasion may arise when it will be necessary in order to save the plant or even human life to stop either the entire plant or various units thereof easily and instantly. Deprived of steam the engine operating under load quickly "dies."

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*Attorney-at-law, St. Paul, Minn.

In order to facilitate the immediate stoppage of either the entire plant or any of its constituent units the Golden-Anderson Valve Specialty Co., of Pittsburgh, Penn., has devised a line of valves, one of which is shown in the accompanying illustration. This particular valve may be controlled in any one of four methods: (1) Automatically, that is closing upon rupture of the pipe or other steam passage between the valve and the engine; (2) electrically by means of the solenoid; (3) by hand through manipulation of a valve in the small branch steam pipe; (4) by hand through the medium of the valve wheel in the ordinary manner.

This valve is intended as an emergency shut-off or engine stop valve and may be operated either by hand from the floor of the engine room or by push button or switch from the engineer's office or other points in the plant.

In an installation provided with this or similar devices which may be operated instantly from a remote point there is no necessity for "taking the engine-room steps three at a time" when a steam pipe bursts or an engine for any reason "runs away."

* *

Safety Conditions for Wire Rope in Mine Hoists

By J. Bradford Richards*

SYNOPSIS—Interesting and valuable data relative to the care of hoisting ropes. All stresses that occur in daily operation are carefully cited and analyzed. Observations on the "factor of safety."

In any operation where men are to be hoisted from or lowered into a mine, the wire rope should be selected with the capacity for not only lifting the load, but doing so with a safe margin. This margin is called by mining engineers the "factory of safety." It varies from 4 to 8 times the load, and is rarely less than 5. By the load is meant the total weight lifted including the weight of the rope itself. Thus the ultimate or breaking strength of the rope is equal to the load multiplied by the factor of safety used.

There are two principal reasons why such margins of safety are justified. One is that, after having become worn out from use, or deteriorated by conditions, or both, the rope must still have a safe margin of reserve strength in order to prevent accident. The other reason is to provide against the mechanical losses from stresses due to bending over the drums and sheaves, starting and stopping, attaining speed, and the friction of the running gear.

Stresses Due to Bending and Friction

Stresses due to bending vary according to the sizes of drums and sheaves. If standard sizes are used, they are about 10 per cent. of the ultimate strength of the rope. If sizes one half the standard are used, about 20 per cent., and so on in inverse proportion. By "standard sizes" are meant those sizes as advised by wire-rope manufacturers in their catalogs. Stresses due to friction should not exceed 2 per cent. of the load for fair conditions.

Stresses induced by starting, stopping and speeding up, vary according to depth of hoist and rate of service or tonnage hoisted, but should not exceed 12 per cent. of the load in short lifts, or 25 per cent. of the load in deep shafts. Thus, when the several losses, including those due to wear and deterioration, are accounted for, the factor of safety is found to be justified.

Corrosion, by acid or sulphurous waters and dampness of the mine, is a frequent cause of deterioration. For this reason, failure to apply liberally a good rope dressing is another cause of deterioration. As a necessary factor for improved service, the importance of a well saturated rope cannot be overestimated.

That portion of the rope where the lower end is attached to the cage is also subject to deterioration. As the slack is taken up at the beginning of hoisting and the rope is pulled taut, the swaying is converted into vibrations; and, as the cage is wound toward the head sheave, these vibrations are increased and crowded into the shortening space. The effect on the socketed end is obvious. Crystallization of the wires takes place at this point. Therefore, at regular intervals, a portion of the rope next to the socket should be cut off and the end resocketed.

Advantage should be taken of these times of resocketing, to cut lengths sufficient for samples for observation and examination. By unlaying the strands and wires the condition as to deterioration of core and internal abrasion of the wires can be ascertained. If desirable these samples can be tested for strength and other physical properties at a laboratory fitted for this purpose. The facts learned in this way are a necessary adjunct to the daily inspection, as it is impossible for the eye to see the inside of the rope.

Daily Inspections Are Advisable

While keeping informed thus at these regular intervals as to the internal condition of the rope, it is desirable to be able to judge of the progress of wearing generally, by superficial observation at the daily inspections. Frictional wear and corrosion externally, abrasion of the wires and deterioration of the core internally, due to use and conditions, are taking place. When the wires are worn down, thereby reducing the cross-section and lessening the strength of the rope, broken wires begin to appear along its surface. As wearing continues, the number of breaks increases. The significance of this increase is the evident sign of diminishing strength, because the broken wires are the result of the weakened condition.

As long as the breaks are far apart, the frictional tenacity of the rope does not relax, so that its strength is not impaired in proportion to the number of breaks. But when several are observed near one point, as within one rope lay, the strength is much more affected. Thus, it is, that the number and location of the broken wires become largely an index of the safe condition of the rope. In other words, a certain number of broken wires in one rope lay, together with a certain loss by frictional wear as found by gage, is an indication of a definite lowering of the factor of safety; and finally, a point will be reached when this percentage of loss coincides with that point fixed as the limit of safety of the rope.

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*Assistant engineer, Hazard Mfg. Co., Wilkes-Barre, Penn.

The following table is appended to show the several stresses in the case of a 1200-ft. hoist. Wire rope used, 1½-in. cast steel, standard construction. Time for a single hoist, 45 sec. Maximum speed 2000 ft. per min. Weight per foot of rope, 3.55 lb. Weight of 1200 ft., 2.13 tons. Weight of cage and material to be hoisted, 9 tons. Size of drum and head sheave, 12 ft.

TABLE SHOWING STRESSES IN A HOISTING ROPE

Stresses Due to	In Tons	In per Cent. of Ultimate
Load (including weight of rope)	11.13	17.5
Friction (2 per cent. of load)	0.22	0.3
Starting, stopping and speeding up (about 12 per cent. of load)	1.34	2.2
Bending (about 5 per cent. of ultimate for 12-ft. sheave)	3.17	5.0
Total working stress	15.86	25.0
Net safe margin	47.58	75.0
Ultimate strength	63.44	100.0

Factor of safety = Ultimate strength ÷ Load = 5.74 when new.

Net factor of safety = Ultimate strength ÷ Total working stress = 4 when new.

After a further loss of 25 per cent. from use, the ultimate strength would be reduced to 47.58 tons. The factor of safety would then be 47.58 ÷ 11.13 = 4.3 and the net factor of safety would be 47.58 ÷ 15.86 = 3, if there had been no change in the other stresses. But while the rope has worn down it has stretched, causing the stress due to bending to increase. The result is that after a loss of 25 per cent. from use, the net factor of safety would be less than 3.

For safe conditions, an original factor of safety of 4 as a minimum and preferably 5 should be used. And when from loss of section through frictional wear, or deterioration through all other conditions, or both, the rope shows a total loss of 25 per cent. of its original strength, the danger point has been reached.

This subject is now being carefully investigated by the U. S. Bureau of Mines, and a report with recommendations will doubtless be made in due course on its findings.

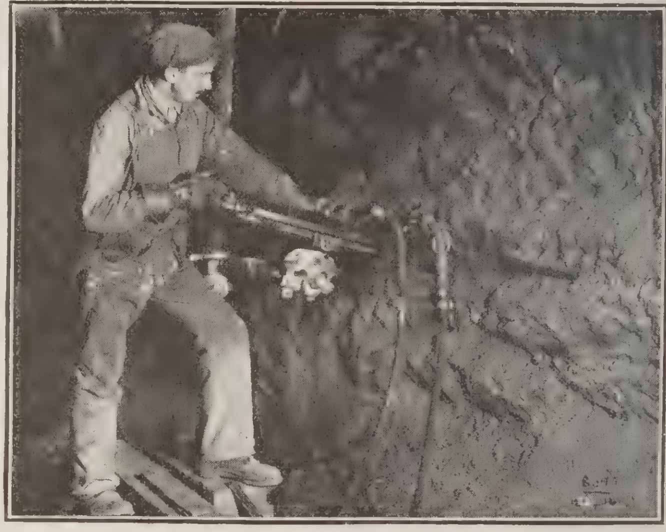
Mounted Jackhamers

Jackhamer drills have been extensively employed in coal mines for many purposes, including taking down top rock, breaking down coal, driving gangways and in general development work. The success attained in this field has been due to certain unique features which the machine possesses, such as its high speed of operation, its ability to penetrate any material, from the softest coal to the hardest rock without changing steels, the ease with which the tool is operated due to its automatic features and comparatively light weight and its general ruggedness and simplicity of design.

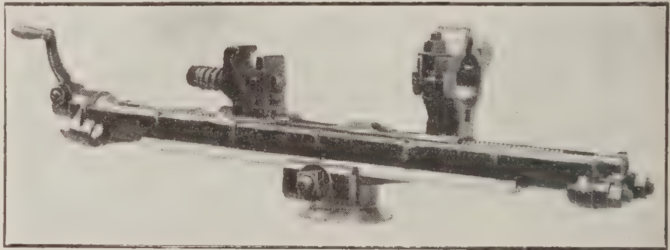
While the standard unmounted jackhamer is suitable for most of the operations of mining coal, occasions may arise where the drilling of horizontal holes has to be carried on and under such circumstances the effort of holding the drill to the work is apt to tire the workman.

Realizing the need for a mounting that would not be cumbersome, but at the same time would be heavy enough to withstand rough usage, the Ingersoll-Rand Co., 11 Broadway, New York, developed, after considerable experimentation, the mounting shown in the accompanying illustrations which is known as the "JM-6" type.

It is but an instant's work to clamp the standard jackhamer in the carriage of the mounting. Therefore, a single drill may be used conveniently for the twofold purpose of drilling horizontal and vertical holes without serious loss of time in making changes. Whether used as a mounted or as a hand drill, the jackhamer retains all the advantages due to its rapid drilling speed, the self-rotating feature and the efficient means for keeping the borehole clean.


A Mounted Jackhamer in Use

A water-feed device of the Leyner type has recently been developed for use with the jackhamer whenever trouble from dust arises. The "JM-6" mounting is adapted for use with both plain and water-feed types of these drills. The clamp which grips the handle of the drill is provided with a cushion spring to take up the shock when a steel is being pulled out of a hole. The forward clamp on the carriage does not grip the machine firmly, but serves only as a support and guide.

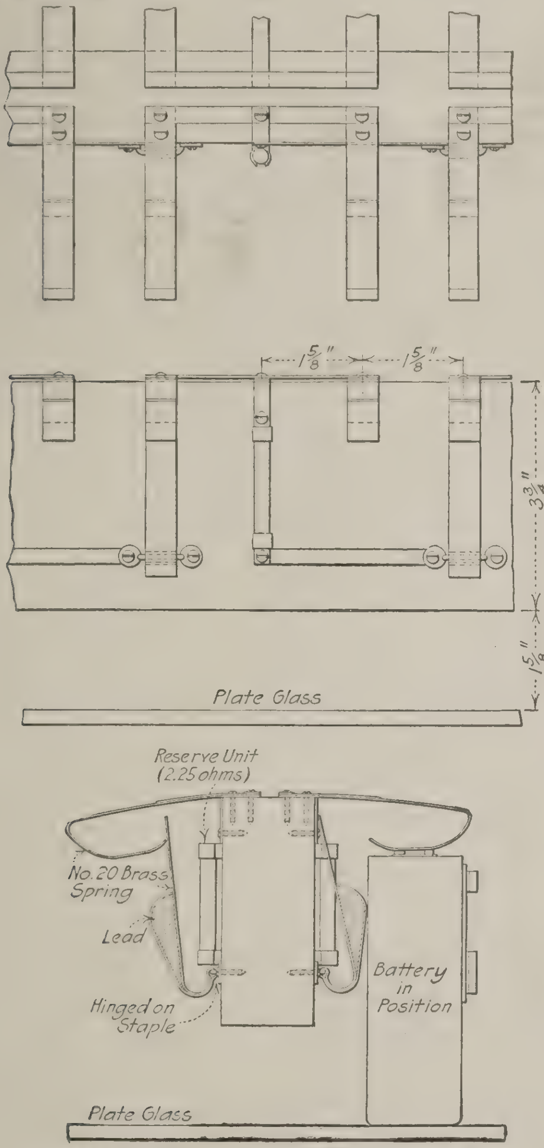

The Drill Mounting

The mounting is adapted for use either on the arm of a vertical column or a horizontal shaft bar, while the cone upon which the shell rests will fit into any 5-in. Sergeant saddle or clamp. The sliding cone gives a quick adjustment when setting up and can be used to increase the length of feed whenever necessary. The length of the feed-screw is a full 24 in. Adding to this the slide of the cone on the shell, which is over 19 in., it will be seen that the total travel is in excess of 43 in.

and may be obtained whenever desired. The total weight of the mounting is 63 lb. Steel castings and drop forgings are employed throughout in its construction, insuring ability to withstand hard usage.

Pottsville Charging Rack for Miner's Electric-Lamp Batteries

Where the miner's electric lamp is being used in large quantities, charging racks are provided with contacts arranged to facilitate the insertion of the storage batteries each day for charging.



Details of Pottsville Charging Rack

Considerable annoyance and delay have been experienced with the designs now in use, and, with the view of overcoming all objections to this part of the equipment, the Philadelphia & Reading Coal & Iron Co., the pioneers of the electric cap lamp, recently brought out the equipment shown in the accompanying sketch and known as the "Pottsville charging rack."

It consists essentially of two brass springs connected to the positive and negative charging circuit which makes the contacts with the positive and negative terminals on the battery. There is also a pivoted weighted brass spring which makes contact with the positive charging spring when the battery is removed, and a resistance unit connected between the weighted spring and the negative charging spring. The charging springs are reinforced with a pressure spring and are so designed that little travel is made when a battery is inserted, thus insuring a flat strong contact on the battery terminals and preventing the contacts from bending out of position.

When the battery is placed on the charging rack, contact is first made for an instant with the battery terminals and the two charging springs before the weighted spring is reached. This position does not short-circuit the battery as the charging current is flowing through the resistance and the voltage drop across the resistance will balance the battery voltage, hence no current flows. If the charging circuit is off when a battery is put on the rack, the battery will for the instant discharge through the resistance at only its normal discharge rate, hence it is impossible to short-circuit the battery.

As the battery is pushed forward under the charging springs, it moves the weighted pivoted spring forward, breaking its contact with the positive charging spring and diverting the charging current through the battery instead of the resistance which is now cut out. When the battery is taken out of the charging contacts, the above process is reversed and the charging current is reëstablished through the resistance, thus leaving the main charging current value undisturbed without sparking at any contacts.

As the voltage drop across the resistance is practically the same as the battery voltage, any number of batteries may be put on or taken off the charging rack without any adjustment of the charging current value. Since the pivoted-contact device operates by weight, it is always positive in its action and needs no attention for adjustment; the movement of the charging spring at the point of contact produces a wiping action which keeps the contacts clean.

Anthracite Notes

A little known phase of the anthracite mining industry is the use of expensive barometers at the principal collieries of all the big companies, especially where the mines are gaseous. When the atmospheric pressure is decreasing, gas is released more easily, and the firebosses all look at the barometers before going into the mines to make their morning inspections. When the barometer is going down they look and test with extra care for gas.

Following the example of the large coal operators, a movement is on foot among several of the so called independent operators in Scranton to train first-aid teams with the coöperation of the Y. M. C. A. Last year teams from the Bull's Head Coal Co., Green Ridge Coal Co., Clearview Coal Co., Carney & Brown, and Nay Aug Coal Co. were given twelve weeks' training, but held no contest. This year State Mine Inspector S. J. Phillips, who is fostering the movement, hopes to induce the Peoples' Coal Co. and the Spencer Coal Co. also to join, and there may be an inter-company contest for a cup offered by the Y. M. C. A. and a banquet. The medical director is to be Dr. Harry Smith, and the expenses will be borne by the companies. Forty-two boy scouts from 12 to 16 years old are now being trained in first-aid-to-the-injured practice at the Scranton Y. M. C. A.

Explosion at the Layland Mine

A severe explosion occurred at 8:25 a.m. on Mar. 2 at the Layland, or No. 3 mine, at Layland, W. Va., a town lying at the head of the Quinnimont branch of the Chesapeake & Ohio Ry. in Fayette County, near the eastern edge of the New River coal field. The mine is owned by the New River & Pocahontas Consolidated Coal Co., an affiliation of the Berwind-White Coal Mining Co. It is working the Fire Creek bed.

It is early yet to state how many lives were lost. Reports show that 10 men were saved and probably 174 were killed. Of these, the bodies of 17 have been recovered. The force of the explosion was so violent that the stone arch over the main portal of the mine was destroyed, windows were broken within a radius of 300 yd., and the explosion was felt for miles around. A. B. Cooper, who was delivering groceries to a house about 75 yd. distant from the mine, was blown against a telegraph pole and killed.

The work of rescue is being aided by rescue car No. 8 of the U. S. Bureau of Mines, which, when the explosion occurred, was located at Glen Alum, Mingo County, W. Va., a village which, from a railroad point of view, is quite remote from the scene of the accident. The rescue force did not arrive till night, but the work of recovering the bodies and the few living men had been actively prosecuted all day by local miners.

Operators Disagree on Co-operative Plan

By H. S. Mikesell

It seems that notwithstanding the persistent efforts put forth by H. C. Adams, of the Jones & Adams Co., for a return to the 1¼-in. lump screen basis by all the operators of the Western bituminous territory, which has been considered by many a matter of vital importance to the soft coal production of the country, the coöperative plan suggested will not become operative. This is mainly for the reason that the eastern Kentucky and Franklin County, Ill., operators will not join in the movement.

These two interests with heavy production are probably at the present time the strongest competitors for Western tonnage and market six or seven different sizes of coal. With their refusal to enter into the suggested arrangement is seems inopportune for the operators of other districts in the five states to standardize their lump production on a 1¼-in. basis.

The eastern Kentucky and Franklin County operators claim that there are many advantages to them in the preparation of the different sizes they are now making, and while Indiana, Ohio and West Virginia operators apparently strongly favor standardization, the undertaking now fails because of the disinclination of these two districts to coöperate with the rest. It is quite obvious to the operators in favor of this plan that its adoption would result in the production of less coal in excess of demand, and it was welcomed by a majority of the retail coal dealers, although some of the railroads were opposed to it because it meant extra expense in sizing the coal in engine chutes, and especially where the railroads were burning egg or smaller sizes and had not been accustomed to use lump.

It is regrettable that here is another case where the producers cannot all agree on a coöperative plan of merit when it is evident to every soft-coal operator that the present method of preparation is most unsatisfactory and unprofitable. The screening of 4-in., 6-in. and even 8-in. lump coal in sufficient quantities to take care of the fall and winter demand for these sizes has always resulted in the production of numerous grades of small coal for which there is no regular demand. These small sizes accumulate every season, and have to be sacrificed at almost any price to relieve the car situation. The effect has always been to demoralize the market. The only alternative seems to be compulsory legislation to prevent this economic waste.

Gain in Production of Somerset County, Penn.

The production of the twentieth bituminous district of Pennsylvania comprising all Somerset County south of Holsopple increased in 1914. The inspector, F. W. Cunningham, says that he believes that no other district in Pennsylvania will show a gain.

The low percentage of volatile matter in the coal of Somerset County renders it of high heating quality and smokeless. Consequently it is highly desirable for naval, marine and industrial uses while unsuited for coking in ordinary beehive ovens. The inactivity in the steel business has therefore not affected it while the demand for a coal, not only pure but also efficient and for one free from smoke has given Somerset a lead over many of its competitors. Coal is no longer bought because it has a pretty look.

We give the outputs for 1913 and 1914 of the seven leading companies. The production of only one of these declined last year.

STATISTICS OF BITUMINOUS DISTRICT NO. 20 OF PENNSYLVANIA

Mines (87 in operation)	108
Tons of coal shipped to market	6,713,727
Tons used at mines for steam and heat	166,122
Tons sold to local trade and used by employees	26,263
Total tons of coal produced (gain 262,647)	6,906,113
Coke ovens (all idle)	225
Tons of coal produced by pick mining	4,965,793
Tons produced by compressed-air machines	298,661
Tons produced by electrical machines	1,641,659
Persons employed inside of mines (gain 1126)	7,365
Persons employed outside (gain 240)	950

PRODUCTION OF COAL—SHORT TONS

	1913	1914
Consolidation Coal Co.	1,952,760	1,990,638
Jenner-Quemahoning Coal Co.	918,259	932,035
Quemahoning Coal Co.	631,480	669,193
Brothersvalley Coal Co	488,083	550,481
Somerset Smokeless Coal Co.	483,327	505,767
Knickerbocker Smokeless Coal Co.	241,905	311,128
Baker-Whiteley Coal Co.	201,627	200,265

Don'ts for First-Aid Men

Don't stimulate with alcohol; aromatic spirits of ammonia is preferred. Procure hot coffee as soon as possible.

Don't tear clothing from a person burned; cut it off.

Don't expose to the air large burned surfaces; dress them quickly.

Don't think that in the great Safety-First movement you are working for the special interest of your employer. You are not; you are working for yourself and your fellowmen.

Don't attempt to give stimulants to an unconscious person. The fluid may run into his lungs instead of his stomach.

Editorials

Private Privilege

History has been full of the contests between the people at large and private privilege. Whenever the latter appears, there are always many fulminations against it as if it were new, and not an old offender rearing its ugly head once more.

So we must not get unduly angry when the miner at the face tries to do what men who pride themselves on better mental equipment and even, in their folly, on better moral status have repeatedly tried to do in the past. Nevertheless, though the miner is by no means the first or only offender, the public must be firm. The miner must not be allowed to restrict the foremanship and inspectorship to the particular class of men that have mined coal at the face as he purposes to do with the help of the electorate in Senate Bill 160, now in the Pennsylvania legislature.

When we look over the list of inspectors and foremen we are disposed to say that practice has almost excluded all men but miners from the positions in question. There has always been a disposition to qualify and select such men. Law or no law, they have been usually so chosen. There is no deep-seated conspiracy against the man of the pick and the drill. Perhaps this is as it should be, but nevertheless the passage of a restrictive law is not to be commended.

The miner should always be careful lest he stir up retaliatory measures. Why not pass legislation forbidding miners to enter the legislature unless they have served a period as page-boys or scriveners, or preventing them from being operators unless they have spent a period at billing coal? We may as well be logical in making our requirements.

It must be remembered that there are many things nearly as important to the safety of the miner as safe coal-getting. There are gas inspection and removal, the province of the fireboss; safe timbering, the work of the timberman; safe ventilation, the part of the bratticeman; the avoidance of breaking into accumulations of water and gas, the function of the surveyor; the maintenance of safety appliances, the duty of the mechanical engineer; and the general coördination of these and many other duties, the daily occupation of the supervisional force.

And it is fair to ask, Is mining the only wisdom-giving function around a coal mine? Moreover, should the miner be the sole care of legislature and union, or is a man to be chosen or rejected for his abilities alone and not according to certain arbitrary tests which a majority ordains?

Apparently the miners have used their numerical superiority in the union to back their demands against those of other union men. Let them remember that if the right to hold office depends on voting strength, then the hewer of coal is not entitled to any place in the gift of the people. The farmer would by that right carry away all the honors, and the miner would be compelled to spend his labor at the pleasure of the man who followed the plow.

Just as the farmer is not justified in tyrannizing over the public, so is the miner without excuse in forcing his numerical superiority on the other mine employees and in saying, "You shall not seek preferment, because you belong to only a small category of workers."

"Business as Usual" but under Difficulties

The American operator's little tale of woe has worn him till he is weary with its iteration, and we will not refer to it now. We will rather lift the curtain today on the conditions under which the British coal trade is doing "business as usual" but under difficulties. The British coal master tries hard, like a good business man, to assure the world that business is unaffected by the war, but we feel he must agree with the American coal-mine operator and confess that the times are grievously out of joint.

To begin with, the shipment of coal, coke and patent fuel for January was only 60 per cent. of that of a year ago when there was no war. The foreign bunker trade of the British has been equally reduced in percentage. But, it must be remembered, that this does not include coal sold to the admiralty. So perhaps the fall of 2,300,000 tons per month in exports and 360,000 tons in foreign bunker trade is made good by these governmental purchases.

But it is those who are not supplying the navy who will suffer most in the coke and patent-fuel decline, and the west Yorkshire producers who mine fuel of the coking and patent-fuel type doubtless have suffered severely. The fact that South Wales is busy supplying the fleet hardly makes amends to the Yorkshire man for the decline in his own market.

The coal operators in west Yorkshire have had to face, in common with other operators, a decrease in the receipt of props of 30 per cent. and an increase in their price of about 45 per cent. And concurrently they have to meet a threatened strike of the coal miners who thought the great world war would give them an unequaled opportunity to increase their minimum wage. The operators gave way "with the object of avoiding the disastrous consequences of a coal strike in a national crisis" and conceded the contentions of the workmen's representatives as they specifically stated in their reply "during the continuance of the war between this country and Germany."

Increasing wages when work is not steady is a trying task, for the fixed charges, the pumping, the maintenance of the workings, and the banking of fires all bear heavily on the operator. The price of exported coal has gone up 3 per cent., or 10c. per ton, since the war started, but the west Yorkshire operator will have to look for a further rise if, during the war, he is to participate in "dividends as usual."

The Storage-Battery Locomotive

The evidence is constantly accumulating that the storage-battery locomotive has come to stay and perhaps even to oust its rivals. It is of course not absolutely safe in the presence of gas, but as the sparks it makes are not near the roof, the danger is lessened, for the gas must be in large quantity if it is to settle so low as to be ignited.

Another increase of safety with the battery locomotive results from its shortened electric circuit. The current does not pass from the power house to the motor and back through the rails to the generator, but the circuit is contained within the locomotive—not even the wheels are included in its range.

Thus if it is true that there is a risk of stray currents prematurely igniting shots, the current of the storage-battery locomotive can meet the accusation with a perfect alibi. And, of course, as there is no conducting wire, there can be no short circuits to ignite gas, coal dust or wooden structures.

The travel of the electric current along the drawbars and couplings of a train of mine cars has always been a strong objection to the trolley locomotive, as it has occasionally shocked men and ignited powder. For this reason operators have sought to improve the grounding of the traction rigging and to make powder cars relatively nonconducting throughout. In other cases the powder car has been hauled around by a mule.

The battery locomotive, however, having its current self-contained, does not offer any such risk. It seems that it would serve admirably for hauling men and transporting material, explosive and otherwise, into and out of the mines. By switching off the electric current on the main haulage road, the loading of men on the man trip and their passage along the road at the beginning and end of the day would be robbed of its dangers, some of which, though unnecessary, are unavoidable so long as careless and ignorant men are employed.

True, the use of a section insulator at the point of embarkation or disembarking has been occasionally adopted and has probably saved many lives, but the adoption of the battery locomotive for haulage is even more a safeguard against such accidents and removes, as has been said, the further danger of the ignition of powder.

In view of the fact that the storage-battery locomotive is not absolutely safe, but only safer than other forms of electrical haulage, it will probably not be adopted for that cause alone. But it has many other advantages.

In mines where all or part of the night load is quite light, it is customary to delay pumping till the mines are closed down. In the Middle West not much water has to be pumped. In other mines the water often runs out by gravity. Consequently, if undercutting is done at night and the coal is loaded and hauled out by day, there is a third shift during which the storage-battery locomotives can be charged. This tends to keep the load curve even and to save in expense. Additional boosting of the locomotive batteries can be performed during the lunch hours and when shifts are being changed, should the batteries need it and should the men walk to their work.

It has been generally thought that the storage-battery repairs would be excessive, but it must be remembered that there are no trolley harps, wheels and supports to be maintained in condition. The cnance of the armature bearings and poles heating or rubbing is about the same in both battery and trolley locomotives. The battery renewals *might*, however, cost so much that the cost of harps, wheels and supports would appear only a trifling drawback to electric locomotives.

This does not seem to be proved in practice, where the batteries are of the right kind. At Kellogg, Idaho, three types of locomotives were used. Because the conditions under which the statistics were collected are manifestly unfair to one locomotive, because the work it was required to perform was unduly light, because it was only credited with useful work and not with the waste rock it hauled, and because its time of service has been short, we will omit all reference to it. One 2½-ton locomotive operated with a combined repair and upkeep cost of $0.00359 per ton. Roughly this is three tons to the cent. The running of a 4-ton locomotive cost $0.00434 per ton of mineral hauled.

These figures, which are evidently of reasonable magnitude and not warranted to cause objection from those who think of purchasing storage-battery locomotives, are nevertheless loaded with costs which do not rightly belong to them. They include the cost of alterations and partial rebuilding at the time when the battery locomotive was installed. The locomotives had to be adapted to the charging system, and provision had to be made to protect them from the water issuing from the chutes under which they had to pass.

As the first locomotive had run only 20 months and the second only 17, this first cost had much to do with the repair and maintenance charges. G. W. Gwinn, who read a paper on these locomotives at the recent meeting of the American Institute of Mining Engineers, stated that the company's engineers believe that the upkeep and repair charges will be 75 per cent. less than for trolley locomotives doing the same work. This is based on an actual experience with excellent makes of trolley locomotives and gives no consideration to the expense of maintaining trolley wires and track bonding, which kept two men busy practically all the time on the somewhat longer stretches of trolley haulage.

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The House Mines Subcommittee has made its report on the conditions in Colorado. It states that "Mr. Rockefeller has done much for the uplift of people in other parts of the country and in foreign lands, spending millions of dollars in this work, yet he has not endeavored to improve the conditions of the more than 6000 employees in the company with which he is connected." All we can say is that if he hasn't, someone has, as our series of articles on the sociological work of the Colorado Fuel & Iron Co. amply proves. But, unintentionally, the report is fair, for in blaming him later for his direction of the Fuel Co., it incidentally must give him credit for the good work that company has done to ameliorate conditions in the mine villages.

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Representative Whittacre of Columbiana County, Ohio, has introduced a bill to relieve conditions in that state by requiring the state board of administration to buy only Ohio coal. Apparently Ohio is on the high road to nullification. Logically the next move would be to put a tax on coal imported from neighboring states.

Discussion By Readers

Drying Washed Coal

Letter No. 5—Several replies have been written to the letter of John Hammond, Coal Age, Nov. 28, p. 879. All of these articles have justly conceded the superiority of the centrifugal drier over all other known methods.

The reduction in percentage of moisture obtained by this method of drying, however, cannot be stated in a general way to be a certain amount, without giving all the conditions and factors entering into the case. In order to definitely control the moisture content of the product delivered from a centrifugal machine, it must at once be clear to anyone that four things are absolutely essential; namely, control of the speed of the machine; control of the capacity of the machine; control of the time that the material is to be held in the drier; and the character of material to be handled.

The speed of the machine will be limited by the strength of the material entering into it and will probably not much exceed 6000 ft. per min., at the periphery. The speed being thus limited, the remaining factor under control should be the time that the material is held in the machine before being discharged. The character of the material handled will largely determine the time of retention in the machine. Experiment only will determine this time factor for a given percentage of reduction of moisture.

Having adopted a suitable time factor and speed for a given material, the *capacity of the machine* is then determined by the size of the container, as it will be clearly seen that a drier is merely the conveyor of a given amount of material as determined by its volume, in a given time. To attain control of the time factor in a large-capacity machine was the problem confronting many experimenters in coal drying. In small-capacity machines used for drying sugar, salt, sulphate, etc., this control is obtained by loading the machine while at rest, then running it for a definite time until the moisture content was reduced the desired amount. The machine was then stopped and unloaded. Such a method is, of course, out of the question with the large capacities required in drying coal.

Carl Wendell, a graduate mining engineer of Frieburg, Germany, and now experimental engineer for the Illinois Steel Co., began the serious study of the methods of drying washed coal for the coke ovens in the steel plant five or six years ago. After building five different machines and spending some twenty thousand dollars, he finally developed a machine of large capacity with continuous feed and continuous discharge. In this drier, the time factor was absolutely under control. It is interesting to note that Mr. Wendell experimented with cone-type machines fed at the apex and depending on the centrifugal force developed by the rotation to slowly drive the coal down or up the slopes, while at the same time driving off the moisture. He experimented with cones having the apex upward and driving the coal downward, as well as with inverted cones that drove the coal upward. Due to the clogging and building up of the material and the erratic discharge, however, this method was finally abandoned. Plows and scrapers were tried to remove the material from the screens; but these wore the screens excessively and, as can be readily conceived, gave no control of the time or of the moisture content and consumed an excessive amount of power in scraping off the packed material.

Mr. Wendell finally built two machines, both of which gave absolute control of the time factor and entirely did away with scraping or plowing in the discharge of the material. The two machines, however, accomplished this end in different ways. The last one built was a complete success for large capacities and is now made so that it is possible to retain the material from a few seconds to a quarter of an hour or longer, by simple gear changes.

Three of these machines have been installed in the Woodward Iron Co.'s plant at Woodward, Ala. They are handling from 50 to 60 tons per hour. They retain the coal, approximately, one-half minute and reduce the moisture from 30 and 50 per cent. to an average of about 8 per cent., which is the amount required by the coke-oven department of the Woodward Co., to obtain the best results in the ovens. The coal is driven at a speed of, approximately, 6000 ft. per min., in these machines. The moisture in this coal could be further reduced, in the two ways mentioned above; namely, by speeding up the machine to 7000 or 8000 ft. per min. or by increasing the length of time in the machines. It must be borne in mind, however, that the external moisture in any material is all that can be reduced by the centrifugal process. Water of composition is not expelled by this process.

Coke-oven men differ in their ideas as to what is the proper percentage of moisture in coal for coking purposes. The moisture content seems to affect both the quantity of the byproducts and the quality of the coke produced. The centrifugal dryer has demonstrated its ability to produce a product of proper moisture content for any reasonable demand of coke-oven operators.

Frank Rasmussen, Engineer.

Evanston, Ill.

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Longwall in the Pittsburgh Seam

Letter No. 2—In his letter referring to the recent discussion of the question of the adaptation of the longwall system of mining to work in the Pittsburgh seam, Coal Age, Feb. 13, p. 303, G. R. Waddell suggests that this system should be adopted and used in working the eastern Ohio No. 8 seam. He quotes S. A. Taylor as being opposed to its adoption and saying that "the roof breaks up too high, sometimes as much as twenty feet, and the bottom is too soft." That statement is true over practically the whole district.

Everybody knows that the overlying strata have an important bearing on the success of longwall mining; but what Mr. Taylor referred to was that, anywhere from three to thirty feet above the coal in this seam, is encountered a limestone stratum that refuses to break, being too thick. Consequently, when the coal has been mined without leaving sufficient pillars and the strata immediately above this coal have caved, the thick limestone supporting the upper measures gradually sags or bends under the enormous weight, until it comes to rest on the mine floor. This bending exerts a great pressure on the face of the live workings—not the moderate roof pressure that Mr. Waddell describes, but a heavy squeeze that closes all entries and proves disastrous to the mine. All roof falls that occur in the No. 8 seam, in eastern Ohio, only break to the limestone. On numerous occasions, operators have tried to get a break of this same limestone, in order to stop the progress of the squeeze over the live workings but have had little success.

Mr. Waddell appears to criticize the mine officials of this district; and suggests some ignorance on their part. Allow me to say that, while there are some officials in the district whose knowledge of mining would warrant such an aspersion, the district also possesses many brainy and capable coal men.

Invariably when a superintendent and mine foreman from Pennsylvania take charge of a mine, either in this district or the West Virginia Panhandle, they want to start to draw the pillars as they do in the same seam in the Pittsburgh district. Let some of the men from there who have tried it testify as to the results.

I have had a varied experience in eastern Ohio and the Panhandle mines and have been observant of conditions and results and worked along recognized progressive lines. At present I am operating not farther than eight miles from Mr. Waddell, and if he can show me a mine that is being worked on either the longwall or the room-and-pillar system and getting 85 per cent. of the coal in eastern Ohio No. 8 seam, I will be grateful; but he will have to show me.

ENGINEER.

Wheeling, W. Va.

Stopping Payroll Leaks

Letter No. 2—In addition to the interesting suggestions given by J. Kenvin, in reference to stopping payroll leaks, COAL AGE, Feb. 20, p. 343, I would like to add the following:

The foremen's timebook should be used but once. If the company pays twice a month, the timebook should run from the first to the fifteenth of the month, and from the sixteenth to the thirty-first, inclusive. These books should contain as few leaves as possible so that they can be filed away in a small space, after the records have been entered on the payroll sheet. Each foreman should turn in his book to the office on the first and the sixteenth days of the month and receive a new book for his use until the next pay.

The payroll clerk should check up the books turned in by the foreman with the daily reports to see that they agree, and care should be taken to place each item of expense in its proper column so that a full account can be kept of the payroll expenditures. It too often happens that not sufficient care is taken in the making out of the daily report and the proper distribution of the time is left for the foreman's monthly report.

Every mine superintendent who does his duty makes a careful inspection of the cost-sheet each day the mine is running. By this means, he knows the actual cost of producing coal each day; and if this cost of production is excessive, he will investigate immediately to ascertain the cause. It frequently develops that the daily cost of production at a mine fluctuates or is temporarily increased by the habit that some mine foremen have of turning in time for men that has been omitted from a previous report. There is no question but that the time worked should be entered on the payroll, in order that men will not lose their pay because of the forgetfulness of a boss; but this should come to the superintendent's attention, that more care may be exercised in the making out of future reports. Instances of this kind that occurred in my own experience were referred to the superintendent for authority to make the entry on the payroll. If this is not required, the opportunity is offered for padding the payroll.

With a little care and the use of proper blanks, the daily cost-sheet can be kept in a manner that will show at a glance the cost of production per ton of coal mined, for each day. The arrangement of the daily report should be such as to divide the expense in the same manner as required by the payroll-sheet. It is a good plan to make a close comparison between the weigh-sheet and the daily report.

As has been suggested, it is the duty of the engineer to check all measurements of contract work. He should make these checks from his own spads driven in the roof and not rely upon paint marks, as these are often changed by men disposed to crooked work. There is not the same danger of an engineer's spad being changed, as any meddling with this would at once be detected by the engineer. Instances have come to my notice where paint marks have been altered and the mistake has not been discovered until some time later when the reports of yardage were compared with map measurements and found to considerably exceed the actual distance driven.

JOHN H. DYE,
Mining Engineer.

Willard, Ky.

Mining Laws, Legislation and Mine Regulations

Letter No. 36—In a recent letter, COAL AGE, Feb. 13, p. 303, discussing needed mining laws and legislation, George D. Evans referred to the anthracite law of Pennsylvania requiring that an applicant for a mine-foreman's certificate must not only be able to pass the examination, but must also give satisfactory evidence that he has had at least "five years' practical experience as a miner," which he stated was then being contested in the Pennsylvania courts to determine the intended meaning of the words "practical experience as a miner."

In this connection, it will be of interest to know that in order to qualify for the position of mine foreman or assistant mine foreman in an anthracite mine in Pennsylvania, one need not have had the five years' practical experience in mining coal at the face or cutting coal directly from the vein, as demanded in the law. This conclusion was reached lately by the Court of Common Pleas of Dauphin County, Penn., in the case of Matthews vs. Roderick. The suit was brought to enjoin issuance of certificates to 142 persons who had passed examinations for mine foremanship and assistant foremanship, but had not had the specific experience mentioned in the law.

In dismissing this suit, the court said: "The statute, however, does not, in terms, declare what is necessary to constitute the five years' practical experience as miners. It does not say that this experience must be in cutting coal or in the doing of any particular work in a mine. A person successfully passing an examination must satisfy the board of examiners that he has had five years' practical experience as a miner, and each board is left to determine in the case of each applicant whether he has had the statutory practical experience to entitle him to a certificate of qualification to act as a mine foreman or assistant mine foreman. The members of these boards must possess practical experience as miners or as owners, operators or superintendents of mines, and the legislature seems to have left to the discretion of the several boards the determination of what the practical experience really is."

A. L. H. Street,
Attorney at law.

St. Paul, Minn.

Letter No. 37—The interesting letters relating to mine laws and legislation that have appeared in Coal Age for some time past have, unquestionably, been of educational value to the large number of readers. Mining law is one of the subjects that receives the least notice, while it should be given the closest attention by all who are engaged in that industry. It is the recognized rule of procedure by which the government seeks to regulate and establish the safety and preservation of life and property by imposing certain duties on both workmen and officials.

The workman is prone to regard some of the law's requirements as being restrictive of his liberties and an infringement of his rights, while the mine official, under pretext of enforcing the law as affecting the workman, frequently adopts a course of procedure that tends to emphasize this opinion. If all parties concerned would carefully read and study the different letters published on this subject they would see the necessity of making and complying with orders that are conducive to the safety and welfare of mine workers and much of the misunderstanding that now exists would be avoided.

The mining laws of every state contain defects and discrepancies and these could not be wholly eliminated, even if the laws were framed by our most practical and scientific mining men. Such defects and discrepancies, however, are of small consequence so long as it is possible to discern and know the meaning or spirit of the law.

In many instances, the interpretation of the law will depend on the desire of both workmen and officials to "play safe" as Sim Reynolds so aptly expressed it, Coal Age, Jan. 9, p. 93. When, however, one part of the law is inconsistent with and contradicts another part, a compliance with such an inconsistency that will endanger life or property may justly be regarded as criminal if intentional.

Such an inconsistency exists in the bituminous mining law of Pennsylvania (1911). For example, Art. 10, Sec. 1, reads:

> The use of open lights is prohibited in any entry, airway, traveling way, room, or any other working place where explosive gas is being generated in such quantity as can be detected by an approved safety lamp, also in pillar workings where a sudden inflow of explosive gas is likely to be encountered, and all such places shall be worked exclusively with locked safety lamps.

Again, Art. 28, Sec. 2, reads:

> The provisions of this act as to mines, or portions of a mine, generating explosive gas in quantities sufficient to be detected by an approved safety lamp shall not apply to any mine wherein explosive gas is being generated only in live entries.

In Art. 10, the mine inspector is given discretionary power with respect to compelling the use of locked safety lamps in places where his judgment deems their use is necessary, but he is not given discretionary power to permit their *nonuse* in places where they are required by law. However, Art. 28 seems to limit the discretionary power of the inspector granted in Art. 10, so that, if the mine management desires to work such places with open lights, they can do so and it is beyond the power of the inspector to prevent such action.

That compliance with such a law would be productive of harm was clearly demonstrated in the Cincinnati mine explosion, Apr. 23, 1913. It is no argument to urge in support of this act that ample ventilation can be kept up to the face by means of brattice, as this precaution was taken throughout the mine in the case just mentioned, and yet 96 lives were lost. The explosion occurred in an entry that was not generating explosive gas, Coal Age, Vol. 3, p. 807. I regard this as a strong argument against the use of *mixed lights* in mining, which so many of our expert mining men and mining journals seem to favor.

One writer, commenting on this disaster, states that the mine foreman was at fault in not complying with General Rule 18, of the bituminous law, which states that in such places "a borehole shall be kept not less than three feet in advance of the face of the work, or three feet in advance of any shot-hole drilled for a blast to be fired in"; but this requirement refers to "mines wherein explosive gas is generated in dangerous quantities." Under the conditions, the mine foreman could not be held legally responsible, as he was within the law. I may add that a compliance with Sec. 1, of Art. 28 is equally if not more dangerous than that of Sec. 2; but the former is not contradictory of the provisions of any previous article.

I believe that all practical mining men will agree with the statement that the operation of a mine, under the provisions of Art. 28, is not consistent with the general spirit of the law, in that it restricts the discretionary powers of the inspectors in an important particular and renders their efforts to safeguard life and property practically useless, and legalizes action on the part of the mine management that would be criminal if it were not for this section of the law.

No matter how conscientious and scrupulous the mine foreman and the inspector may be, in regard to the enforcement of the precautions for safety; no matter how well they may know that such procedure may be productive of the most disastrous results, they can be overridden by the operator, because the law sanctions his action. If the Department of Mines of Pennsylvania earnestly desires to eliminate or reduce accidents, it would be well to see that the law is expurgated of such inconsistencies and contradictions and that the mine foreman and inspector are not handicapped by the statutory provisions of such incongruities.

I. C. Parfitt,
Assistant Foreman.

Jerome, Pa.

Tractive Effort vs. Draw-Bar Pull

In connection with the excellent explanation given of the tractive effort a locomotive can exert, COAL AGE, Dec. 5, p. 917, I thought the following definitions of the terms "tractive effort" and "draw-bar pull" would help to further elucidate their meaning and use.

The *tractive effort* of a locomotive is the force exerted by the motors at the wheel rim. The *draw-bar pull* of a locomotive is the force it is able to exert to pull a trailing load.

When the locomotive is on a level track the tractive effort is equal to the draw-bar pull plus the friction of the locomotive, which consists of wheel friction, journal and axle-bearing friction, and windage. The windage is not much of an item in a mine locomotive. The tractive-effort curves of the motors most always include the gear losses, so that the difference between the *input* to the motors and the power represented by the tractive effort consists of motor and gear losses.

On a grade the difference between the tractive effort and the draw-bar pull is the same as for a level, plus 20 lb. per ton of locomotive, for each 1 per cent. of grade. It will be readily seen that a grade will finally be reached when the part of the tractive effort due to grade will just balance the adhesion of the wheel to the track when the draw-bar pull the locomotive can exert becomes zero. Any steeper grade will cause the wheels to slip and the locomotive will slide down the grade.

So far, I have assumed that the locomotive is traveling at a constant rate of speed. During acceleration the portion of the tractive effort necessary to accelerate the locomotive will not be available for draw-bar pull. This acceleration will absorb about 100 lb. per ton for each one mile per hour per second rate of acceleration, which will give the same loss of draw-bar pull that a 5 per cent. grade will produce. However, the rates of acceleration in mine service are usually only 0.2 to 0.25 mile per hour per second, so that this loss is not great.

The draw-bar pull or, as you state, "tractive force," is therefore limited by the weight of the locomotive, the adhesion of its wheels to the track and the grade of the road, while the tractive effort is only limited by the capacity of the motors. As you have already said, the tractive effort may be very much greater than the draw-bar pull. This may be caused by the motorman holding his brakes on while notching up, which is a bad and dangerous practice, and is one of the evils resulting from "overmotoring" a locomotive.

GRAHAM BRIGHT.

East Pitsburgh, Penn.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

MINE-LOCOMOTIVE HAULAGE

A mine locomotive consists of a heavy iron frame or bed mounted on wheels, which are operated through a system of gears by steam or air cylinders or powerful electric motors built in the frame.

It is common in mines to speak of the locomotive as the "mine motor," "haulage motor," or simply "motor." It is necessary, however, to avoid confusion, to distinguish between the **locomotive,** which is the machine, and the **motor** by which it is driven.

Types of Mine Locomotives—Mine locomotives are classified, according to the power used to drive them, as **steam, compressed air** or **electric,** all of which are employed under the varying conditions in mining.

Adaptation to Mine Use—The use of steam locomotives in coal mining is very limited owing to the annoyance and danger arising from the presence of the exhaust steam and gases in the mine entries. Such locomotives, however, are frequently found employed in small drift openings, but rarely in other cases.

The **choice** between compressed-air and electric locomotives for mine use is almost wholly governed by the question of relative cost of installation and maintenance and the adaptation of these two kinds of power to the various operations and requirements in the mine. Obviously, it would not be advisable, generally, to install and operate two large power plants with their separate systems of transmission in the mine where one such installation will perform the work that is required.

Where a compressed-air plant is already in operation supplying power to drills and coal-cutting machines, compressed-air locomotives can be used with greater economy for hauling the coal, supplies and refuse in the mine. The same principle holds true in respect to electricity. Where this power is already in use for operating machines at the working face it will be advantageous and more economical to employ electric locomotives for haulage purposes.

Compressed Air, Advantages and Disadvantages—The air exhausted from compressed-air machines is a decided advantage in the ventilation of headings and chambers driven ahead of the air. On the other hand, the system of pipes required to conduct the power from the compressors on the surface to the machines at the face is cumbersome and rigid, which makes it comparatively difficult to extend, alter, repair and maintain. In case of accident, this system may furnish the air needed to sustain the lives of entombed miners cut off from the regular air supply.

Electricity, Advantages and Disadvantages—The electric transmission of power possesses a great advantage in the flexibility of the system, which makes it easy to install, extend, alter and repair. The use of electricity in gaseous mines is always attended with more or less danger owing to the possibility of the gas being ignited by the sparking of wires, switches or brushes. There is also the danger of shock to men and animals.

The Coal Age Pocket Book

Hauling Capacity of Mine Locomotives—The load that a locomotive will haul depends on the **grade of the track;** the **weight of the locomotive** resting on the driving wheels; the **adhesion of the wheels** to the rails and the condition of the track and general rolling stock or mine cars hauled, assuming of course that the power of the motors is proportioned to the weight on the drivers and their adhesion to the rails, since these two factors practically determine and limit the **draw-bar pull** of the locomotive or its hauling capacity.

Tractive Effort of Locomotive—The tractive effort of a locomotive is the effort it can exert to move the entire load, which includes its own weight in addition to that of the cars hauled.

Assuming what is true in a properly designed mine locomotive that the effective power of its motors is in proportion to the weight on the drivers, the tractive effort, which is the force of the motors available at the circumference of the drivers, cannot exceed the adhesion of the wheels to the rails or the **wheels would slip** and the locomotive and its train would not be moved.

The adhesion of the wheels to the rails will vary according to the material of the wheels and rails and the presence of any lubricating matter, as water, clay, grease, etc. The **coefficient of friction,** in haulage, may vary from 0.15 to 0.20, depending on conditions; but, in coal mining practice, it is only safe to assume a value of, say 0.16, which makes the tractive effort practically one-sixth of the weight on the drivers.

Mine locomotives are commonly built so that the entire weight of the locomotive rests on the driving wheels. The foregoing makes clear why mine locomotives are rated on a basis of their weight in tons and not on the horsepower of their motors, since the **tonnage of a locomotive** indicates its possible tractive effort from which its hauling capacity can be calculated in accordance with the known data in regard to grade and conditions of track, rolling stock, etc., which together determine the track resistance.

Track Resistance—What is commonly called "track resistance" includes all the frictional resistances (outside the motor gears) that oppose the movement of the locomotive and its train **on a level track.** It is estimated in pounds per ton of moving load.

Track resistance, in mines, may be safely estimated as, say 50 lb. per ton of moving load. With good rolling stock (14-in. wheels), proper lubrication and well ballasted track, this may be reduced to 40 lb. per ton, while improved car wheels with ball or roller bearings make it possible to estimate on a track resistance of 30 or even 20 lb. per ton, in exceptional cases.

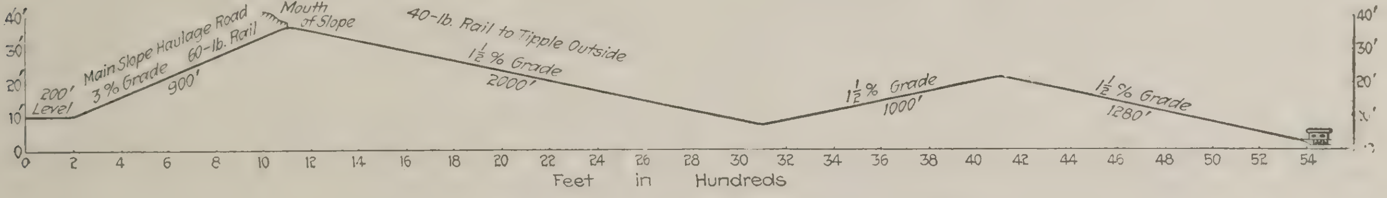
Grade Resistance—When haulage is performed on an incline, the weight of the load resting on the incline produces a pull commonly called the "gravity pull" acting in a line parallel to the track. For grades not exceeding 10 per cent., the gravity pull or grade resistance is $0.01 \times 2000 = 20$ lb. per ton for each per cent. of grade.

Inquiries of General Interest

Electric-Haulage Problem

I desire some information on the installation of an electric-haulage plant at our mines. At the present time, we are hauling the coal from the slope to the tipple, a distance of nearly a mile, using for this purpose a steam locomotive. We desire such information as will enable us to purchase an equipment that will prove satisfactory.

It is proposed to haul the coal from the siding at the bottom of the slope, in trips of 30 cars. The empty cars each weigh one ton and have a capacity of 1.5 tons. This will make the total weight of the loaded trip 30 (1 + 1.5) = 75 tons. The accompanying profile of the road, extending from the siding at the slope bottom in the mine to the tipple where the coal is loaded into the railroad cars, shows the length and grade of each portion of the track and the weight of rail in use at the present time.



PROFILE OF TRACK FROM BOTTOM OF SLOPE TO TIPPLE

Kindly state the size of electric motor that will be required for this haul; also the weight of rail and style of rail bond that should be used, the size of trolley wire required for the transmission of the power from the generator to the mine, and the required horsepower of the generator and boiler.

JOHN E. KELLEY, Supt.,
Big Four Coal Co.

Boonville, Ind.

The first step is to estimate the weight of locomotive required to haul a loaded trip of 75 tons up a 3-per cent. grade, under ordinary mining conditions. In mining practice, it is not safe to estimate on what is commonly called the "track resistance" as being less than 50 lb. per ton. To this must be added 20 lb. per ton for each per cent. of grade or, in this case, 3 × 20 = 60 lb. grade resistance, which makes the total resistance 50 + 60 = 110 lb. per ton of total moving load including the locomotive.

Also, in mining practice, the coefficient of adhesion of the wheels to the rails should not be estimated as exceeding 0.16, which makes the tractive effort that the locomotive can exert to move itself and the loaded trip 0.16 × 2000 = 320 lb. per ton. Then, since this tractive effort of the locomotive must be equal to the total resistance of the entire moving load including the locomotive,

$$320\,W_m = 110(W_m + W_t) = 110\,W_m + 110\,W_t$$

and $$W_m = \frac{110\,W_t}{320 - 110} = \frac{110 \times 75}{210} = \textit{say 40 tons}$$

This shows conclusively that, under the adverse conditions common in coal mining, a 40-ton locomotive would be required to haul a loaded trip of 75 tons up a 3-per cent. slope. This of course provides for the worst conditions that are liable to exist, in respect to both the track and rolling stock in the mine.

Before going further, it will be well to estimate the weight of locomotive that will be required to haul the same loaded trip on the 1½-per cent. grades outside of the mine. In this case, the track resistance, as before, is 50 lb. per ton, but the grade resistance is 1.5 × 20 = 30 lb. per ton, which makes the total resistance 50 + 30 = 80 lb. per ton. This gives for the required weight of the locomotive

$$W_m = \frac{80 \times 75}{320 - 80} = \textit{25 tons}$$

We would suggest here that the same weight of locomotive will haul practically two-thirds of the number of cars up the slope that it can handle on the outside grades, as shown by transposing the formula previously given and finding the load that a locomotive can be expected to haul regularly up grades of 1½ and 3 per cent., respectively, under the conditions named, thus,

On a 3-per cent. grade:
tractive effort of locomotive, 320 lb. per ton;
track and grade resistance, 80 lb. per ton.

Loaded trip, $$W_t = \frac{320 - 110}{110}\,W_m = 1.9\,W_m$$

On a 1½-per cent. grade:
tractive effort of locomotive, 320 lb. per ton;
track and grade resistance, 80 lb. per ton.

Loaded trip, $$W_t = \frac{320 - 80}{80}\,W_m = 3\,W_m$$

For this reason, it might be well to provide a siding at the top of the slope that will hold 20 or 40 cars as desired, and make three trips on the slope for every two trips to the tipple, using a 25-ton locomotive for the entire work.

So far, we have only considered relative weights of the locomotive and the load it can be expected to handle regularly and satisfactorily on different grades, under the worst conditions that are liable to exist or arise in mining practice. It is important to remember that having assumed a coefficient expressing the adhesion of the wheels to the rails, it is the *weight* of the locomotive that determines the tractive effort the machine can exert, regardless of the power of the motors or engines with which it is equipped. It is a fatal mistake to equip a locomotive with more power than its weight will permit it to utilize.

(To be continued in next issue)

Examination Questions

Hoisting Engineers' Examination Held at Terre Haute, Ind., Sept. 10, 1914

(*Selected Questions*)

Ques.—(a) Why should scale never be allowed to accumulate in a boiler? (b) How can the bad effects of scaling be prevented?

Ans.—(a) The formation of scale in a boiler prevents, to a large degree, the transmission of heat from the furnace to the water in the boiler and decreases, to that extent, the production of steam per pound of fuel burned and lowers the efficiency of the boiler. Again, the presence of scale in a boiler has a tendency to induce overfiring, with the result that the fireplates of the boiler are often blistered or bulged. When this occurs there is danger that the cracking of the scale may permit the water to gain access to a red-hot plate, which would generally cause the explosion of the boiler. The formation of scale has, also, the effect to deteriorate the iron and weaken the boiler.

(b) The bad effects of scaling are best prevented by avoiding the formation of scale, by purifying the feed water used in the boiler. The purification of the feed water will depend on the impurities it contains. Water containing sediment held in suspension should be permitted to stand awhile in settling tanks from which it can be drawn for use as required. The precipitation of sediment and organic matter in water is facilitated by heating or boiling. Acid feed waters must be treated with salts that will neutralize the acids and prevent them from attacking the iron of the boiler.

In general practice, the purification of feed water is accomplished by settling, feed-water heaters, the use of soda ash to neutralize the acid of the water, or the use of graphite or petroleum (coal oil) either of which has the effect to disintegrate the scale and prevent, to a large extent, its adhesion to the iron plates of the boiler. The powdered graphite or the oil is introduced into the feed water before it is pumped into the boiler. Where scale forms readily, the boiler should be blown off at regular intervals, say at least once a week. In some cases, the results are improved by blowing off 3 or 4 inches of the water each night.

Ques.—(a) What is the purpose of a flywheel on an engine? (b) What is the effect if a flywheel is too light for its work? (c) What is the effect if the flywheel is too heavy?

Ans.—(a) The purpose of a flywheel of an engine is to regulate the motion of the engine and render its speed uniform, by virtue of the stored energy of the wheel.

(b) If the flywheel is too light for its work, it does not properly regulate the motion of the engine, which continues to have a variable speed of rotation, running slower or faster as the load is increased or decreased.

(c) If the flywheel is too heavy, it renders the work of the engine heavy and laborious, absorbing more energy than is required for the purpose intended and increasing the time for acceleration and retardation when starting and stopping the engine. The excessive weight of the wheel also adds to the wear and tear of the machinery.

Ques.—(a) For what purpose are bearings bushed? (b) What metals are generally used for this purpose, and why?

Ans.—(a) The purpose of bushing machine journals or bearings is chiefly to reduce the friction and to overcome the effects of wear by making it possible to replace the bearings when worn, by a new one inserted in its place.

(b) The metals most commonly used in bushing are babbitt, brass or bronze. Various compositions of copper, tin and zinc are used for this purpose. The composition commonly known as "babbitt metal" is an alloy of copper, tin and antimony. This alloy is much used because of its antifrictional properties and because of the ease with which it can be molded about a journal or bearing.

Ques.—Explain why it is economical, in many cases in mining practice, to employ compressed air or electricity in place of steam power.

Ans.—In the use of compressed air or electricity, it is possible to transmit the power over considerable distances more conveniently and with less loss than in the use of steam. The transmission of steam power for any considerable distance is not only attended with much loss, owing to condensation in the pipe line, but, in mine entries, the radiation of the heat from the pipes and the presence of the exhaust steam in the workings are objectionable. Moreover, the steam has a bad effect on the mine roof, in many cases.

Ques.—What are the advantages and disadvantages of using electricity for power or other purposes, in coal mining?

Ans.—For answer to this question, see Study Course in Coal Mining, p. 434.

Ques.—(a) If a pump is located at the bottom of a shaft 300 ft. deep, what is the pressure per square inch when the pump is in operation? (b) How many gallons of water will a tank hold, the diameter of the tank being 53 in. and its height 9 ft. 11 in.?

Ans.—(a) The pump's static head is 300 × 0.434 = 130.2 lb. per sq.in. The pressure when the pump is in operation cannot be calculated without knowing the size of the column pipe and the quantity of water discharged. For example, assuming a discharge of 250 gal. per min. through a 4-in. column pipe, in this case, the effective head when the pump is in operation is

$$h_1 = h + \frac{G^2 h}{800\,d^5} = 300 + \frac{250^2 \times 300}{800 \times 4^5} = \textit{say } 330\ \textit{ft.}$$

(b) This tank is a cylinder having a sectional area of $0.7854 \times 53^2 = 2206+$ sq.in. Its depth is $9 \times 12 + 11 = 119$ in. The capacity of the tank in gallons is, therefore, $2206 \times 119 \div 231 = 1136$ gal.

Coal and Coke News

Harrisburg, Penn.

Governor Brumbaugh and Attorney General Brown have prepared tentative drafts of six bills designed, in a comprehensive fashion, to carry into effect the state administration's idea as to a workmen's compensation act.

They have also prepared the proposed amendments to the constitution, which would, if adopted by the people, give the Legislature power to enact a compulsory compensation law. The law proposed for this session is elective. The constitutional amendment in question has already passed one session of the Legislature. If it be passed by the present session, the people may vote it into the constitution next November.

The six bills, as tentatively framed by the attorney general are: First, the workmen's compensation act, which provides a schedule of compensation at the rate of 50 per cent. on the wages received for varying periods. This bill provides that the act shall apply to all accidents occurring within the state, irrespective of place where the contract for hiring was made, renewed or extended.

Second: An act creating a bureau to enforce the workmen's compensation act.

Third: An act creating a state insurance fund.

Fourth: An act regulating policies of insurance against liability arising under Article 3, of the workmen's compensation act.

Fifth: An act creating and authorizing mutual liability associations.

Sixth: An act to overcome all constitutional objections to the exemption of any class of labor.

Compensation for injuries: For total disability, 50 per cent. of wages for first 500 weeks; maximum, $10 a week; minimum, $5 a week. For partial disability, 50 per cent. of the difference between the wages received at the time of injury and the earning power thereafter; maximum, $10 a week; maximum period, 300 weeks.

Compensation for death: Minimum, $1.50 a week to dependent brother or sister; maximum, $12 a week to widow with four children; period of death compensation 300 weeks; death compensation to children until they reach the age of 16.

It is estimated that there will be 60,000 compensable accidents annually. The compensation bill enlarges the right of an employee to recover in an action at law aganist his employer.

In case of the injury or death of an employee, it shall not be a defense of the employer in any action that the injury was caused by the negligence of a fellow employee, or that the employee had assumed the risk of the injury, or that the injury was caused in any degree by the negligence of such employee, unless it be established that the injury was caused by such employee's intoxication or by his reckless indifference to danger. The bill provides that the burden of proving such intoxication or reckless indifference shall be upon the defendant and the question shall be one of fact to be determined by a jury.

Employer Is Liable for All Negligence

The employer shall be liable for the negligence of all employees while acting within the scope of their employment, including engineers, miners, mine foremen, firebosses, mine superintendents, officers of vessels, etc., and all other employees licensed by the state or other governmental authority if the employer shall be allowed by law the right of free selection of such employees from the class of persons thus licensed.

This is a very perplexing question since the miners are employed upon examination in the anthracite region under state auspices, and other mine employees in both regions are hired by foremen who are chosen by state examination, the operators cannot be held responsible for the payment for injury or loss of life, and a decision of the Supreme Court recognizes the responsibility of the state in employment, because of the state examination.

Compensation to alien dependent widows and children not residents of the United States shall be the same in amount as is provided in each case for residents, except that, at any time within one year after the death of injured person, the employer may, at his option, commute all future installments of compensation to be paid alien dependents not residents of the United States by paying such alien dependent two-thirds of the total amount of such future installments. Alien widowers, parents, brothers and sisters not residents of the United States shall not be entitled to any compensation.

Coal operators while pleased in some respects with the bill will no doubt make a strenuous fight against the provision of the employers' law defenses, which should be retained to him in cases where the employee does not elect to accept compensation under the act.

The expense of administration of the act is apparently to be borne by the state for only two years. The employer will be compelled to pay an insurance company or state commission to conduct the business, which will no doubt be opposed by operators. The provision that after Dec. 31, 1915, the employer will be presumed to have accepted the act is not taken to kindly.

The provision as to payments to aliens will be bitterly fought by the bituminous operators, as they claim this clause is too liberal. As the foreigner with a family benefits equally, apparently, with the American citizen. Today the foreigner enjoys all use of hospitals and other institutions, to which he does not contribute, while his own money is sent back to the old country, and should not participate fully until he becomes an American citizen.

The united forces of the manufacturers and the coal operators, it is expected, will be brought to bear to reduce the concessions granted to workmen in the Brumbaugh bills.

PENNSYLVANIA

Anthracite

Scranton—It is reported that there is over 7000 miles of underground tunnels in the anthracite mines of Pennsylvania. It is said that the Philadelphia & Reading Coal & Iron Co. has more than 800 miles of timbered gangways and that there is a total of 2000 miles of these underground passages in the Schuylkill region alone.

Nesquehoning—The fire that broke out in the inside workings of No. 9 colliery of the Lehigh Coal & Navigation Co. on Christmas day, is burning despite strenuous efforts to extinguish it. Every time the fire has been partly under control the flames would break out again. The company is now sinking a shaft to the burning section and through this opening it is proposed to flood the interior with culm and water. The fire is raging almost under the business section of the town, near the old tunnel plane to Summit Hill.

Plymouth—One lone individual miner, who refused to pay his union dues, was the cause of tying up the Nottingham No. 15 colliery of the Lehigh & Wilkes-Barre Coal Co. on Feb. 25. The mine workers learned that he was in arrears and when he appeared at the head of the shaft he was requested to secure the necessary button, but refused and descended the shaft alone, the workmen refusing to either ride with him or work until he should pay his dues. Thus the action of one man prevented a thousand or more tons of coal being mined and caused a loss of hundreds of dollars in wages.

Pittston—For the second consecutive year, not a single death from the explosion of gas occurred in the mines of the eighth anthracite inspection district in 1914, according to the report of Mine Inspector S. J. Jennings, which was recently forwarded to the Bureau of Mines. The eighth district includes 15 collieries and 27 mines in upper Luzerne County. The production for the year was 3,943,873 tons, as compared with 4,012,653 tons in 1913. There were 37 fatal accidents, all but two occurring inside the mines, which means that for every life lost, 112,682 tons were mined. Forty per cent. of the fatalities were due to falls of roof. The majority of the accidents were of the class termed "avoidable." In 1913 there were 47 fatalities.

Bituminous

Punxsutawney—The scale office and scales and a portion of the tipple of the No. 7 mine of the Berwind-White Co. operated by the Anita Coal Mining Co. were destroyed by dynamite Feb. 24. The office was partly demolished and part of the tipple destroyed and the scales torn to pieces. This is the second attempt to destroy the scale house, and the company officials are unable to determine who the dynamiters may be.

Uniontown—By the recording of deeds in the County Recorders Office, the long struggle between the H. C. Frick Coke Co. and W. J. Rainey for possession of the Mount Braddock farm and its underlying coal has been ended. With the exception of small strips necessary for the Rainey company in order to mine its coal the surface now belongs to the Frick interests. The Frick company also possesses two-thirds of the coal and the Rainey company owns the remainder. Almost 650 acres are embraced in this tract.

Connellsville—A pronounced improvement has taken place in the Connellsville coke region, and production and shipments are about equal at 270,000 tons weekly. This is the best record since the first half of 1914, but will shortly be exceeded when 418 more ovens will be fired by the H. C. Frick Coke Co. It is believed that the 300,000-ton mark will be reached before the close of the first quarter.

Allanvale—Officials of the Consolidated Coal Co. are pushing the extensive improvement work at the Shaw mines, recently acquired by the company, as if there were no slump in the coal business. A 4-ft. vein of coal is to be developed, and preparations now being made to mine it show that the output will be heavy from the beginning of operations and that the supply will be large and dependable. Company officials state that they intend to be ready for the revival in demand whenever it comes.

WEST VIRGINIA

Fairmont—The grand jury empaneled to inquire into the crimes said to have been committed by strikers recently at Farmington has made a report and returned indictments charging 114 men with various offenses, ranging downward from riot and conspiracy to murder. There may be some trouble in making arrests, in anticipation of which the local company of the national guard is ready for service. Mines Nos. 7 and 9 are to resume work shortly, and this is also expected to bring about a clash. The funeral of Constable W. R. Riggs, who died as the result of a beating received at the hands of the strikers, drew an immense crowd.

Charleston—Following the conviction of Romeo Campi and John H. Riley, fire bosses of the Carlisle mine, where several men were killed a few weeks ago by an explosion, Earle Henry, chief of the Department of Mines, recently announced that any boss found neglecting his duty will have his license revoked. The convicted fire bosses were fined $50 each and forfeited their licenses. The foreman, Pilkington, who was also indicted was acquitted, but had his license revoked.

Huntington—The two men who pleaded guilty to polluting the waters of the Guyan River were fined a total of $150. They are employees of the United States Coal & Oil Co. Insufficient evidence caused the discharge of three others arraigned on similar charges. These men had permitted mine water containing sulphur to run into the river killing many fish in the stream.

Plans are now on foot looking to the organization of an association of West Virginia coal operators which will have for its object the extension of export coal trade especially in South America, the standardization of grades of coal, ascertaining and publishing costs of coal production in West Virginia and the dissemination of actual and reliable information about the industry in the state with the elimination of destructive and wasteful competition as far as this purpose can be lawfully accomplished. It is said that permanent headquarters will be established in Huntington, as this point can be more easily reached than any other center from all the mining fields of the state.

ALABAMA

Montgomery—Governor Henderson announces that he will soon make an inspection of the conditions in the minig camps operated with convict labor. It is expected that he will make some suggestions relative to the management of convicts to the Legislature when it reassembles in July.

KENTUCKY

St. Charles—In spite of warnings which were posted by alleged "possum hunters" near the Carbondale mines, white miners are being employed daily and for the present the mine is working full force and full time. It is not expected that the warnings will make trouble.

Baskett—The Pittsburg Coal Co. on Feb. 20 made the best run of the year, with an output of 437 tons of coal. Ninety men worked 8 hours and loaded 14 railroad cars. The best one-day record ever made at the mine was 637 tons. The company has a contract which will keep the mine going all summer and by Apr. 1 it hopes to have an output averaging 700 tons a day.

Rockport—The Rockport Coal Co. has closed its mines here for an indefinite period. This throws 125 men out of work.

Central City—The impending shutdown of the mines of the Central Coal & Iron Co. has been forestalled by an order from John P. White, president of the United Mine Workers of America, who has suspended the order of the International Executive Board pending a personal investigation of the controversy involving the mines of the company and the union workmen, which involves the matter of arbitration. The Central company has orders which will permit operation of the mines four days out of the week.

OHIO

Columbus—The Green anti-screen law passed by the Ohio legislature a year ago has been held constitutional by the United States Supreme Court. The Gallagher bill now pending in the Ohio legislature is aimed at this law. While operators in the Hocking Valley are opposing the amendment, those in eastern Ohio are fighting for its enactment.

J. M. Roan, Ohio chief mine inspector, was called to Zanesville recently to investigate a complaint arising from the use of a new cutting machine in the Elk mine at that place. The machine which has just been placed on the market is an overcutter and it was averred that the dust left was dangerous as an explosion might result. A specimen of the cuttings has been taken for analysis.

Martins Ferry—The largest number of defendants ever named in a suit filed in the Belmont County Court are involved in an action to quiet the title to real estate, filed for the Ohio River & Western Coal Co. Clarence Armstrong and between 600 and 700 others are the defendants. The petition contains copies of 236 deeds for tracts of coal land in the southern part of Belmont County. The suit is the outgrowth of the sale of the coal land and it was necessary for the company to bring suit to have the titles established in the county records.

INDIANA

Vincennes—The Indian Creek mine, near here, with an output of 3307 tons of coal in eight hours, on Feb. 24 set a new one-day record for the state, eclipsing its previous record by 204 tons. Six hundred men are employed at this mine.

ILLINOIS

O'Fallon—The lives of 150 miners were endangered during the past week at the Ridge Prairie mine, two miles west of here, when fire broke through a brick wall and filled the mine with smoke and gas. The miners at work at this time were only part of the 250 men regularly employed. It is understood that the fire has been burning in the unworked portion of the mine for something like two years. This section, however, had been bricked in and the property was supposed to be safe. Heat from the fire crumbled the brick. A mine-rescue car soon arrived on the scene with experts to advise means of fighting the fire.

Harrisburg—O'Gara coal mine No. 8 recently closed for an indefinite period, throwing 300 men out of employment.

ARKANSAS

Fort Smith—The purchase of the Bache-Benman Coal Syndicate's property by the United Mine Workers of America, District 21, was recently officially called off. The Union deposited $50,000 early in January as an evidence of good faith. It is believed that Judge Youmans of the United States District Court who named a receiver for the corporation, will not order the property sold.

OKLAHOMA

Muskogee—The Dow Coal Co. recently filed a voluntary petition in bankruptcy in the United States Court. The company's indebtedness is more than $250,000, while its assets including real estate and machinery and accounts due aggregate $226,000.

COLORADO

Denver—Two of the four bills intended to increase the authority of the state government in strike disorders recently passed the House. One imposes a penalty for refusing to obey an order issued by the National Guard, and the other imposes a penalty for resisting the militia.

Golden—The State School of Mines recently announced a short course in coal mining to be given from Apr. 5 to May 28. The course is for practical coal miners and is designed for the purpose of giving them an opportunity to improve their work and benefit themselves in their position. The instruction includes mining, chemistry, mathematics, drawing and geology. No fees are to be charged for instruction and the course is open to all.

PERSONALS

Charles B. Levy has retired from the presidency of the Guarantee Coal Co. with which he has been connected for some time.

H. E. Marks, for some years Pittsburgh representative of the Asbestos Protected Metal Co., has been elected vice-president and manager of sales.

M. T. Ashton, Boston sales representative of the Pennsylvania Coal & Coke Corp., has been made Boston manager for D. Nicoll & Company

James Emery, representing the Pittsburgh-Westmoreland Coal Co. has optioned 1100 acres of coal land, four miles south of Ellsworth, Washington County, Penn. This option was secured at $320 per acre.

L. W. Brand, of Benton, Ill., was recently appointed receiver for the Hart-Williams Coal Co., of Benton. The assets are given as $400,000 and the liabilities are $200,000. The property will be disposed of as soon as possible.

Frank Albright, of Sumner County, Ala., was recently appointed statistician in the State Mining Department by Chief Sylvester, and the appointment confirmed by the governor. Mr. Albright will at once take up the duties of his new office which will be largely clerical.

George M. Jones, of the Geo. M. Jones Co., went to Washington recently as a member of a committee appointed by the Eastern Ohio Coal Operators' Association, to confer with Sec. of Labor Wilson regarding the resumption of operations by the eastern Ohio mines, which have been closed since last April.

George and Harry Whyel, of Uniontown, Penn., have acquired the property of the Killarm Coal Co., located near Monongah, W. Va. The Killarm property was formally owned by Worth Kilpatrick and J. A. Armstrong of Connellsville, and other associates. It consists of approximately 1200 acres of the Pittsburgh seam, and adjoins the property of the Fairmont Coal Co. This coal is in the heart of the Fairmont District and the quality is equal to any of the Fairmont operations. . This mine was opened several years ago, and was electrically equipped, tipple, houses, store, and other equipment necessary to operate the same were built, but on account of some local conditions the owners decided not to continue operation, and it has been practically abandoned for several years.

TRADE CATALOGS

The Armstrong Cork & Insulation Co., Pittsburgh, Penn. "Permanent Fortifications." Eight pages, 7x6 in.; illustrated.

The Weinman Pump Mfg. Co., 270-280 Spruce St., Columbus, Ohio. Bulletin No. 51. "Weinman Power Pumps." Illustrated, 16 pp. 6x9 in.

The Waterbury Co., 80 South St., New York City, "Waterbury Fibreclad Wire Rope." Twenty-three pages, 3½x6¼ in.; illustrated.

The Portable Safety Lamp Co., 10 Johnson St., Newark, N. J. "Hubbell Electric Hand Lantern." Leaflet of six pages, 3¼x6 in.; illustrated.

The Atlas Car & Mfg. Co., Cleveland, Ohio. Bulletin No. 1175. "Storage Battery Locomotives, Cranes and Cars." Illustrated, 32 pp., 9½x6 in.

The Goulds Mfg. Co., Seneca Falls, N. Y., Bulletin No. 119. "Single Stage, Single Suction Centrifugal Pumps." Twelve pages, 7¾x10 in.; illustrated.

NEW PUBLICATIONS

The Oregon Bureau of Mines and Geology. "The Mineral Resources of Oregon"; 161 pp. 6½x10 in., illustrated.

Seventeenth Annual Report of the Bureau of Labor and Industrial Statistics of the State of Virginia, 1914. Bound volume of 192 pages with many tables.

Department of the Interior, U. S. Geological Survey. Bulletin No. 590. "Reconnaissance of the Geology and Oil Prospects of Northwestern Oregon." By C. W. Washburne; 111 pp., 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines, "Metal-Mine Accidents in the United States During the Calendar Year 1913," compiled by Albert H. Fay. Seventy-three pages, 6x9 in.; unillustrated.

Department of the Interior, U. S. Geological Survey. Bulletin 570. "Results of Spirit Leveling in Wisconsin, 1897 to 1914, inclusive," by R. B. Marshall, chief geographer. Eighty-six pages, 6x9 in.; unillustrated.

CONSTRUCTION NEWS

Piedmont, W. Va.—Miller Bros. will shortly open for development a large body of coal on the J. O. J. Greene property which they have purchased.

Somerset, Penn.—Talk of an extension of the Western Maryland R.R. into the Jenner-Quemahoning coal field of Somerset County has been resumed, and predictions have been made that construction work will be started during the coming year.

Piedmont, W. Va.—The Davis Coal & Coke Co. is constructing another power plant at mine No. 52, near Franklin. It will furnish power for operating the mines which will use electrical cutting machines and locomotives for transporting the coal to the tipple.

Cordova, Ala.—The Diamond Coal Co., J. S. Shannon, president, N. L. S. Lunsford, vice-president, announces that it will install electric machinery at the property of the Oak Leaf Coal Co. recently purchased, containing about 1000 acres of coal land and will develop for a capacity of 250 to 500 tons per day of coal.

Steubenville, Ohio—A syndicate has been busy during the past few weeks buying up coal lands in Germany Township, Harrison County, Ohio. The company is purchasing the land outright and expects to start development during the summer. A branch of the Wheeling & Lake Erie will be built to the property.

Chicago, Ill.—The Roberts & Schaefer Co. has just secured contracts for the building of Marcus patent coal tipples for the Harty Coal Co., Mullens, W. Va., the Moffat Coal Co., Oak Creek, Colo., the Henderson Coal Co., Hendersonville, Penn., the Sunnyside Coal Mining Co., Denver, Colo. These plants are modern installations and will be equipped with thorough screening and picking facilities.

Shenandoah, Penn.—James Bros., individual operators, recently struck a 30-ft. bed of mammoth vein anthracite at their stripping operations on Bear Ridge Mountain at Gilberton. This with the rich beds recently discovered on Locust Mountain, gives a large supply of the finest kind of anthracite. The James Bros. will commence the erection of a large breaker at once, giving employment to hundreds of men and boys.

NEW INCORPORATIONS

Hazard, Ky.—The Perry County Block Coal Co. has been organized with a capital stock of $30,000. The incorporators are R. L. Peters, L. C. Winfrey, and W. E. White.

Rutland, Ohio—The Hobson Coal Co. has been incorporated with a capital stock of $10,000, by W. E. Williams, David Rees and others, for the purpose of engaging in mining.

Bellaire, Ohio—The Pinney Fork Coal Co. has been incorporated with a capitalization of $150,000, by Charles F. Bachman, C. W. Dickens, J. F. Johnson, E. M. Findley and W. R. Dorsey.

New Philadelphia, Ohio—The New Philadelphia Coal & Mining Co. has increased its capital stock from $5000 to $10,000 and leased several mines belonging to the defunct Goshen Coal Co.

Akron, Ohio—The Akron Coal Co. has taken over the interests of the Loomis Moss Coal Co. and increased its capitalization to $300,000. The Loomis Moss Coal Co. will retain its incorporation but its capital will be reduced from $100,000 to $5000.

Hombre, Ky.—The Wheelerson Coal Co. has been organized with $50,000 capital with the intention of developing the old McIntyre tract and conducting operations which will give employment to several hundred men. R. M. McIntyre, of Hombre, and P. T. Wheeler and J. B. Allen, of Hazard, are promoters of the company.

Philippi, W. Va.—The W. H. Hauser Co. has been incorporated with a capital stock of $25,000. The incorporators are E. T. Thompson, W. H. Hauser, Austin C. Merrill, Gordon B. Ramsey, Arthur S. Dayton, all of Philippi. The incorporation is in order to conduct mercantile establishments, trade in real estate, mine coal, drill oil wells, and deal in general stocks and bonds of all kinds.

Emma, Ky.—The Floyd Mining Co. has been organized and incorporated with $50,000 capital; Ben E. Tate is president and Henry L. Coe, secretary, treasurer and manager. The company will develop 1000 acres, equipping to produce 100 tons daily. A small power plant will be installed, with a 250-volt generator, and an electric cutting machine, boiler, engine, with two breast, or short wall, coal-cutting machines, fan and motor.

INDUSTRIAL NEWS

Charleroi, Penn.—Inspector Charles P. Byrne, of the 21st bituminous district of Pennsylvania, recently submitted his report which shows a total tonnage of 5,502,506 tons for the year ending December 31, 1914.

Pekin, Ill.—The United States District Court at Peoria recently ordered T. W. Dodecker to sell the Champion Mine on the premises on Mar. 10 at 11 a.m., Mr. Dodecker was appointed receiver of the Champion Coal Co. recently.

Washington, D. C.—Increases in the coal rate proposed by the Santa Fé, Illinois Central and Toledo, Peoria & Western railroads from Illinois mines to points in Indiana and Iowa, were recently suspended by the Interstate Commerce Commission.

Columbus, Ohio—The Ohio Public Utilities Commission has approved of the application of the New York Central System to issue $70,000,000 four-per cent. bonds to take up a former issue. It is one of the steps toward a reorganization of the system.

El Paso, Tex.—The American railroads' embargo on coal and oil into northern Mexico was recently raised. It had been installed as the result of a dispute between the American roads and the Villa railroad management over the free delivery of American owned equipment.

Pittsburgh, Penn.—The steamers "Thomas Dodsworth" and "F. M. Wallace," of the Monongahela River Consolidated Coal & Coke Co. cleared for Louisville Feb. 27 with tows of coal totaling about 1,200,000 bushels, also two freight barges each carrying 1400 tons of manufactured iron and steel.

San Francisco, Calif.—The Western Fuel Co. in recently answering the Government suit for recovery of $861,576 in custom duties, which it is alleged the company withdrew through fraudulent methods in the weighing of imported coal, denied practically every allegation made.

Harlan, Ky.—A meeting has been called of coal land owners in this section of eastern Kentucky, to start a movement looking toward interesting capital in the construction of a railroad to open up the coal lands in the Clover Fork region of eastern Kentucky and southwest Virginia.

Connellsville, Penn.—The newly organized American Connellsville Coke Co. which recently acquired the properties of the Sunshine Coal & Coke Co. has announced that 400 ovens will be fired shortly. The American Steel Co. of Pittsburgh is interested in the new firm, but it will operate as a merchant coke interest.

Indiana, Penn.—The report of Thomas F. Lowther, mine inspector for the 26th bituminous district comprising the territory within a radius of 20 miles of Indiana, shows a decrease of nearly 700,000 tons in the amount of coal mined in the district in 1914 as compared with the previous year. Depression in business is given as the cause.

Hazelton, Penn.—The report of Mine Inspector, D. J. Roderick of the 11th anthracite mine inspection district for the year 1914, shows that 6,240,102 tons of coal were mined. There were 31 fatalities during the year. The figures for 1913 were 5,875,770 tons with 23 fatalities. The G. B. Markle Co. led in tonnage with 1,704,909 tons. There are 80 mines in the district, 78 of which were in operation.

Charleston, W. Va.—The statement of the shipments of coal and coke over the lines of the Norfolk & Western Ry. for the month of January revealed shipments amounting to 1,957,153 tons, showing a decrease of 127,406 tons from shipments in January of 1914, when 2,084,559 tons were hauled over the line, but an increase of 242,913 tons over the preceding month of December when only 1,714,240 tons were carried.

Portsmouth, Ohio—A 10-day test of a new variety of washed stoker coal was started recently on the engines of the Norfolk & Western R.R. between Portsmouth and Columbus, under the supervision of J. B. Stewart, of the car allotment commission, and H. S. Walker, road foreman of engines. The tests will be made on the Mallet type of locomotives, and if they prove successful the new coal will be used largely.

Columbus, Ohio—M. J. Caples, of the Chesapeake and Ohio R.R. system who has been located in Columbus in charge of the proposed line of the company from Portsmouth to Columbus announces that the project has not been abandoned but that it is being held up indefinitely by the uncertain conditions of the financial world. The route for the new line has been laid out and everything waits on the question of financing the project.

Greensburg, Penn.—Chauncey B. Roth, inspector of the 2nd bituminous district, has completed his annual report for 1914, which shows that 8,854,848 tons of coal and 2,190,169 of coke were produced in the county, a decrease in the production of coal as compared with 1913 by 182,621 tons, while that of coke was 525,979 tons. There are 56 mines in the district, 53 of which were in operation. Twenty-six fatal accidents occurred, and 42 non-fatal accidents.

Fayetteville, W. Va.—Railroad men report the most serious freight congestion at tidewater ever known. Practically no coal has been sent to tidewater for over two weeks. In the vicinity of Newport News, the Chesapeake & Ohio is reported to have 12 miles of cars on the siding. The only class of freight that appears to be going through without delay is horses, of which some 50 cars a day are passing over the Chesapeake & Ohio, all these animals being destined for English and French armies.

Charleston, W. Va.—Figures showing the total shipments of coal and coke over the lines of the Chesapeake & Ohio R.R. during December and the year 1914 as a whole, with comparisons with the preceding year, have been made public, showing large increases. During December 1,513,375 tons were shipped, as compared with 1,472,127 tons in December, 1913, while the year showed total shipments of 20,778,880 tons, as compared with 17,490,166 for the preceding year, an increase of 2,488,714 tons.

Knoxville, Tenn.—Following the appointment of Neal Robinson as receiver for the La Follette Coal, Iron & Railway Co. several officers and employees of the company have tendered their resignations which have been accepted. A. D. MacFarlane, chief engineer and assistant manager of operations under the receiver of the La Follette Coal, Iron & Railway Co., has been appointed to immediate charge of operations of the Iron company. It is reported that the Iron company will resume operations under the receiver shortly.

Columbus, Ohio—A bill for the regulation of freight rates on coal shipments in Ohio has been introduced in the Ohio General Assembly. Senator Vorheis, of Guernsey County, is fathering the measure. The bill goes even farther in the regulation of freight rates than the former announcements showed. The schedule of rates is as follows: For more than 300 miles haul, 85 cents per ton; 225 to 300 miles, 80 cents; 175 to 225 miles, 75 cents; 135 to 175 miles, 70 cents; 100 to 135 miles, 65 cents; 75 to 100 miles, 60 cents; 50 to 75 miles, 50 cents; 35 to 50 miles, 40 cents; 20 to 35 miles, 30 cents and less than 20 miles, 25 cents.

Pittsburgh, Penn.—Including a recent sale of coal lands amounting to about 11,000 acres which was transferred from the Pittsburgh Coal Co. to the Monongahela River Consolidated Coal & Coke Co. on the basis of $813 per acre, there has been in the past three years about $30,000,000 of high grade coal lands purchased in the Pittsburgh district, and at a rate of over $900 per acre. An increasing demand for export coal and an improved demand in the domestic markets, together with a shortage of mine workers as soon as trade revives, is the basis for considerable optimism among the coal operators of the Pittsburgh district.

Pittsburgh, Penn.—Acting upon the knowledge which has been disseminated by United States engineers who have demonstrated that in every million gallons of water drained from the coal mines in the Pittsburgh district, there is at least one ton of valuable chemicals, the H. C. Frick Coke Co. is constructing a chemical laboratory at its Davidson mine near Connellsville for the recovery of the acids and chemicals contained in the water pumped out of that operation every day. From this water it is expected to produce sulphuric acid, paint pigment, hydrates and fertilizer. All of these products are in demand and the supply thereof in the past has been largely drawn from foreign countries.

Coal Trade Reviews

General Review

Anthracite collieries rigidly curtailing production and April circulars prevail. Competition keen on new bituminous contracts. Prompt market continues flat with no indications of any improvement in sight.

The recent cold snap has shaken out a few additional orders for anthracite but it is clear that all sections of the country are heavily overstocked and dealers are concentrating their efforts on working off the surpluses before the summer discount goes into effect. With the individuals pushing hard for business at the April circular, or even occasionally less, the large companies are hard pressed to find a disposal for even their limited output which is very light, as a result of the rigid curtailment policy in effect. A few terminal points are reported congested with coal on which large demurrage may accrue before it can be moved.

Negotiations on new contracts continue to absorb more attention as the season advances. It is developing that competition is exceedingly keen while consumers are more critical as regards quality, and an unusually large number are testing out new coal in an attempt to secure bargains. The buyer is showing no interest at all where purchases can be conveniently delayed, and those closing are proceeding very cautiously.

In the prompt market there has been a renewed inquiry off shore which is relieving the pressure slightly at the loading piers, but some consignment coal is appearing and prices are uneven with a strong tendency to decline. Railroads are cutting down their requisitions still further and mine operations continue on a curtailed basis. The premiums on vessel tonnage to foreign ports still prevail so that the situation in coastwise freights is as uncertain as ever.

While actual conditions remain unchanged in the Pittsburgh district, the attitude of the trade is more discouraging. With the winter practically over, so far as the coal interests are concerned, the operators have a better realization of how exceedingly poor the market situation is; at no time during the past season has there been any flurry in the demand or shortage of supplies, and the outlook in the future is even more uncertain. Lake shippers are showing no interest whatever in buying, and although the periodical opening of navigation is now close at hand, it is evident that practically no tonnage will move in that direction until well into the season, if then.

In Ohio much the same conditions prevail; dealers are busily engaged in cleaning up their stocks, while mine operations are heavily restricted, a great many having closed down indefinitely and others working only one or two days a week. The only encouraging feature in the situation is a tendency to hold coal somewhat closer in order to tone up the market in preparation for negotiations on new contracts.

The Middle Western market has reached a point where it is not believed that even a severe cold snap would serve to stimulate much business. Prices are down to a level where there is no further room for any reduction, while mine operations are still restricted and the large terminals congested with coal, a considerable tonnage of which is on consignment. On new contracts buyers are already feeling around for concessions on last year's figures.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River market dull and almost featureless. Off-shore inquiry somewhat improved. Georges Creek still in heavy supply but no move as yet on delivered prices. Canvassing in progress for spring orders on anthracite.

Bituminous—About the only new feature in the situation on Hampton Roads coals is a renewal of inquiry for cargoes off-shore. Shippers who have postponed South American delivery in the hope freight rates would ease off are now being required to send coal forward, and this is relieving the pressure somewhat at the loading piers. Coastwise there is practically no change. The clear weather has allowed transportation to move regularly and receipts are now well up to current demand.

Prices at the distributing points for shipment inland are uneven as compared with a fortnight ago. Cargoes have arrived with unsold balances and quotations have sagged in consequence; $3.75 was quoted a few days ago, on cars Boston, and so long as such figures are named the prospect is the less favorable for closing yearly contracts on a higher basis.

Advice is still freely given to delay purchases and more than a few buyers appear to be guided by it. Except for a relatively few plants that are working on war orders, textile and shoe factories are on short time and are proceeding very cautiously as to the future. There is almost an entire lack of interest in purchases of coal, especially in cases where they can be postponed for two or three months.

The Georges Creek interests, although under severe curtailment, continue to have accumulations at all points and find that even contract demand is very light. No delivered prices have yet been heard from these shippers, although it would seem they could not be much longer withheld if any buying materializes on the part of their usual consignees.

The Pennsylvania operators, on the other hand, are offering every inducement in the way of uniform price over a year's period but no particularly large contracts have so far been taken from the Southern shippers yet. An amount of Pennsylvania coals of high grade is still coming forward both for testing purposes and to enable certain buyers to keep out of the market on Southern coals.

Water Freights are unchanged; $1.60 has been paid on coal from Hampton Roads to Puerto Rico points in sailing vessels that are ordinarily in the coastwise trade. Less is heard of coal freights across the Atlantic since the new aspect of things in the North Sea.

Anthracite—Spot demand is almost nil in this territory. Dealers are more concerned with working down their stocks so that too much will not be carried over into April. Salesmen are already busy receiving orders for spring shipment and from present appearances the demand then will be only a little less than normal. Stocks are so light along the Maine coast that should there be a cold March there will be a good deal of eagerness for early April shipments.

Current quotations on bituminous at wholesale are about as follows:

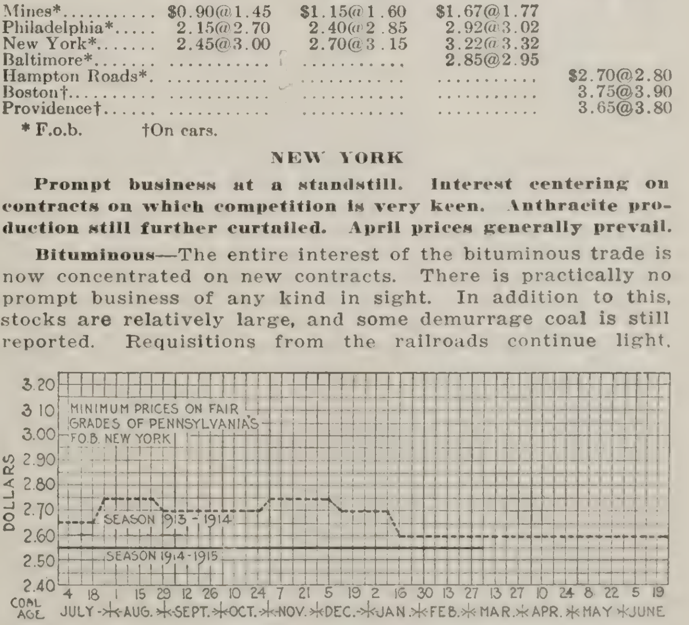
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.90@1.45	$1.15@1.60	$1.67@1.77	
Philadelphia*.....	2.15@2.70	2.40@2.85	2.92@3.02	
New York*.......	2.45@3.00	2.70@3.15	3.22@3.32	
Baltimore*.......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.70@2.80
Boston†.........	....	....	....	3.75@3.90
Providence†.....	....	....	....	3.65@3.80

* F.o.b. †On cars.

NEW YORK

Prompt business at a standstill. Interest centering on contracts on which competition is very keen. Anthracite production still further curtailed. April prices generally prevail.

Bituminous—The entire interest of the bituminous trade is now concentrated on new contracts. There is practically no prompt business of any kind in sight. In addition to this, stocks are relatively large, and some demurrage coal is still reported. Requisitions from the railroads continue light, some new reductions being reported during the current week. With the exception of isolated plants working extra time on war orders, which is resulting either directly or indirectly in requisitions for additional tonnages, the situation has seldom ever been so flat. Mine operations are still heavily curtailed,



particularly on the off-qualities, the demand for which is especially light. Bunkering trade is only fair; the declaration of the war zone in the North Sea is not apparently affecting the off-shore trade, the difficulty still hinging on the shortage of vessel tonnage.

On new contracts the situation is still uncertain. What business has so far been closed has been on the same basis as last year, with possibly a few exceptions where concessions have been forced. But competition for business is extraordinarily keen this year, and conservative observers are convinced that some shading of old figures will ultimately prove necessary.

The prompt market is not changed from past quotations extending over several months which we continue as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—With the individuals offering coal clear down to the April circular, and apparently having plentiful supplies, the large companies adhering rigidly to the winter price schedule, are hard pushed to find an outlet for their production, even under the heavily restricted operations now in effect. A feature of the curtailment propaganda during the past week was the unexpected announcement of a full week's suspension by the Lehigh Valley; this company has been unusually successful in moving its product up to the present time, and the necessity for such a drastic restriction is significant of the trend of conditions.

The dealers are making every effort to clean up their stocks in order to avoid carrying over any high-price coal after the spring discount goes into effect. It can scarcely be said that there is a shortage on any sizes with the possible exception of buckwheat and broken coal; the intermittent operations at the collieries have so disruptured the customary routine of business that the output of these sizes has at times been temporarily short, though not to such an extent as to cause any anxiety. The large companies will no doubt begin the new coal year with exceptionally heavy stocks on hand. Further evidence of the adverse conditions prevailing in the trade is seen in the unusually large volume of coal loaded on Lake vessels.

The market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	4.85@5.35	5.30	4.80@5.30
Chestnut	5.60	5.10@5.60	5.55	5.05@5.55
Pea	3.55	3.40@3.55	3.50	3.30@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.90@2.25
Barley	1.80	1.70@1.80	1.75	1.30@1.75

BUFFALO

Operators pushing hard for business, which is having an adverse effect. Indications point to a dull market for some time. Independents quoting the April circular on anthracite and the coal year is about concluded.

Bituminous—There is a steady, but small trade, with sellers pushing hard for business which is hurting the market. They are urging all the coal on customers that they can and with the spring contracting season now at hand, this is having a decidedly adverse effect.

Slack is weak again but with the approach of the Lake season, all bituminous, especially slack, should be improving. From reports made at Upper-Lake ports it does not appear that there is going to be any help to the Lower-Lake trade this spring from that direction. Indications now are that the trade is bound to be dull for an indefinite time and it will take a large increase of tonnage to improve it very materially.

Some shippers found their closing February trade considerably better than it had been for some time and look for a further increase during the current month, while others will not admit that the improvement is worth mentioning and it is clear in any event that a large increase of tonnage will be necessary to put bituminous trade on a profitable basis. There is no change from the bottom quotations and Pittsburgh lump is $2.80, three quarter, $2.70; mine-run, $2.55 and slack, $2.15, with Allegheny Valley sizes about 25c. lower. All slack sells about on a par.

Anthracite—The trade for the coal year is about at an end. The late cold weather has added a car order here and there, but March is always quiet and a reduction is expected toward the close of the month. It appears that there has been rather too much coal sold in many districts and this will accentuate the general slowing down. The independent mines and jobbers are freely offering March deliveries at April prices but they are apparently not getting much tonnage, even at this cut. The large companies have sold a normal amount and will not push for trade at present.

There is some stocking of anthracite, besides the loading into Lake vessels. There is no surplus of egg in this market; all the loading and stocking have been confined to the smaller sizes, and this should be favorable to a brisk spring trade westward. At present there is about 175,000 tons afloat in the harbor for spring delivery.

PHILADELPHIA

Anthracite buyers show a marked indifference. Retailers' stocks sufficient for present requirements. Offerings at April circular numerous. Bituminous still characterized by weakness, and contracts on new business proceeding slowly.

Anthracite—The absence of any kind of weather conducive to the consumption of coal has almost brought the market to a standstill. The large companies maintaining the full circular prices are finding themselves hard pushed to dispose of their output, even on curtailed operations. During March a year ago, a succession of snow storms, coupled with low temperatures, injected considerable activity into a period which as a rule is dull, but the prospects for such a condition this year are growing more remote daily. The dealers are well intrenched in the matter of supplies, and have no difficulty in filling any gaps in their stocks at less than circular.

At the present time, more attention is being devoted to the conditions that are likely to prevail during the new coal season. The output this season has been more than the market will absorb, and many of the large companies will go into the new coal year with stocks far in excess of what is usually the case. The current output of pea, usually far from sufficient to supply the winter demand, has this year proved adequate, and accumulated stocks are likely to be carried over. The falling off in the demand for chestnut, and the increase in the call for stove are also likely to bring about the introduction of some policy to equalize the demand for these two sizes.

Outside of broken coal, for which there is an active demand at present, there seems to be little or no specific call. The fact that all sizes have been offered at substantial concessions down to the April circular or less to dispose of coal nearing the demurrage limit, makes the buyer very uncertain. Tidewater business to New England has been reduced to a minimum; it is understood that the terminal points are crowded with coal, and that substantial demurrage bills are likely to be incurred.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.80@4.90
Stove	5.00	4.90@5.00
Chestnut	5.25	4.90@5.00

Bituminous—There seems to be nothing in the bituminous market at the present time that would indicate an upward trend, either in prices or demand. Contracting proceeds slowly, possible purchasers apparently preferring to buy on the market for their current requirements, rather than enter into agreements which invariably call for higher quotations than spot offerings.

HAMPTON ROADS

Movement for week shows up well. Demand seems to be increasing with prices stationary.

Dumpings over the Tidewater piers for the week have shown up well. There have been heavy coastwise shipments to New England ports and a fair number of export cargoes. In addition to this the government has taken about 8000 tons for San Francisco, this cargo having been shipped by the str. "Cacique."

The demand for New River and Pocahontas run-of-mine and prepared sizes has improved somewhat, and there has also been a little demand for high volatile coals. Prices remain stationary. Present indications are that the February dumpings will show a decided increase over January figures. Export cargoes for the week have gone to Manzanilla, Buenos Aires, Genoa, Canal Zone, Pernambuco, Havana, Santiago, and San Juan, Porto Rico. Sailing vessels are still being employed in the export trade.

BALTIMORE

Contracting period engrosses attention of the trade. Export shipments holding up fair. Anthracite stimulated slightly by colder weather, but no branch of business is very brisk.

Were it not for the activity on new contracts, business would be unusually dull. As it is many coal men report more than the usual difficulties in placing their coal to advantage, and the current month will probably see many more consumers trying out fuels to secure bargains, than for a number of years past. Shipments of trial lots go to make up a large part of the tonnage now moving outside of coal intended for export, which remains quite active from this port.

Reports from West Virginia, western Maryland and Penn sylvania show much activity in developments for larger tonnages. The colder weather has helped anthracite sales in small way; there is nothing doing in larger business except negotiations along contract lines. No branch of the trade is brisk just now. Spot sales have been almost wiped out for soft coals, and the few sales made are about on a par with the prices for the past two or three weeks.

Exporting business holds up well, a number of charters for March loading having been announced. January of this year saw a movement of 89,779 tons, and February of 79,029 tons, the total movement for the first two months of 1915 being 47,262 tons in excess of the same periods of 1914. A maintenance of this average would give a yearly shipment of 1,012,848 tons, a considerable gain over the total figures of 1914.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Willesden	British	Baltimore	River Plate	3141	
Franklyn	British	Norfolk	West Coast Italy	3161	
Banan	Norwegian	Baltimore	Guantanamo	948	
Nellie W. Craig		Norfolk	Bermuda	488	$2.25
Van Allens Boughton		Baltimore	Boston	1909	
Petra	Norwegian	Baltimore	Puerto Barrios	1292	
Edgar W. Murdock		Norfolk	Buenos Ayres	1215	
Australia (ship)	Italian	Philadelphia	Genoa	1442	
Gladys		Newport News	Porto Rico	645	
J. Edward Drake		Philadelphia	Galveston	789	$1.87½
Alderney	Norwegian	Philadelphia	Havana	1970	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN FREIGHTS

Prompt steamers difficult to obtain and rates continue to advance.

The freight market again advanced during the past week, principally owing to the increased demand for steamers for grain cargoes. Prompt boats are very scarce and difficult to obtain. Since our last report only a few steamers have been chartered for export coal.

Rates quoted below, under present conditions, are bound to be more or less uncertain.

To	Rate	To	Rate
Havana	**$3.00**	Guantanamo	**$3.75**
Cardenas or Sagua	**3.75**	Demerara	5.50@6.00
Cienfuegos	**3.50**	Bermuda	3.75@4.25
Port of Spain, Trinidad	**3.50**	Vera Cruz	**3.50**
St. Lucia	**3.50**	Tampico	**3.50**
St. Thomas	**3.50**	Rio	**10.20**
Barbados	**3.50**	Montevideo, Buenos Aires or La Plata	**9.60**
Kingston	3.50@4.00	Mediterranean	**11.40**
Curacao	**3.25**	Valparaiso	**8.40**
Santiago	**3.75**		

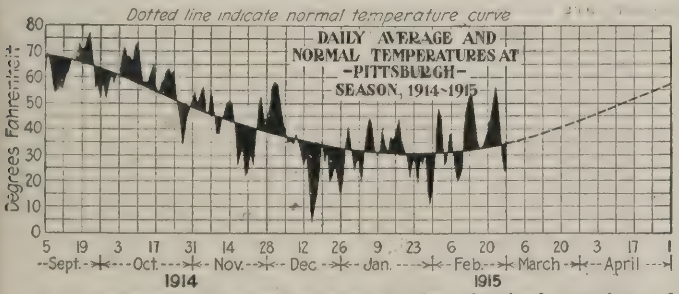
Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OHIO VALLEY

PITTSBURGH

Trade more depressed as season progresses without bringing any improvement. Asking prices continue almost nominal.

As the new month of March appears the coal trade is brought to a stronger realization of how poor the market situation is. The backbone of winter has certainly been broken, and without there having been even a single fortnight in which the domestic demand could be considered even passably good. It is now barely a month to Apr. 1, the conventional date for the closing of annual contracts, with practically nothing done in this direction and scarcely any negotiations seriously undertaken.



It is only six or seven weeks to the physical opening of Lake navigation, but the actual opening, as to the moving of any noteworthy tonnage of either ore or coal, appears to be in the dim and distant future. As to contracting for Lake coal, there has been scarcely any as yet, and the large Lake shippers are showing no interest. Apparently they will be able to move nearly all the coal for which they can now see a demand without making any season contracts, having fairly large tonnages from affiliated mining interests or from long-term annual contracts. The only Lake coal tonnage noted in these reports as closed in the past few weeks was a contract extending over a period of years.

The mental attitude in the trade is one of greater depression than a few weeks ago, though the actual market situation is unchanged. Domestic demand is moderate. Manufacturing demand makes a good comparison with the extremely poor conditions of last December, but has shown no improvement in the past two or three weeks, and the same is to be said of railroad demand. As for a long time past, quotations are almost invariably cut when anything like a good order appears. We continue to quote prices that are regarded as nominally representing the market, though they represent the basis from which departures are made, rather than the basis upon which any considerable tonnage is sold: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

COLUMBUS

The continued warm weather has weakened the trade still further. Production is at a low ebb. Outlook on new contracts generally adverse.

General weakness is still the chief characteristic of the local trade. The recent high temperatures have caused a still further falling off in domestic demand, which has really been the backbone of the trade. Dealers are not inclined to buy under present conditions and are devoting their energies to cleaning up their present stocks. Very few orders have been placed and cancellations are still one of the striking features. Little is now expected of the trade here until the stocking-up period arrives.

As a result of the decreased domestic demand, production in Ohio fields has been still farther curtailed. Reports from the Hocking Valley show that the output is only 25% of normal; the same figures are also reported from Jackson, Crooksville and Cambridge. Massillon is producing about 35% and Pomeroy Bend, 50% of the average. Many of the mines have been closed down indefinitely and others have been operated only one or two days weekly.

Prices are somewhat weak at the same levels which have prevailed for some time. Rescreened lump is selling in small quantities but other domestic grades are slow. Pocahontas is still quite popular. Steam business is heavy in every direction and sales agents have considerable difficulty in renewing contracts. Many of the steam users have been content to buy their supply on the open market. It is feared that when contracts are renewed it will be at some sacrifice.

Little is doing so far in the Lake trade; some coal has been loaded for shipment to the Northwest, but it is only a small amount. Just how active the Lake business will be is a matter of conjecture so far.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.60	0.65	0.55
Coarse slack	0.50	0.55	0.45

CINCINNATI

Cold weather causes a local flurry in domestic, but the trade continues at a standstill. Market virtually on a spring basis. New contracts the only business in sight.

The trade has now settled down into the usual between-seasons attitude, operators being convinced that it will be impossible to add anything further to the winter's business; this seems to have had the effect of putting an end to heavy price concessions. The agencies also have their eyes on the coming spring business and are not inclined to jeopardize this with offers at ruinous prices. There also seems to be little distress coal offering on this market, probably for the same reason. Some consignment coal is reported at other points, but shipments to Cincinnati on that basis appear to have been discontinued as useless. Prospects for spring business are considered favorable, especially by Kentucky and West Virginia interests.

LOUISVILLE

Operations being curtailed and prices low.

The Kentucky market continues unsatisfactory, with suspension of operations more or less general in the Western field and imminent in the Eastern. Continuation of the warm weather and the most limited demand for any of the domestic sizes have caused a stiffening in the nut and slack market, due to scarcity of that grade rather than to increase in the demand; some of the better grades are commanding from 65 to 75c. Other coals are unchanged in price.

BIRMINGHAM

Coal market very quiet and mine operations heavily restricted. Large sales of pig iron.

The past 10 days has brought little change in either lump or steam coal. There is practically no demand outside of regular yearly contracts. The mines are running on an average of two to three days per week. Blacksmith coal is about normal. There have been several large sales of pig iron recently, though the prices are far below normal.

COKE

CONNELLSVILLE

Coke market continues stagnant marketwise, with heavier production and shipments by the producer-consumer class.

The coke market continues without important incidents. There are no furnaces going into blast that would need to purchase coke, such increases in furnace operations as have occurred, or are in prospect, being by those who have their own production or closed contracts late in the old year. We quote: Prompt furnace, $1.50@1.55; contract furnace, to July 1, $1.60; to Dec. 31, nominal, $1.75; prompt foundry, $2@2.25; contract foundry, nominal, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 20 at 271,090 tons, an increase of 20,235 tons, and shipments at 269,888 tons, an increase of 20,345 tons.

Buffalo—There is nothing to indicate a stir in the coke market. A moderate amount is selling and that is likely to be the extent of the trade for an indefinite time. Coke prices remain on the former basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—Furnace and foundry coke is listless, with prices remaining about the same as last week. Domestic sizes are quiet, with no better absorption. Quotations are as follows: Byproduct, $4.75@4.90; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4.10@4.25; furnace, $4.50@4.65.

THE STEEL INDUSTRY

February record shows an increase but it is questionable whether it can be maintained. Railroad buying fair.

The February record of larger specifications by buyers and of broadening operations of mills has created a good feeling in the steel trade, but with it a question is raised as to the maintenance in March of the recent rate of new bookings. The advance of heavy steel products to 1.15c., Pittsburgh, put into effect Mar. 1, finds many consumers covered for this month at 1.10c., while not a few have contracts at 1.10c. that will carry them one or two months into the second quarter. It is not likely, therefore, that bars, plates and structural steel will be active enough to really try out the new prices.

The month starts with steel ingot production at 60 to 65% of capacity, the latter being the Steel Corporation's rate. Due to the heavier shipments last month—and shipments are the real barometer—the Steel Corporation's unfilled orders at the end of February, while more than at the end of January, showed a smaller increase for the second month than for the first.

A number of independent producers have had the same experience as the Steel Corporation—larger shipments in February than in January, but with a tendency to quietness showing itself as the month ended.

While disappointing as to cars and locomotives, there is no great complaint of railroad buying of rails, which for the first two months of the year has exceeded 500,000 tons.—"The Iron Age."

MIDDLE WESTERN

CHICAGO

General weakness prevails. No improvement in domestic coals. Smokeless fuels still inactive and depressed. Some hardening in steam coals.

Coal buying drags along in a discouraging way, and demand for domestic sizes is at a standstill. All efforts to stimulate sales have proved fruitless, and spring-like weather has played havoc with the situation. The Indiana and Illinois mines are operating at three days per week, and some only two days. Tracks at the Indiana mines are congested with coarse coal, and in southern Illinois there is a considerable tonnage of the finer sizes on consignment. Operators see no improvement in sight, even though a cold snap should arrive, and it is felt that the winter is mostly over.

More stability is evident in screenings, due primarily to curtailment of production. Free screenings are very spotty; in some districts none are available, and in others they are plentiful. Prices for domestic sizes are at the bottom, and retailers report a slowing up in the demand from consumers.

The movement of coal from the Indiana mines during February will probably fall 25% below that for the same month last year. A number of mines have suspended with the expressed intention of remaining idle for an indefinite period. Prices on domestic sizes range as low as $1.30 per ton, and there hardly seems to be room for further reductions. Mine-run is selling around $1 per ton.

Circular prices on Franklin and Williamson County coals are being maintained, but shipments are scarce. Screenings have improved. Operating time is averaging about two days per week.

In the Springfield District the working time averages about three days per week. The domestic demand still continues weak and the railroad demand has been reduced.

In Hocking, 50 cars of lump on demurrage were offered at any price to effect disposition. This coal has not been absorbed, and the major portion of it will be sold for demurrage and carrying charges.

Smokeless coals show no improvement, and some producers are accepting any reasonable offer for mine-run. The situation is extremely unfavorable.

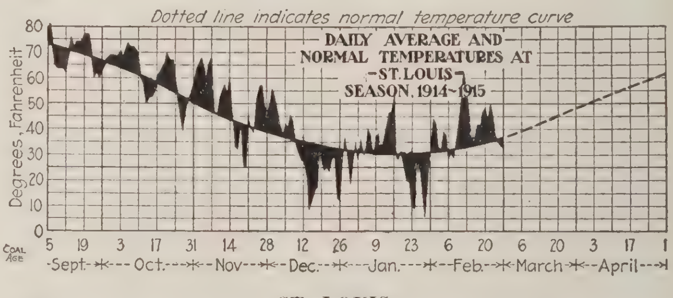
Anthracite is flat, due to the near approach of the April prices. Some of the independents have quoted 40c. per ton under list in a futile effort to force the market.

Prevailing quotations are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.40@1.50	$1.30@1.40	....	$1.30@1.40	$1.40@1.65
4-in. lump..	....	....	$1.40@1.75	....	....
Steam lump	....	....	1.25@1.35	1.25@1.35	....
2½-in. lump.	....	....	1.35@1.50	....	....
1¼-in. lump.	....	....	1.25@1.35	1.25@1.35	....
Mine-run...	1.10@1.25	1.00@1.05	1.00@1.10	0.95@1.10	....
Egg........	1.35@1.50	1.25@1.40	1.20@1.30	1.15@1.25	....
No.1washed	....	....	....	....	1.50@1.65
No.2washed	....	....	....	....	1.40@1.50
6x3-in. egg.	....	....	....	....	1.50@1.65
Nut........	....	1.25	....	1.20@1.25	....
No. 1 nut..	1.35@1.50	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	0.75@0.85	0.65@0.70	0.65@0.75	0.65@0.75	0.75@0.80

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.35@1.40	$1.00@1.25	$1.50@2.00	$1.50@1.90	....
1¼-in. lump.	....	1.00@1.25	....	....	$0.90@1.25
Lump & egg	....	....	....	....	....
Mine-run...	1.10@1.15	....	1.25@1.40	1.00@1.15	1.00@1.15
Egg........	....	0.90@1.00	1.50@2.00	1.40@1.75	....
No. 1 nut..	1.30@1.40	....	1.50@1.75	....	....
No. 2 nut..	1.25@1.40	....	....	....	....
Screenings..	0.65@0.75	....	....	....	....

Knox and Greene County 5-in. lump, $1.35@1.50; 3-in. lump, $1.25@1.30; 5-in. lump, $1.20@1.30; 3-in. egg, $1.20@1.25; mine-run, $1@1.10; screenings, 65@75c.



ST. LOUIS

Screenings market temporarily stimulated. February an unsatisfactory month for the coal trade.

Toward the close of last week, the screenings market tightened up, but not to the extent that was anticipated. Williamson and Franklin County 2-in. screenings went to 80c. and 85c. and Standard 2-in. advanced to 65c. With the beginning of March, however, there is a better demand for domestic sizes, both locally and from the country section, and this has eased the screenings market some. But unless there is some cold weather to follow, this domestic demand will be light and only temporary, which will put steam sizes back into their own.

February was the mildest in the history of the local coal trade. Summer prices prevailed on all coals from the Williamson-Franklin County field, both raw and washed, as well as from the Standard district. Pennsylvania anthracite is at a standstill, and practically no smokeless is moving in at all.

KANSAS CITY

Weather continues favorable but mines are slowing up with the approach of spring. Prices lower.

The slow season for the operators has arrived, although winter still prevails. A number of mines were reported closed during the week and some others are operating only part time. This is mainly the result of the usual spring slowing down, but is partly caused by an over supply of coal on the cars in Kansas City. Nearly all companies have been obliged to pay demurrage, and in the anxiety to move their coal, much cutting of prices occurred last week. Cherokee lump fell off 25c. to $2 and nut dropped about 10c. to $1.85 or $1.90. Both Missouri and Kansas steam coal sells now at $1.25, but the price went as low as $1.10 early in the week.

PORTLAND, ORE.

Volume of business for the season well up to the average. Summer discount on Wyoming and Utah coals.

The fuel business has held up splendidly during February, contrary to expectations of dealers and the final analysis for the season will probably show that business was up to the average. The Utah and Wyoming mines took off 50c. per ton on Feb. 1 but the retail prices here have not been affected yet; the reduction is that usually announced for May 1 when summer prices go into effect. Washington mines usually maintain the same prices winter and summer. There is said to be little likelihood of any Atlantic Coast coal coming into this field by way of the Panama Canal, owing to the scarcity of attractive carriers.

PRODUCTION AND TRANSPORTATION STATISTICS

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for January of the current year and the 12 months of 1913 and 1914, in short tons:

	January		Twelve Months	
	1915	1914	1914	1913
Anthracite	894,529	915,027	11,201,150	10,711,335
Bituminous	3,571,345	4,117,514	47,769,227	51,526,267
Coke	685,546	853,412	9,548,354	13,892,825
Total	5,151,420	5,885,953	68,518,731	76,330,427

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during November and December of 1914 and January of the current year:

	November		December		January	
	1914	1913	1914	1913	1915	1914
Coal	2,324,271	2,939,975	2,227,899	3,005,914	2,293,406	2,917,834
Coke	185,466	343,387	232,594	269,998	221,395	274,955
Total	2,509,737	3,283,362	2,460,493	3,275,912	2,514,801	3,192,789

COAL FREIGHT DECISIONS

The Illinois Coal Cases—I. C. C. Nos. 5346, 5668, 5698, 5698 Sub-No. 1 and Investigation and Suspension Docket No 237.

1. Upon complaint and intervening petitions alleging (1) that the so-called Springfield group of Illinois is unduly large and that the application of the same rate from all coal mines in this group to destinations in the Northwest unjustly discriminates against the mine operators in the northern part of the group by depriving them of the advantage of their location nearer to the common markets; and (2) that the present spread of 70c. in the rates from southern Illinois over those from northern Illinois to the same destinations is not sufficient and should be increased to $1; it is **Held:**

That no basis has been shown of record for dividing the present Springfield group or for increasing the present rate differential against the southern Illinois mines. Nor does the record justify a modification in any of the other rate groups involved in the proceeding.

2. No unjust discrimination against St. Louis or other violation of the act to regulate commerce shown of record in the present relation of rates on coal from Illinois mines moving to that point as compared with rates on coal from the same mines to East St. Louis.

3. The proposed increase of 5½c. per ton in the rates on coal to St. Louis from Illinois mines found to have been justified.

Investigation and Suspension Docket No. 448—Rates on coke from Chicago and Peoria, Ill., to St. Paul, Duluth, Minn. and other points.

1. Proposed increased rates on coke in carloads from St. Louis, Mo., Chicago, Waukegan, and Peoria, Ill., Milwaukee and other points in Wisconsin, and Menominee, Mich., to points in Minnesota other than Duluth and in Wisconsin, Iowa, and South Dakota, justified.

2. Proposed increased rates on the same commodity from the same points of origin to Duluth, Minn., held unreasonable to the extent that they exceed $2.15 per ton.

I. C. C. No. 6712—Public Utilities Commission of Idaho vs. Oregon Short Line R.R.

Rates for the transportation of bituminous coal in carloads from Kemmerer and Rock Springs, Wyo., to points in southern Idaho not shown to be unreasonable. Complaint dismissed.

FOREIGN MARKETS

GREAT BRITAIN

Demand in excess of supply. Prices high and sellers cautious about commitments.

The coal industry is still suffering a great deal from the abnormal difficulties which have come upon it as a result of the war. There can be no doubt that the demand for practically every class of coal remains in excess of the available supply, and in the circumstances prices have an upward tendency all around. Even in the North East Coast shipping centers, and in South Wales, where scarcity and irregular arrivals of tonnage have often combined to depress the export market, the trade tide seems to have turned definitely at last, and, despite the continued high level of freight rates, business is decidedly better.—"The Iron and Coal Trades Review."

Feb. 19—For all classes of coal the market remains in an extremely strong condition. Supplies are unobtainable for this month while the various collieries are heavliy booked for March. Quotations are approximately as follows:

Best Welsh steam	$5.40@5.52	Best Monmouthshires	$4.92@5.04
Best seconds	4.92@5.28	Seconds	4.80@4.92
Seconds	5.04@5.16	Best Cardiff smalls	4.14@4.26
Best dry coals	4.80@5.04	Cargo smalls	3.60@3.84

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport both net, exclusive of wharfage.

Freights—Chartering is fairly active but business is below normal owing to the difficulty of arranging loading turns. Rates are approximately as follows:

Gibraltar	$5.04	Naples	$7.92	Las Palmas	$4.80
Malta	....	Venice, Ancona	10.20	St. Vincent	5.16
Marseilles	5.79	Alexandria	6.96	Rio Janeiro	6.48
Algiers	5.40	Port Said	6.96	Monte Video	5.64
Genoa	7.92			River Plate	5.88

Note—These quotations are based on an exchange rate of one shilling equals 24 cents.

Exports—British exports for January and the past three years were as follows:

	January			Year		
To	1912	1913	1914	1912	1913	1914
Russia	226,040	239,004	....	4,046,644	5,998,434	3,087,805
Sweden	305,905	286,488	262,936	4,115,551	4,563,076	4,250,255
Norway	215,012	217,682	210,335	2,201,305	2,298,345	2,462,200
Denmark	259,464	246,017	208,784	2,780,957	3,034,240	3,059,162
Germany	668,466	553,433	....	8,394,864	8,952,328	5,256,765
Netherlands	202,122	127,412	131,378	2,096,494	2,018,401	1,722,215
Belgium	197,220	178,849	....	1,546,768	2,031,077	1,168,554
France	1,150,552	1,235,642	1,383,961	10,190,948	12,775,909	12,330,545
Portugal[1]	142,590	130,778	69,934	1,255,417	1,356,081	1,169,625
Spain[4]	361,473	345,621	159,350	3,441,523	3,648,760	2,940,148
Italy	821,387	790,605	469,885	9,180,208	9,647,161	8,625,254
Aus. Hung.	137,555	72,842	....	728,941	1,056,634	564,362
Greece	40,831	46,291	23,588	610,383	727,899	578,757
Roumania	....	8,334	....	195,600	251,925	218,218
Turkey	16,772	40,219	....	348,469	369,789	429,506
Egypt[2]	130,731	131,274	99,227	2,925,825	3,162,477	2,633,581
Algeria	23,827	20,911	9,437	1,054,786	1,281,664	910,211
Portuguese[5]	66,004	35,398	5,224	281,869	233,015	184,686
Chile	139,911	118,531	66,484	551,980	588,526	377,482
Brazil	78,351	56,523	49,692	1,625,780	1,886,871	1,176,780
Uruguay	319,409	354,770	178,606	870,313	723,936	550,876
Argentine	13,273	12,031	7,340	3,365,099	3,693,572	2,883,064
Channel Is.	36,794	32,481	30,269	176,996	167,862	162,066
Gibraltar	66,616	35,686	11,316	343,439	354,702	309,650
Malta	314,420	315,182	149,665	474,784	700,111	338,673
Aden[3]	11,153	12,079	10,254	191,307	181,204	169,821
India	4,773	1,837	8,925	134,514	179,192	158,261
Ceylon	24,376	38,539	6,604	242,111	239,657	250,173
Miscell'ous.	95,051	110,311	59,775	1,071,520	1,277,270	1,101,185
Coke	107,095	124,256	92,597	1,010,650	1,235,141	1,182,248
Briquettes	196,739	169,945	64,038	1,580,803	2,053,187	1,607,757
Total	6,374,152	6,088,971	3,769,598	67,035,848	76,688,446	61,830,485
Bunker	1,757,679	1,731,012	1,377,081	18,291,370	21,031,550	18,535,579

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies [4] And Canaries. [5] West Africa.

Coal Contracts Pending

It has been found impossible to eradicate all inaccuracies from this department; since its inception 2.5 per cent. of the items listed have been reported as incorrect, in spite of the fact that we are paying a higher average scale of remuneration for this matter than has ever been paid by this, or any other coal journal. In the collection of this information the customary sources of inquiry, such as clipping bureaus, press reports, etc. were rejected because of their unreliability. Only information obtained directly from the source of the proposed business, or a seemingly reliable connection, is accepted, and much of this is drawn through our affiliations with other leading technical journals. In justice to ourselves and our readers, we believe this brief statement to be warranted. It is only through the close cooperation of all concerned that this department can attain a lasting success and be of real benefit to the coal trade. We will, therefore, appreciate any and all information relative to inaccuracies of contracts listed below.

No. 88—Vincennes, Ind.—The City Electric Lighting Co., at this place, contracts for about 5000 tons of mine-run coal and screenings some time during the current month. The approximate cost is $1.45 for mine-run and $1.15 for screenings and the business is done on a competitive basis (p. 318). Address Mgr., A. J. Hetz, The City Electric Lighting Co., Vincennes, Indiana.

No. 93—Jersey City, N. J.—The lowest bid submitted to the Hudson County Boulevard Commissioners for furnishing and delivering 2500 gross tons of best quality pea coal (p. 356) was from Behrens Bros., Paterson Plankroad, Secaucus, N. J. Address Clk. of the Bd. John C. Sweney, Boulevard Comrs., County Courthouse, Jersey City, N. J.

No. 131—Rochester, N. Y.—The Board of Education at this place will be in the market during the current month for about 6000 tons of anthracite and 6000 tons of semi-bituminous coal (p. 357). Address Secy. J. S. Mullen, Municipal Bldg., Rochester, N. Y.

No. 135—Baltimore, Md.—Henry Sonneborn & Co., at this place, purchase an annual supply of from 3500 to 4000 tons of standard mine-run soft coal (p. 357). In general the contract is let during March. Address Pur. Agt. A. Mainzer, Pratt and Paca St., Baltimore, Md.

No. 138—Baltimore, Md.—The Calvert Bldg. contracts for an annual supply of 5000 tons of standard mine-run soft coal, usually during the current month (p. 358). Address Pur. Agt. Franklin G. Lauderman, Calvert Bldg., Baltimore, Md.

No. 157—Detroit, Mich.—Sealed proposals will be received up to 2 p.m., Mar. 9, by the Board of Water Commissioners for furnishing 25,000 tons of bituminous mine-run coal (p. 398). The Board reserves the right to order, before Aug. 15, 2000 additional tons at the contract price. Each bid must be accompanied by a certified check for $500. Address Secy. H. A. Gilmartin, Board of Water Commissioners, Detroit, Mich.

No. 164—Detroit, Mich.—Sealed proposals will be received until 2 p.m., Mar. 9, by the Board of Water Commissioners for furnishing about 700 tons of bituminous and 40 tons of anthracite coal to be delivered at the storage yard, emergency station and office of the Board of Water Commissioners (p. 399). Address Secy. H. A. Gilmartin, Board of Water Commissioners, Detroit, Mich.

No. 170—Pontiac, Mich.—Bids will be received until 1:30 p.m., Mar. 11, for furnishing the Pontiac State Hospital with a supply of coal for one year commencing May 1, 1915 (p. 399). The approximate quantities are 7500 tons of free-burning three-quarter lump bituminous coal and about 500 tons of anthracite coal (250 tons grate, 250 tons stove, and 30 tons chestnut). Prices must be f.o.b. hospital, and bidders should specify location of mine. Address Steward E. H. Halsey, Pontiac State Hospital, Pontiac, Mich.

No. 186—Natick, Mass.—The Natick Gas Light Co. at this place advises that it has discontinued the manufacture of gas and will not be in the market for 3000 tons of bituminous coal, as stated in a previous issue (p. 398). Address B. J. Bean, Natick Gas Light Co., Natick, Mass.

No. 188—Sturgeon Bay, Wis.—The local utility commission will be in the market for about 4000 tons of coal, contract for which will be made during either this month or next (p. 399). Youghiogheny three-quarter coal is ordinarily used, and the price is about $3 per ton. Address Supt. James E. Johnson, Sturgeon Bay Utility Commission, Sturgeon Bay, Wis.

No. 191—Metropolis, Ill.—The local water and light department will be in the market during March or April for about 2700 tons of 2-in. screenings (p. 399). This business is usually closed at about $1.60 per ton. Address Frederic N. Cover, C. E., City of Metropolis Water & Light Dept., Metropolis, Ill.

No. 214—Grand Junction, Colo.—The Grand Junction Electric, Gas & Mfg. Co. at this place will be in the market about Apr. 1 for approximately 7500 tons of bituminous coal, the present contract being closed at $1.54 per ton. Address Gen. Mgr. E. A. Sunderlin, Grand Junction Electric, Gas & Mfg. Co., Grand Junction, Colo.

No. 215—Martins Ferry, Ohio—The Municipal Electric Light & Power Plant will be in the market about Apr. 1 for from 3000 to 4000 tons of bituminous mine-run coal. The present contract was closed at $1.45 to $1.50 per ton. Address Supt. J. W. Tush, Municipal Electric Light & Power Plant, Martins Ferry, Ohio.

No. 216—Frederick, Md.—The Municipal Electric Light Plant at this place will be in the market about Apr. 1 for approximately 1100 tons of Big Vein Georges Creek coal. The present contract was closed at $3.20 per ton, f.o.b. Frederick. Address Clk. Jacob H. Schmidt, The Municipal Electric Light Plant, Frederick, Md.

No. 217—Dixon, Ill.—The Illinois Northern Utilities Co. of this place will be in the market about Apr. 1 for 45,000 tons of screenings, mine-run, and egg coal. The approximate cost per ton is $2.80 unloaded. Address F. M. Smith, Fuel Dept., Illinois Northern Utilities Co., Dixon, Ill.

No. 218—New Britain, Conn.—The Board of Education will be in the market during March or April for about 1500 tons of hard white ash or Old Company's Lehigh coal. Address L. H. Pierce, Finance Com., Board of Education, New Britain, Conn.

No. 219—Hillsdale, Mich.—The Board of Public Works will be in the market about Apr. 1 for 3500 tons of West Virginia mine-run coal, the present contract being closed at $2.50 per ton. Address Contract Agt. J. C. Hanson, Municipal Electric Light & Water Plant, Hillsdale, Mich.

No. 220—Richmond, Va.—Bids will be received until 2 p.m., Apr. 14, for furnishing the U. S. Post Office 400 tons of bituminous coal. Address Custodian H. T. Thornton, U. S. Post Office, Richmond, Va.

No. 221—Columbus, Ohio—Bids will be received until 2 p.m., Apr. 14, for furnishing the U. S. Post Office 700 tons of bituminous coal. Address Custodian S. A. Kinnear, U. S. Post Office, Columbus, Ohio.

No. 222—Bayonne, N. J.—Sealed proposals will be received by the Board of Education until 8 p.m., Mar. 18, for furnishing about 2500 tons of coal, the amount to be made up of 1500 tons, more or less, of egg, stove, or nut coal, and 1000 tons, more or less, of pea coal. Address Secy. W. J. Tomlin, Board of Education, Ave. C and 26th St., Bayonne, N. J.

No. 223—Independence, Iowa—Bids will be received by the City Clerk until Mar. 8, for furnishing the coal supply for the city during the year ending Apr. 1, 1916. Prices should be submitted for No. 2 washed coal, f.o.b. Independence, giving the B.t.u. dry and wet basis. About 125 car loads of 80,000 lb. each are used per year. Address City Clk. Rufus Brewer, Independence, Iowa.

No. 224—New Albany, Ind.—Bids will be received by the Auditor, Floyd County, until 10 a.m., Mar. 4, for furnishing coal for the court house, poor asylum, and county jail during the fiscal year. Address Audr. Julian T. Miller, New Albany, Ind.

No. 225—Madison, Wis.—The Board of Education of this place will be in the market during April or May for about 500 tons of anthracite pea and Pocahontas coal. This contract is usually awarded to a local dealer, the award being made on a competitive basis. Address Chief Clk., Board of Education, Madison, Wis.

No. 226—Portland, Ore.—The Board of Education will be in the market during April for about 2000 tons of steam coal. The present contract was let at $6 per ton. Address Chief Clerk, Board of Education, 401 Court House, Portland, Ore.

No. 227—Wabash, Ind.—The Wabash Water & Light Co. will be in the market about Apr. 1 for 7500 tons of southern Indiana No. 4 slack coal. The present contract price is $1.70 per ton, delivered. Address Mgr. T. W. McNamee, Wabash Water & Light Co., Wabash, Ind.

No. 228—Cambridge, Mass.—The Board of Education will be in the market about Apr. 1 for 5000 tons of anthracite and bituminous coal. The present contract was awarded at $5.73 for anthracite and $4.36 for bituminous. Address the School Committee, City Hall, Cambridge, Mass.

No. 229—Bennettsville, S. C.—The Bennettsville Electric & Water Plant will be in the market about Apr. 1 for 7500 tons of semibituminous coal, the present contract price being $3.75 per ton. Address Mgr. E. C. Morrison, Bennettsville Electric & Water Plant, Bennettsville, S. C.

No. 230—Eldon, Iowa—The City Electric Light & Water Works will be in the market about Apr. 1 for 1200 tons of 1¼-in. screening, the present contract price being $1.75 per ton in bin. Address Mgr. C. A. Flint, Municipal Electric Light & Power Plant, Eldon, Iowa.

No. 231—Easthampton, Mass.—The Easthampton Rubber Thread Co. will be in the market about Apr. 1 for 1500 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Pur. Agt. W. L. Pitcher, Easthampton Rubber Thread Co., Easthampton, Mass.

No. 232—Middletown, Conn.—The Middletown Electric Light Co. will be in the market for 5000 tons of bituminous coal about Apr. 1, delivery via water. Address Pur. Agt. L. C. Whitney, Middletown Electric Light Co., Middletown, Conn.

No. 233—Fair Haven, Vt.—The United Shirt & Collar Co. will be in the market about Apr. 1 for 4000 tons of anthracite coal, delivery via D. & H. R.R. Address Pur. Agt. W. A. Pine, the United Shirt & Collar Co., Fair Haven, Vt.

No. 234—Middletown, Conn.—The Russell Mfg. Co. will be in the market about Apr. 1 for 3500 tons of bituminous coal, delivery via water and teams. Address Pur. Agt. L. deK. Hubbard, Russell Mfg. Co., Middletown, Conn.

No. 235—Springfield, Mass.—The United Electric Light Co. will be in the market for approximately 20,000 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address Pur. Agt. W. L. Mulligan, United Electric Light Co., Springfield, Mass.

No. 236—New York, N. Y.—The International Paper Co. will be in the market about Apr. 1 for 200,000 tons of bituminous coal, deliveries at their various plants via water and rail. Address Pur. Agt. G. E. Smith, 30 Broad St., New York, N. Y.

No. 237—Northampton, Mass.—The Northampton Electric Lighting Co. will be in the market about Apr. 1 for 2500 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Light, Heat & Power Corporation, Boston, Mass.

No. 238—Chicago, Ill.—The Grand Crossing Tack Co. will be in the market about Apr. 1 for a year's supply of Youghiougheny ¾-in. lump coal and Illinois or Indiana mine-run coal. This company consumes about 75 tons of Youghiogheny ¾-in lump coal per week, and 160 tons of Illinois or Indiana mine-run coal per day. Address Grand Crossing Tack Co., 75th St. and Stoney Island Ave., Chicago, Ill.

No. 239—Hartford, Conn.—The Columbia & Electric Vehicle Co. will be in the market for 2500 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address Columbia & Electric Vehicle Co., Hartford, Conn.

No. 240—Bellows Falls, Vt.—The Robertson Paper Co. will be in the market about Apr. 1 for 4000 tons of anthracite coal, deliveries via B. & M. R.R. and Rutland R.R. Address Pur. Agt. F. H. Babbitt, Robertson Paper Co., Bellows Falls, Vt.

No. 241—Fall River, Mass.—The Stafford Mills will be in the market for about 11,000 tons of anthracite coal on Apr. 1, delivery by team. This supply is bought from local dealers. Address Pur. Agt. Samuel Wilkinson, Stafford Mills, Fall River, Mass.

No. 242—New York, N. Y.—The Rutland R.R. Co. will be in the market about Apr. 1 for 150,000 tons of bituminous coal, delivery all rail. Address Gen. Pur. Agt. F. H. Greene, Grand Central Station, New York.

No. 243—Manchester, Conn.—Case Bros. will be in the market about Apr. 1 for 2000 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. and teams. Address Case Bros., Manchester, Conn.

No. 244—Taunton, Mass.—The Elizabeth Poole Mills will be in the market about Apr. 1 for 1500 tons of anthracite and bituminous coal, deliveries by team. This supply is usually bought from local dealers. Address Henry Lovering, Elizabeth Poole Mills, Taunton, Mass.

No. 245—Southington, Conn.—The Peck, Stow & Wilcox Co., Southington, Plantsville, East Berlin and Elmwood, will be in the market about Apr. 1 for 10,000 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Pur. Agt. W. H. Neal, Peck, Stow & Wilcox Co., Southington, Conn.

No. 246—Haverhill, Mass.—Lennox & Briggs will be in the market about Apr. 1 for 1800 tons of bituminous coal, deliveries via water and B. & M. R.R. Address George Lennox, Lennox & Briggs, Haverhill, Mass.

No. 247—Montpelier, Vt.—The Capital City Gas Co. will be in the market for 2000 tons of gas coal about Apr. 1, delivery via Central Vermont R.R. Address Capital City Gas Co., Montpelier, Vt.

No. 248—Mt. Tom Junction, Mass.—The Mt. Tom Sulphite Pulp Co. will be in the market for 11,000 tons of bituminous coal about Apr. 1, delivery via B. & M. R.R. Address Mt. Tom Sulphite Pulp Co., 50 State St., Boston, Mass.

No. 249—Middletown, Conn.—The Connecticut Hospital for the Insane will contract about Apr. 1 for 9600 tons of anthracite and bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Superintendent, Connecticut Hospital for the Insane, Middletown, Conn.

No. 250—Waterbury, Conn.—The United Gas Improvement Co. will be in the market about Apr. 1 for 5000 tons of anthracite coal, delivery all rail via N. Y., N. H. & H. R.R. Address United Gas Improvement Co., Philadelphia, Penn.

No. 251—Bellows Falls, Vt.—The Rockingham Paper Co. will be in the market for 2000 tons of bituminous coal about Apr. 1, deliveries via D. & H. R.R. and N. Y. C. R.R. Address Pur. Agt. G. H. Babbitt, Rockingham Paper Co., Bellows Falls, Vt.

No. 252—Taunton, Mass.—The Taunton State Hospital will contract about Apr. 1 for 3000 tons of bituminous coal, delivery by team. Address Superintendent, Taunton State Hospital, Taunton, Mass.

No. 253—Rutland, Vt.—The Rutland R.R., Light & Power Co. will be in the market about Apr. 1 for 3000 tons of gas coal, delievries via D. & H. R.R. and N. Y. C. R.R. Address the Rutland Ry., Light & Power Co., Rutland, Vt.

No. 254—Montville, Conn.—The C. M. Robertson Co. will be in the market about Apr. 1 for 3000 tons of bituminous coal, deliveries via D. & H. R.R. and N. Y. C. R.R. Address Pur. Agt. T. E. Robertson, C. M. Robertson Co., Montville, Conn.

No. 255—Taunton, Mass.—Reed & Barton will be in the market about Apr. 1 for 1500 to 2000 tons of anthracite and bituminous coal, deliveries by team. This supply is usually bought from local dealers. Address Pur. Agt. L. A. Hodges, Reed & Barton, Taunton, Mass.

No. 256—Ludlow, Vt.—The Black River Woolen Co. will be in the market about Apr. 1 for 1000 to 1500 tons of bituminous coal, delivery via Rutland R.R. Address Pur. Agt. Geo. P. Levey, Black River Woolen Co., Ludlow, Vt.

No. 257—New Haven, Conn.—The Department of Charities and Correction will contract about Apr. 1 for 1100 tons of bituminous and anthracite coal. This coal is purchased from local dealers, delivery by team. Address the Department of Charities and Correction, New Haven, Conn.

No. 258—Albany, N. Y.—Sealed proposals will be received until noon, Mar. 24, for supplying various state institutions with coal for one year, beginning Apr. 1, 1915. Address Agt. and Warden Thomas Mott Osborne, Sing Sing Prison, Ossining, N. Y.; Agt. and Warden Charles F. Rattigan, Auburn Prison, Auburn, N. Y.; Agt. and Warden William J. Homer, Great Meadow Prison, Comstock, N. Y.; Agt. and Warden John B. Trombly, Clinton Prison, Dannemora, N. Y.; Medical Supt. R. F. C. Kieb, Matteawan State Hospital, Beacon, N. Y.; Medical Supt. Charles H. North, Dannemora State Hospital, Dannemora, N. Y.

No. 259—Fall River, Mass.—The Algonquin Printing Co. will be in the market about Apr. 1 for 12,000 tons of anthracite and bituminous coal, delivery by water. Address Pur. Agt. W. H. Jennings, Algonquin Printing Co., Fall River, Mass.

No. 260—Erie, Penn.—Sealed proposals will be received until Apr. 1 for furnishing a six months' supply of coal to the Soldiers' and Sailors' Home at Erie. Address Col. John P. Nicholson, Flanders Bldg., 15th and Walnut St., Philadelphia, Penn.

No. 261—Avon, Conn.—The Ensign Bickford Co. will be in the market about Apr. 1 for 2500 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. Address the Ensign Bickford Co., Avon, Conn.

No. 262—St. Louis, Mo.—Bids will be received until Apr. 14 for furnishing and delivering 360 tons of bituminous coal to the Federal Building. The specifications require 2-in. lump or over. Address Custodian Fountain Lorthwell, Federal Bldg., St. Louis, Mo.

No. 263—Fall River, Mass.—The American Linen Co. will be in the market about Apr. 1 for 10,000 tons of bituminous coal, delivery by water. Address Pur. Agt. J. E. Osborne, American Linen Co., Fall River, Mass.

No. 264—New York, N. Y.—Sealed bids will be received until 10 a.m., Mar. 6, for furnishing and delivering to the Police Department of the City of New York anthracite coal for use in all boroughs, and also for the steamboat "Patrol" and launches of the Police Department. The security required is 30% of the total bid, and a deposit of 1½% must accompany each bid. Delivery to be completed before July 1, 1915. Address Police Comr. A. Woods, 240 Center St., New York.

No. 265—Meriden, Conn.—The Meriden Gas Light Co. will be in the market about Apr. 1 for 9000 tons of gas coal, delivery via N. Y., N. H. & H. R.R. Address Charles A. Learned, Meriden Gas Light Co., Meriden, Conn.

No. 266—Boston, Mass.—The City of Boston will be in the market about Apr. 1 for a supply of coal for various public buildings and city departments. The present contract was let during May, 1914, and provided for coal as follows: 600 tons for the Children's Institute, 5000 tons for the Infirmary Dept., 10,000 tons for the Ferry Dept., 6000 tons for the sewage-pumping plant at Calf Pasture, 5000 tons to the penal institutions, 9000 tons for the City Hospital and approximately 27,000 tons to other city departments. Address Supt. of Supplies D. F. Doherty, City Hall, Boston, Mass.

No. 267—Pittsfield, Mass.—The S. A. & C. Russell Mfg. Co. will be in the market about Apr. 1 for 2500 tons of bituminous coal, deliveries via B. & A. R.R. and N. Y., N. H. & H. R.R. Address Pres. H. R. Russell, S. A. & C. Russell Mfg. Co., Pittsfield, Mass.

No. 268—Buffalo, N. Y.—Sealed proposals will be received until 2 p.m., Mar. 15, for furnishing anthracite and bituminous coal as required by the Police Department and Patrol Boat for the year beginning Apr. 10. Bids are to be accompanied by a certified check for $500 and a bond of not less than $5000 is required. Address Board of Police Comrs., Headquarters Bldg., Franklin and Seneca St., Buffalo, N. Y.

No. 269—Warehouse Point, Conn.—The Hartford & Springfield St. R.R. Co. will be in the market about Apr. 1 for 4000 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Hartford & Springfield St. R.R. Co., Warehouse Point, Conn.

No. 270—North Adams, Mass.—The North Adams Gas Light Co. will be in the market for 18,000 tons of gas coal about Apr. 1, delivery via B. & M. R.R. Address H. L. Ogden, 131 State St., Boston, Mass.

No. 271—Brattleboro, Vt.—Twin-State Gas & Electric Co. will be in the market for about 500 tons of anthracite coal Apr. 1. Deliveries via B. & M. R.R. and Central Vt. R.R. Address, Twin-State Gas & Electric Co., Brattleboro, Vt.

No. 272—Millis, Mass.—Joseph W. Herman & Co., will be in the market for 400 tons of coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address, Joseph W. Herman & Co., 159 Lincoln St., Boston, Mass.

No. 273—Naugatuck, Conn.—The Naugatuck Malleable Iron Co. will be in the market about Apr. 1 for 10,000 to 15,000 tons of bituminous and gas coal, delivery all rail via N. Y., N. H. & H. R.R. Address, Naugatuck Malleable Iron Co., Naugatuck, Conn.

No. 274—Pittsfield, Mass.—Helliwell & Co. will be in the market for 1500 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address, Helliwell & Co., Pittsfield, Mass.

No. 275—Claremont, N. H.—Claremont Power Co. will be in the market for 1000 tons of bituminous coal about Apr. 1. This coal is usually purchased from local dealers. Address, Claremont Power Co., Claremont, N. H.

No. 276—Bennington, Vt.—The Bennington Gas Light Co. will be in the market for 175 tons of anthracite and 50 tons of bituminous about Apr. 1. This coal is purchased from local dealers. Address, Superintendent, Bennington Gas Light Co., Bennington, Vt.

No. 277—Oxford, Mass.—David N. Taft will be in the market for 500 tons of coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address, David N. Taft, Oxford, Mass.

No. 278—Thompsonville, Conn.—The Thompsonville Water Co. will be in the market for 500 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. and teams. Address, Superintendent, Thompsonville Water Co., Thompsonville, Conn.

No. 279—Windsor Locks, Conn.—The Northern Connecticut Light & Power Co. will be in the market for 800 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address, Northern Connecticut Light & Power Co., Windsor Locks, Conn.

No. 280—Mittineague, Mass.—The Southworth Co. will be in the market about Apr. 1 for 3000 tons of bituminous coal, deliveries via N. Y., N. H. & H. R.R. and teams. Address, C. A. Edgerton, Southworth Co., Mittineague, Mass.

No. 281—Laconia, N. H.—Winnepesaukee Gas & Electric Co. will be in the market for 300 tons of anthracite and 300 tons of bituminous coal about Apr. 1, delivery via B. & M. R.R. Address Winnepesaukee Gas & Electric Co., Laconia, N. H.

No. 282—Meriden, Conn.—The School Board here will place a contract for about 800 tons of anthracite coal in April. This coal is purchased from local dealers. Address, chairman of Committee on Buildings, School Department, Meriden, Conn.

No. 283—Holyoke, Mass.—The Holyoke St. Ry. Co. will be in the market about Apr. 1 for 9000 tons of bituminous coal, delivery via N. Y., N. H. & H. R.R. Address, Holyoke St. Ry. Co., Holyoke, Mass.

No. 284—Bristol, N. H.—The Dodge-Davis Manufacturing Co. will be in the market about Apr. 1 for 700 tons of bituminous coal. Delivery via B. & M. R.R. Address, Dodge-Davis Manufacturing Co., Bristol, N. H.

CONTRACTS AWARDED

No. 94—New York, N. Y.—The following are the bids and awards on this contract (p. 356) which provides for furnishing and delivering bituminous coal for fire companies in the Boroughs of Bronx and Queens: Olin J. Stephens, Inc., $570, Bronx (awarded contract); Rudolph Reimer, $495, Queens (awarded contract); Consolidation Coal Co., $1078; Jamieson & Bond Co., $83.30 (informal). Address Fire Comr. Robert Adamson, Municipal Bldg., New York.

No. 98—New York, N. Y.—The following are the bids and awards on this contract (p. 356) which provides for furnishing and delivering anthracite coal: No. 1, for the fire companies in the Borough of Queens, only one bid was submitted, that being from Jamieson & Bond Co., at $715 (awarded contract). No. 2, for the fireboats, Wm. Farrell & Sons, $6479; Commercial Coal Co., $3324 (awarded contract); Meyer-Denker-Sinram Co., $6112.50; John F. Schmadeke, Inc., $5995; Bacon Coal Co., $3384; Burns Bros., $12,675.50. No. 3, for the companies in Dist. No. 23, Borough of Brooklyn, John F. Schmadeke, Inc., $2100; A. J. & J. J. McCollum, Inc., $1995; Bacon Coal Co., $1947 (awarded contract); Rudolph Reimer, Jr., $21,000; C. H. Reynold & Son, $2043. Address Fire Comr. Robert Adamson, Municipal Bldg., New York.

No. 154—Stamford, Conn.—This contract (p. 398), which called for 5000 tons of gas coal, has been awarded. Address G. D. Leland, Supt. Stamford, Gas & Electric Co., Stamford, Conn.

No. 163—Boston, Mass.—The Quincy Cold Storage and Warehouse Co. advises that they have already closed their contract for coal (p. 399.) Particulars are not available. Address Treas. & Mgr. Geo. H. Stoddard, Quincy Cold Storage & Warehouse Co., 133 Commercial St., Boston, Mass.

CONTRACT NOTES

The Board of Administration, Springfield, Ill., recently awarded a contract to Walton & Co. for furnishing anthracite coal to the Chicago State Hospital at Dunning, Ill., at $6.81 per ton. Address Fiscal Superv. Frank D. Whipp, Board of Administration, Springfield, Ill.

There are growing evidences that operators of Eastern Kentucky intend to more actively solicit business in Indiana, Illinois and Iowa. More arrangements are under way with Indiana and Chicago wholesale jobbers to handle these coals next season, and attempts are being made to substitute these coals for West Virginia splints, with some success. The coals are favorably received by the retailers, and their competition with Indiana and Illinois coals necessarily must increase with the efforts being put forth.

Press reports state that contracts have been signed for 1,000,000 tons of Pocahontas coal for France and England, to be delivered by the Norfolk & Western and the Virginian Ry. at Sewalls Point and Lambert Point, Va. The coal is to be loaded into British ships before June 1.

The Boston Safe Deposit & Trust Co., 100 Franklin St., Boston, Mass., purchase about 1600 tons of coal per year, the usual contract being made with the Staples Coal Co. Deliveries are made as required.

R. M. Sutton & Co., Baltimore, Md., uses an annual supply of 500 tons of standard mine-run coal. At present no contract exists, and bids for furnishing this supply might be considered. Address Pres. John R. Sutton, R. M. Sutton & Co., Baltimore, Md.

C. E. Cotting, Boston, purchases coal for nearly two hundred buildings, and generally closes the contract with the Metropolitan Coal Co. Address Supt. D. F. Kilgour, 11 Pemberton Sq., Boston, Mass.

ILLINOIS MINERS' & MECHANICS' INST.

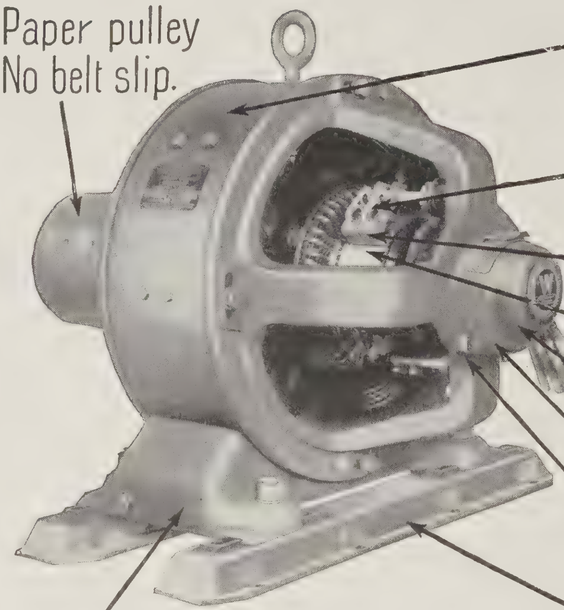
COAL AGE

Volume 7, No. 11
Issued Every Saturday
Hill Publishing Company

NEW YORK, MARCH 13, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

One of three rescue stations built by the State of Illinois in 1911. Since then, 516 men have been given mine-rescue and first-aid certificates. This station at Benton serves an area of 10,000 square miles


Paper pulley
No belt slip.
Rolled openhearth steel frame
Great strength - Compactness - Light weight.
Brush position fixed for all loads and either direction of rotation.
Brushes have very long life.
Sparkless commutation.
Large bearings. Dust-proof - Non-leaking.
Automatic oil-ring lubrication.
Oil overflow plug. Insures proper filling.
Forged openhearth steel slide rails with belt-tightening screw.
Forged openhearth steel feet.

"The SK for Mine"

This is what the Superintendent, or Manager, who has used it says—

Because the above features make it the best motor for driving—

Fans
Crushers
Hoists
Pumps
Shaker Screens
Tools
Conveyors
Washers
Dumpers

Write to a *user* and ask *him* how the SK is doing in *his* mine, tipple or shop.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

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Birmingham, Ala.
Bluefield, W. Va.
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Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio.
Cleveland, Ohio.
Columbus, Ohio.
*Dallas, Texas.
Dayton, Ohio.
Denver, Colo.
Detroit, Mich.
*El Paso, Texas.
*Houston, Texas.
Indianapolis, Ind.
Joplin, Mo.
Kansas City, Mo.
Louisville, Ky.
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Memphis, Tenn.
Milwaukee, Wis.
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Pittsburgh, Penn.
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Seattle, Wash.
Syracuse, N. Y.
Toledo, Ohio.
Washington, D. C.

W WESTINGHOUSE ELECTRIC

*Westinghouse Electric & Mfg. Co., of Texas

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

VOLUME 7 MARCH 13, 1915 NUMBER 11

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*PLANT OF THE NOKOMIS COAL CO.: *Pages* 450-452

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*EFFECTS OF THE EUROPEAN WAR ON OUR EXPORT TRADE—I: *Pages* 453-455

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When powdered aluminum is mixed with iron oxide and a portion of the mixture heated to a certain temperature, a self-propagating reaction is started whereby the oxygen leaves the iron and unites with the aluminum. This chemical transfer of the oxygen evolves intense heat and results in the formation of highly heated liquid low-carbon steel, which may be employed for autogenous welding. Frank H. Kneeland. COAL AGE, Vol. 7.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

Here's a story so good in its logic that I want to call it to your attention. It was printed in *System* some time ago.

◦ ◦ ◦

"I remember distinctly that when I was a small boy my father used to buy magazines and bring them home. He always tore off the advertising sections and threw them away. Sometimes he used them for shaving paper.

"When I got old enough to shave, I tore advertising sheets out of the back of the magazines and used them for shaving paper. Perhaps I may have inherited my father's point of view. He was a sea-faring man and resented what he called 'the attempts of infernal tradesmen to get me to buy their miserable stuff.' When I began to use advertising sheets for shaving paper, occasionally something would strike my eye and all of a sudden it occurred to me that there might possibly be something interesting in advertisements. I began to read them. They were interesting and I continued to read them.

"I still read them. As a matter of fact, I find the advertising sections of the magazines about as interesting as what the publishers call 'pure reading matter.' The pictures nowadays are quite as good as those in the body of the magazine. The English also is good.

"Advertisements are interesting to me because they have to do with real people, real things and real facts. The body of most magazines has a pretty generous sprinkling of fiction, stories about imaginary people, imaginary places and imaginary situations. There is an atmosphere of unreality about a good deal of it.

"The advertising pages on the other hand have the real stuff in them. The writer of fiction is expected to draw on his imagination. The writer of advertisements (P. T. Barnum, to the contrary, notwithstanding) must confine himself to facts, if he is going to last.

"This reading of advertisements certainly has had its effect on me as a consumer. Unless there are some intervening circumstances, I buy things which I have seen advertised.

"I think I have more confidence in advertised than in unadvertised goods. I feel that I know them. I feel much towards advertised articles as I do towards people that I have heard of or heard my friends speak of, or that I have seen many times. I feel acquainted. In buying an article which I have seen advertised I have a feeling of confidence.

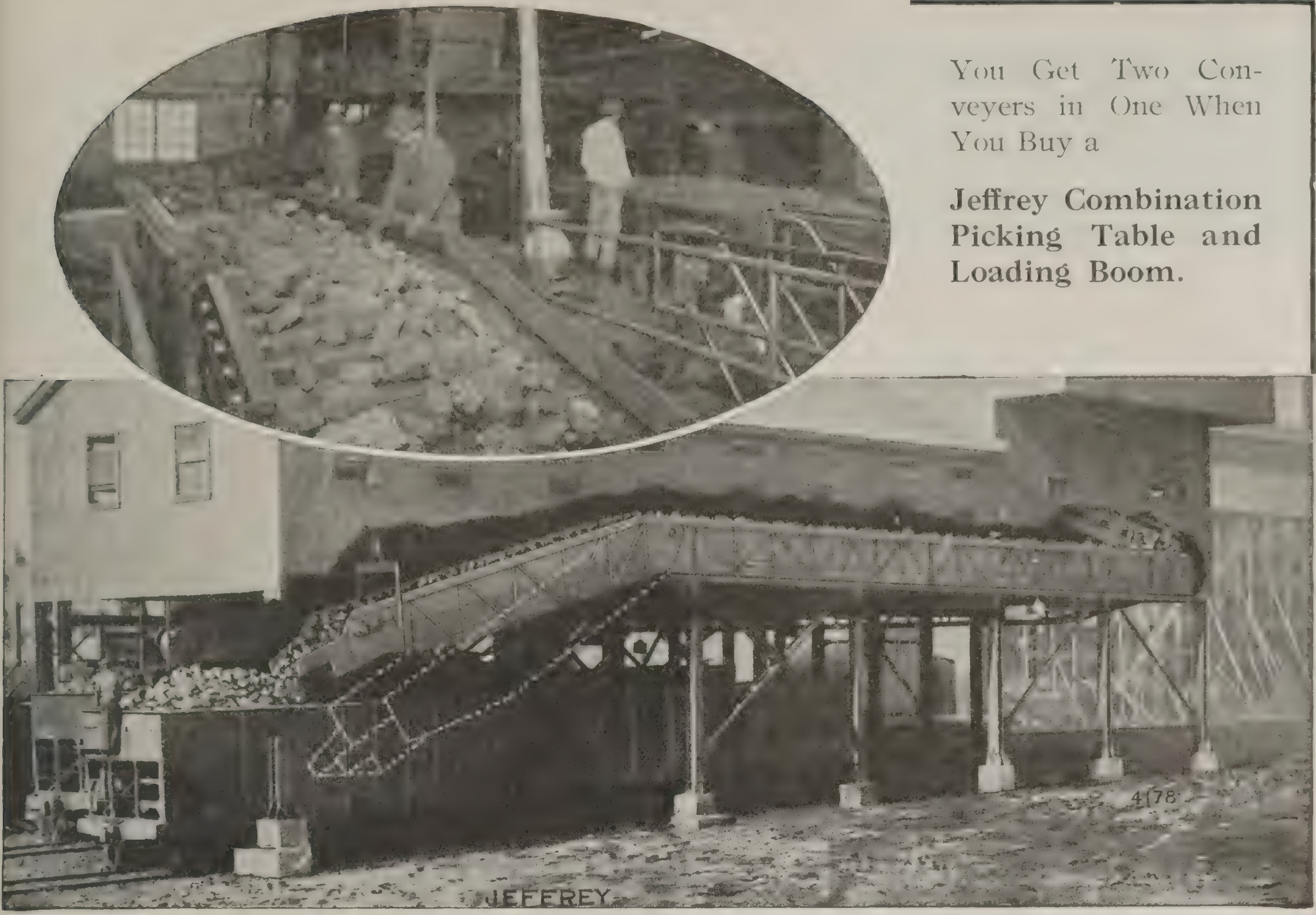
"I suppose my mental processes are about as follows: This thing must be good or it would not be advertised—nobody will spend money in getting people to buy a worthless thing—if it is worthless every buyer will tell every other buyer and the advertiser's money will be thrown away. It has got to be good or it won't stand advertising.

"This is particularly true of things which I have seen advertised for a long time. I suppose I reason about as follows: People must buy this thing or the manufacturer couldn't afford to advertise it so extensively and so long. If people keep on buying it, it must be giving satisfaction. If it is giving satisfaction to other people, it probably will to me.

"It generally does."

You Get Two Conveyers in One When You Buy a

Jeffrey Combination Picking Table and Loading Boom.



Clean Your Coal Thoroughly Eliminate Breakage in Loading

Many Operators are Increasing the Selling Price and Demand for their Coal through the Use of

Jeffrey Combination Picking Tables and Adjustable Loading Booms

Our **STANDARD Picking Tables,** with perfect discharge flights and steel thimble roller chains, form a moving pan, which makes an ideal arrangement for picking the refuse from the coal.

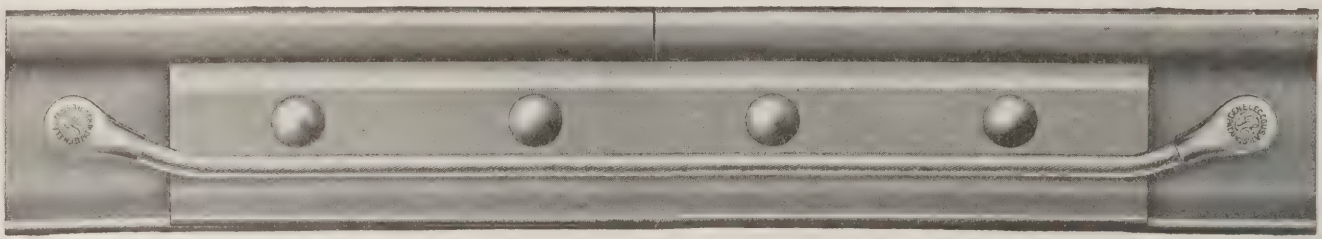
The **Jeffrey Loading Boom** eliminates the long drop to the bottom of the railroad car and the consequent breakage. It practically lays the coal down into the car. It is mechanically balanced, thus requiring little power to operate. Can be applied to new and old tipples.

Write for full particulars and copy of Bulletin No. 45-12.

Jeffrey Mfg. Co., 912 North Fourth St., Columbus, O.

New York Boston Philadelphia Charleston, W. Va. Birmingham Chicago Denver Montreal

3-13-15



G-E Form D Compressed Terminal Railbond

Railbond Economy

A well bonded return circuit means low resistance at track joints, reducing the waste of electrical energy at these points to the minimum.

G-E Compressed Terminal Railbonds

will positively accomplish the following economies if installed throughout your mine railway system:

More cars hauled each trip
More trips in given time
Fewer armature and field coil burnouts
Fewer repairs for the bonding gang.

Mine haulage efficiency is improved by installation of G-E compressed terminal railbonds

Ask our railbond engineers.

General Electric Company

General Office: Schenectady, N.Y.

ADDRESS NEAREST OFFICE

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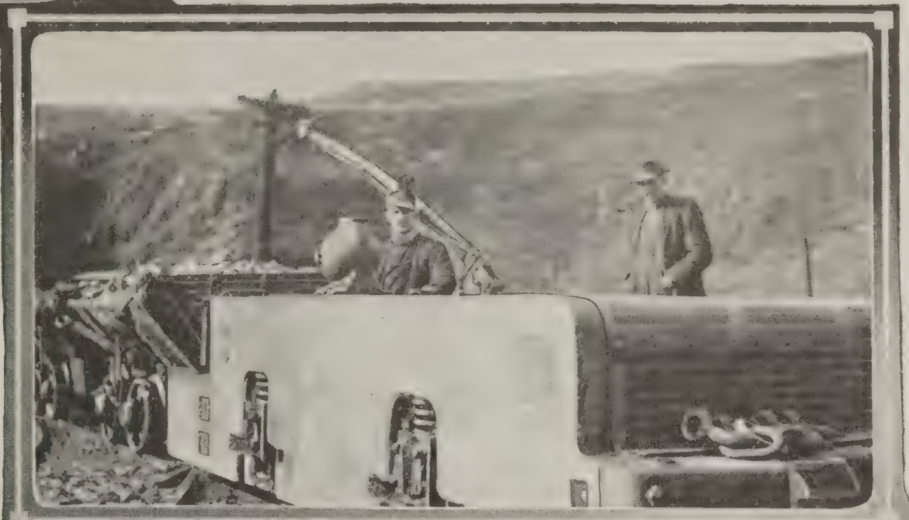
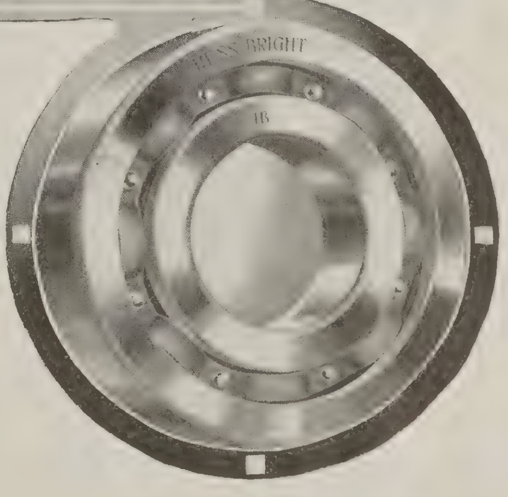
Chicago, Ill.
Cincinnati, Ohio
Cleveland. Ohio
Columbus, Ohio
Dayton, Ohio
Denver, Colo.
Des Moines, Iowa
Detroit, Mich.
(Office of Agent)
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
Fort Wayne, Ind.
Hartford,Conn.
Indianapolis, Ind.
Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
Salt Lake City, Utah
San Francisco, Cal.
St. Louis, Mo.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y
Toledo, Ohio
Washington. D. C.
Youngstown, Ohio

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.)—Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.

5165

The Foreman Says:—





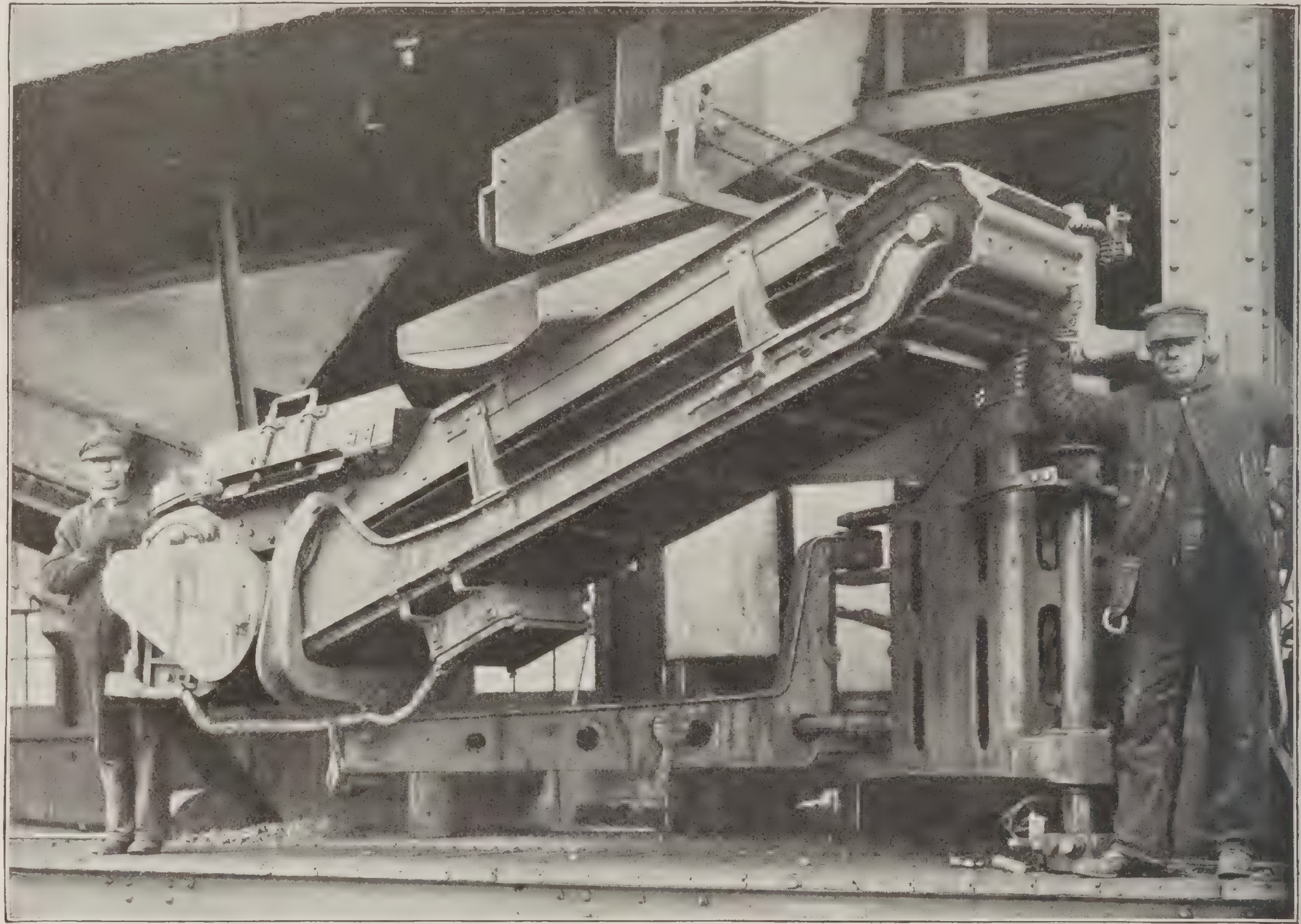
"No, I don't know much about ball bearings," says the foreman at this drift mine—he's the man standing behind the motor with his hands in his pockets.

"All I do know is," he continues, "we get a big sight more work since they sent down some motors with ball bearings in 'em."

HESS HB BRIGHT

Progressive users are learning to insist on motors with ball bearing equipment on the armature shafts. Progressive motor builders are choosing the world-known bearing for such use—HESS-BRIGHT.

The Hess-Bright Mfg. Co.
Front Street and Erie Avenue Philadelphia, Pa.



This Loader Handles **LUMP COAL** Without Breakage.

Of course, it's a **MANIERRE** Long Reach Loader.

Repeat orders tell the tale!

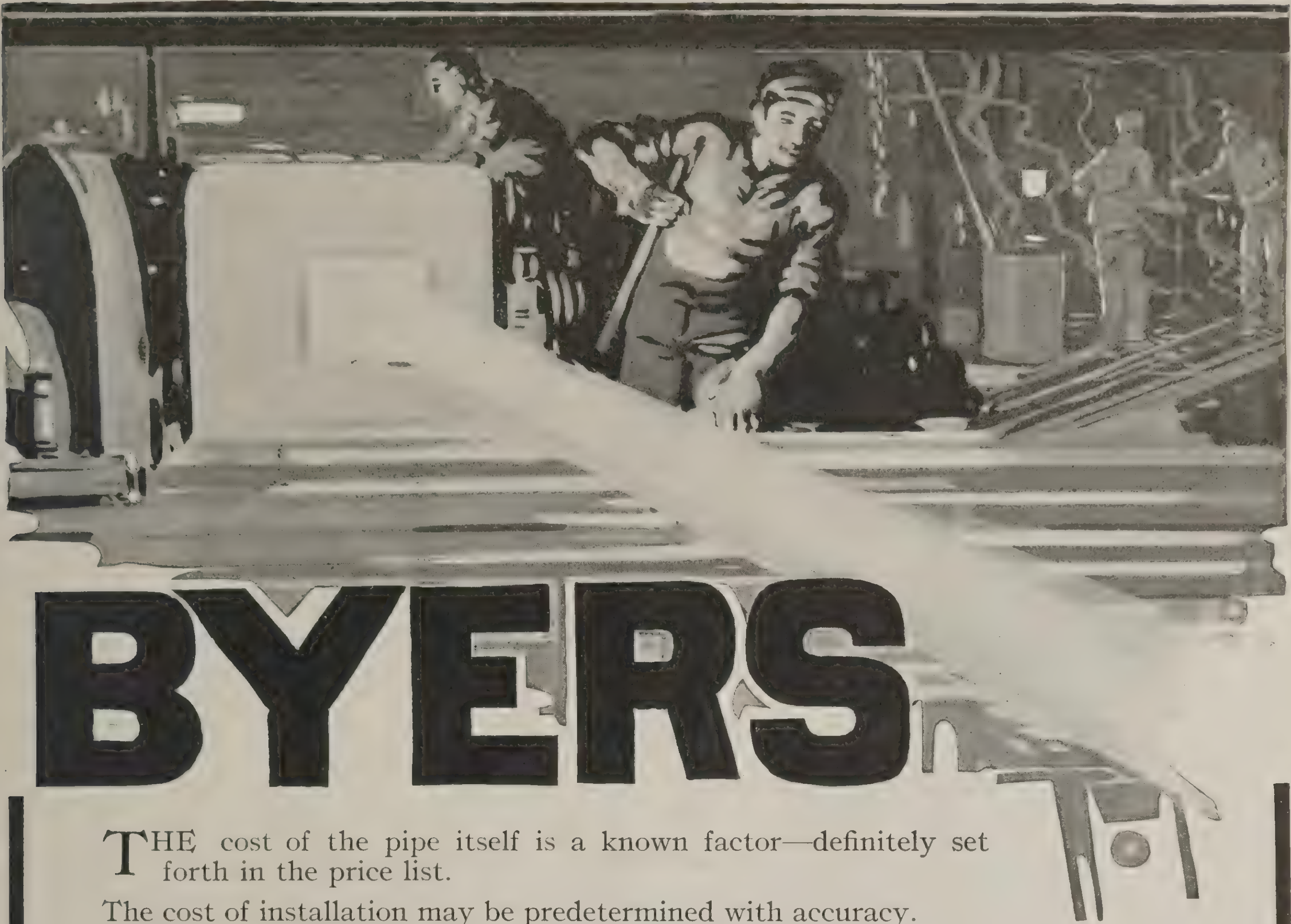
The machine here pictured is a 24″ steel apron box car loader. It is on the docks of the C. Reiss Coal Co. at Superior, Wis. The same company has three Manierre steel apron and two belt loaders and have just ordered one of our new steel apron portable loaders.

Of the above loader, Mr. H. Beck, manager of the Superior docks, writes: "*The loader handles lump coal with practically no breakage, and we favor it for handling this grade of coal over other loaders.*"

"Six firms use thirty-one Manierres."

Manierre Engineering & Machinery Company
Milwaukee **Wisconsin**

Write for Bulletin 406.



BYERS

THE cost of the pipe itself is a known factor—definitely set forth in the price list.

The cost of installation may be predetermined with accuracy.

It is the cost of maintenance that can neither be known nor estimated in advance. And it is this item—with inferior pipe—that eats the heart out of profit, or plays hob with the smooth operation of the mine and plant.

BYERS GENUINE WROUGHT IRON PIPE
FULL WEIGHT GUARANTEED

—alone gives definite assurance of lasting and economical performance. Only in the Byers installation can there be a calculated expectation of life, with the elimination of breakdown and repair.

This superiority of Byers is not theoretical—not occasional. It is constant—the averaged, verified experience of over fifty years.

It is the result of undeviating adherence to the highest standard—of material, of method, and of men.

Write for the Byers Book—it enables you to speak with authority on pipe problems.

A·M·BYERS COMPANY ·PITTSBURGH, PA·
STABLISHED 1864

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Chicago
Cincinnati
Cleveland
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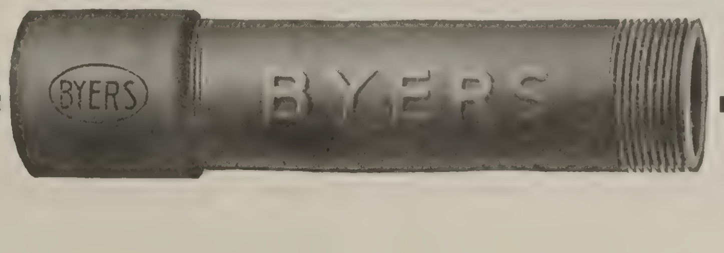
Dayton
Decatur
Denver
Detroit
Duluth
Dunkirk
Indianapolis
Jacksonville

District Agents at
Kansas City
Knoxville
Lansing
Los Angeles
Louisville
Memphis
Minneapolis
Milwaukee
Nashville
Newark
New Orleans
New York City
Philadelphia
Portland, Ore.
Quincy
Rochester
Saginaw
San Antonio
San Francisco
Savannah
Seattle
St. Louis
Syracuse
Tampa
Toledo
Union City, Ind.
Utica
Wheeling

Canadian Representatives: THE CANADIAN FAIRBANKS-MORSE COMPANY, Ltd., Montreal Toronto Winnipeg Calgary Vancouver

Write for the name of the Byers Dealer in your District. He can supply you immediately.



Here is the Point

What We Do It With

The advent of the simplified type known as the LAWSON TRAMWAY puts the whole subject of Short-Haul Transportation on a new basis. The Aerial Tramway has hitherto been strictly an emergency apparatus, to be resorted to when all other reasonable means of transportation fail. The standard or narrow gauge road, traction engines, motor trucks, etc., were first figured on as the preferred plan. But if on account of severe grades, sharp curves, deep canons, river crossings, etc., none of these were feasible, then, as a last resort, the Aerial Tramway was called in; and performed its service well, as a rule. Nevertheless, its high initial cost, its endless and heavy upkeep, and its lack of general flexibility to adapt itself to the best route, have always stood in the way of its broader application.

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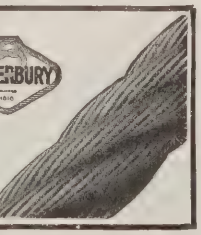

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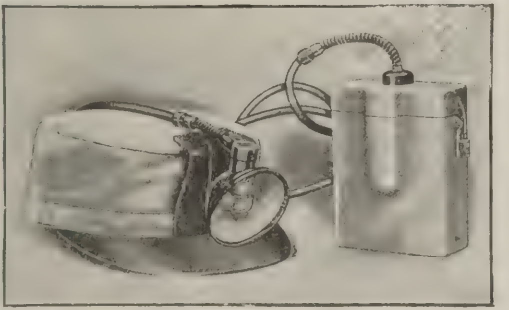

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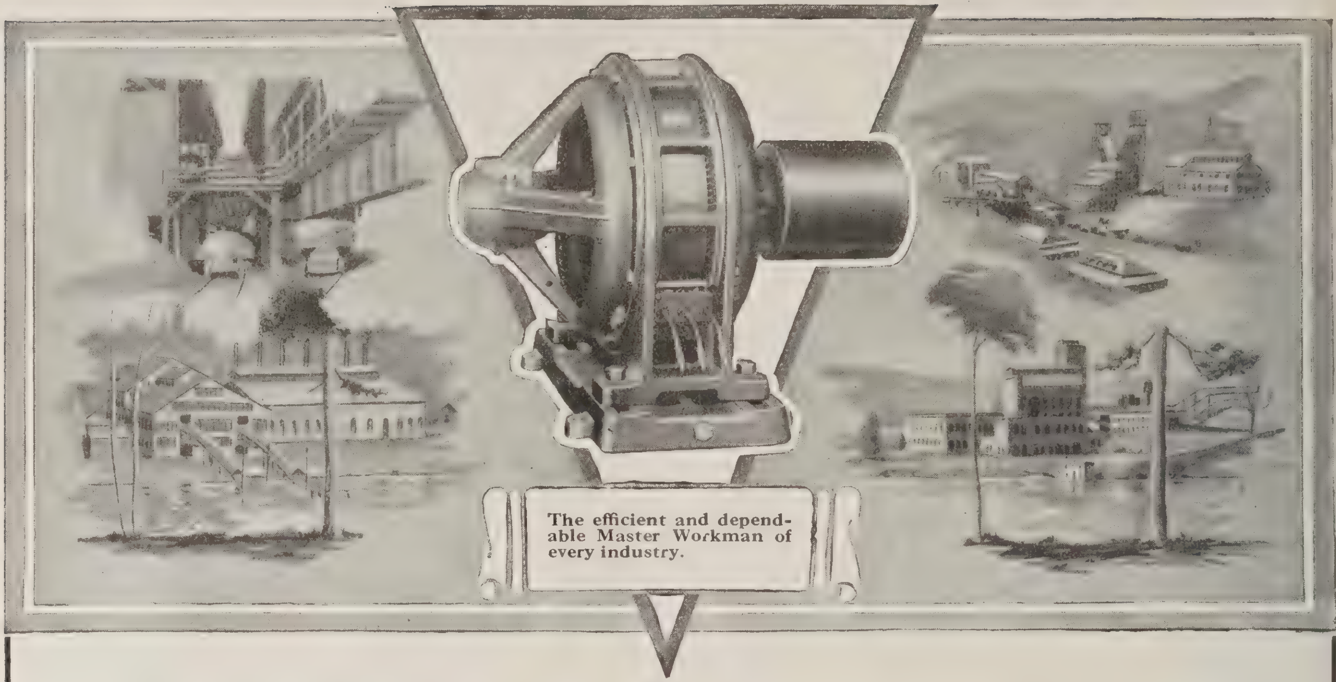

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COAL AGE

Vol. 7 NEW YORK, MARCH 13, 1915 No. 11

Procrastination

By M. D. Cooper

Are you a procrastinator? Are you putting off, for an indefinite future time that may never arrive, something you ought to be doing today?

A Specific Case

A SUPERINTENDENT *who took charge of a mine a year ago remarked, on his way to the office during one of the first days of his connection with the company, that he did not like the looks of an old engine, a mass of junk lying nearly across his path. "I'll have that removed in short order," he said. But he has postponed the departure of the engine, and it still remains. In fact, it will probably stay where it is until some official higher than himself suddenly bears down on him with a few short, crisp remarks.*

Another Instance

AT ANOTHER MINE *the blower fan is located on a small area of sloping ground. In winter there is real danger of a person slipping and falling against the rotating fan wheel. Everyone in authority at that particular mine is aware of the danger. However, the very ease with which the danger could be eliminated by erecting a short fence made up of a few feet of chain or two or three lengths of old pipe has resulted in the development of a general spirit of procrastination in regard to it. An accident, of course, will recall attention to the surroundings of the fan.*

SUCH cases as that of the fan make one almost ready to believe that some people have twisted the old saying around and actually follow a revised version of their own, which probably is, "Never do today what you might as well do tomorrow."

The difficulty with such a motto is that it sounds sweet and musical today; but generally for its follower tomorrow arrives with a thud, and the contented procrastinator of yesterday finds himself thrown in with the things of yesterday—things the usefulness of which is gone.

On the other hand, there is a mighty comfortable feeling that takes hold of all of us when we know that we are keeping our work up to the top notch; when, because of our careful planning and the fact that things are being done on time, everything goes "dead right." ("Dead right" is rather an uncommon expression, isn't it? We've heard many times of things going "dead wrong," but we need not forget that it is possible to make things go "dead right.")

"Leave it to time," said the ancients. Our sorrows and our ills and our injuries were left for time to heal. But today we are beginning to realize that we must not put off things for the future, waiting for accidents to happen and then applying the cure.

TODAY we must use our brains and our energy to prevent accidents and reduce to a minimum those things that must unavoidably be left to time. What are you doing *now* in your mine, or around your ovens, or in your town?

You doubtless have a force you feel compelled to keep at work during the present dull season. Are you using it to best advantage, or are you procrastinating—killing time? Are the stoppings in your air-courses being tightened up? Are the loose frogs in your haulageways, that you never can touch during busy periods, being repaired? Are you employing most advantageously the men you are compelled to keep on the payroll in fixing up the thousand and one little details you can't stop for when you are running at full capacity?

Or, on the other hand, perhaps you are just waiting. Business is dull, but prosperity will return. There is no need of bothering about much, say some. Yes, surely prosperity will return. But remember its return will inevitably be surer and sooner to those places where best efforts have been put forth for its welcome. The dilatory fellow, who keeps putting things off, will doubtless find out that prosperity, for him, may do a little procrastinating on its own account.

Plant of the Nokomis Coal Co.

By Warren R. Roberts*

SYNOPSIS—Severe competition in the coal fields of the Mississippi Valley impels operators to cheapen costs and improve the quality of the mine product by all means possible. The plant here described was designed not only to handle an enormous output but to prepare it in the most thorough manner.

The severe competitive conditions which exist in the Central Mississippi States have compelled coal operators to resort to every means at their command to secure advantages and thereby markets. In certain districts where the quality of the coal is such as to need less preparation than that from some other locality, producers have given their attention to increasing their tonnages and thereby reducing the cost of production.

One of the mining districts in Illinois where unusually large production has been secured is that including the coal field from Gillespie, southward through Staunton and Livingston, and thence northeast to Nokomis. Within this district are located several of the largest producing mines in the state, as well as some new operations which are being developed for still larger capacities than even the largest mines within the district.

At Gillespie, Ill., there are located three mines of the Superior Coal Co., which have averaged daily productions of about 4000 tons each and often exceed this amount.

The Mount Olive & Staunton Coal Co. has two mines near Staunton, Ill., both of which are large producers. No. 2 is especially interesting in this connection as it has an average daily capacity of about 4000 tons.

At Livingston is located the mine doubtless having the largest average production. This mine is operated by the New Staunton Coal Co., and before the recent business depression, which has undoubtedly somewhat curtailed its output, it often produced approximately 4500 tons per day and several times exceeded this amount.

The above discussion of large tonnages is only recited in order to indicate the requirements when a new mine is opened in this district, which is to equal or exceed the production of some of those already existing.

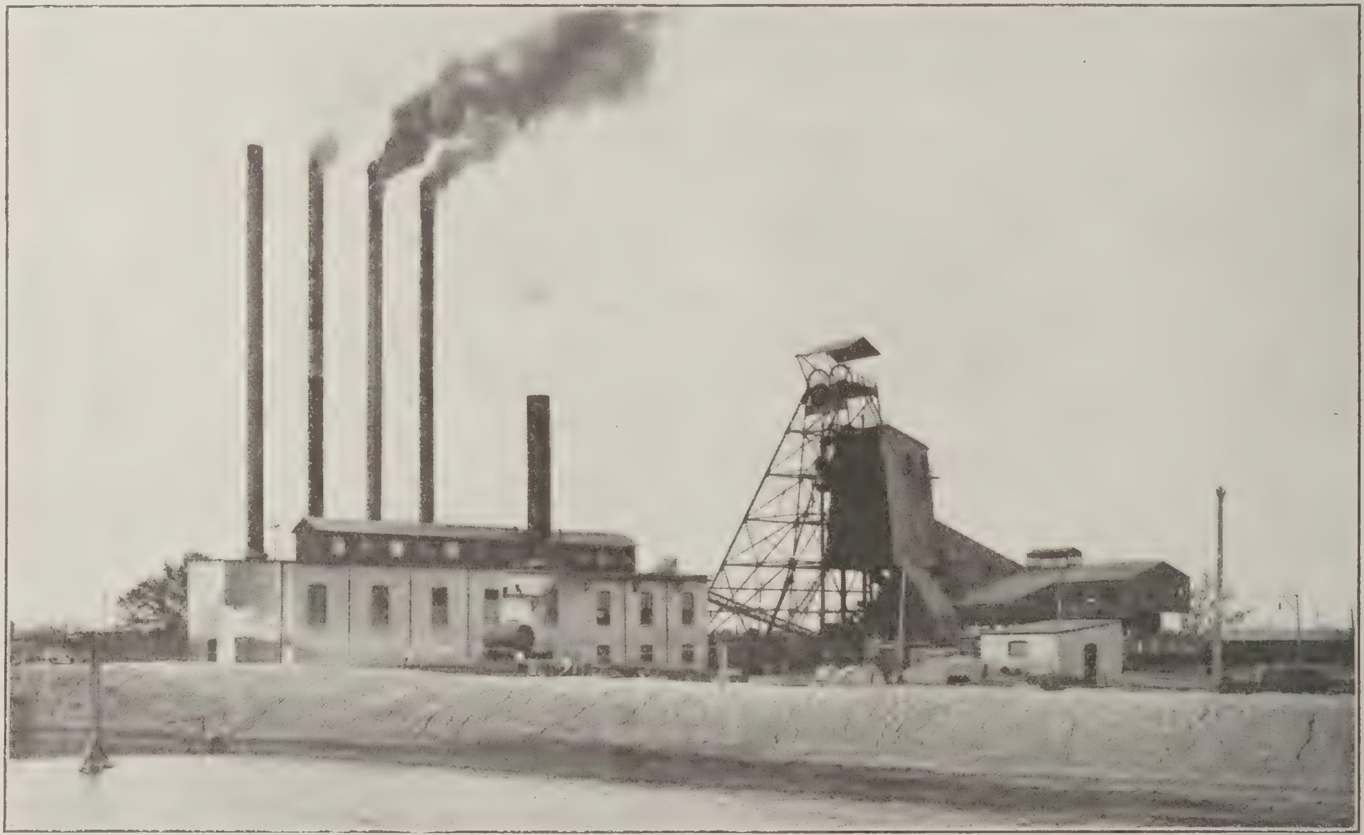

Fig. 1. General View of Tipple and Power House

Some three years ago J. E. Rutledge, of St. Louis, Mo., general manager of the New Staunton Coal Co., organized a new firm and began the development of a valuable tract of coal just south of Nokomis, Ill. It was the desire of Mr. Rutledge and his associates to develop a mine which could easily produce 5000 tons of coal per day. He, therefore, in sinking his shafts, developing his underground layout and building the top works, made all of his plans for this extreme production. The plant which this article describes and illustrates will indicate in a somewhat meager way how well he has accomplished what he set out to do.

---

*President, Roberts & Schaefer Co., Chicago, Ill.

The top works consist of a large steel four-track tipple; a combined power and boiler plant; a large building including the various shops for blacksmithing, carpentry and general repairing; a complete water system, including a large reservoir; and several lesser buildings.

The illustration in Fig. 1 gives the general view of the plant showing especially the tipple and combined boiler and power house.

Fig. 2 is a closer view of the tipple, taken so as to especially illustrate the sheds adjoining the tipple for housing the loading booms on the lump and egg tracks and including the weigh house for all the railroad track scales.

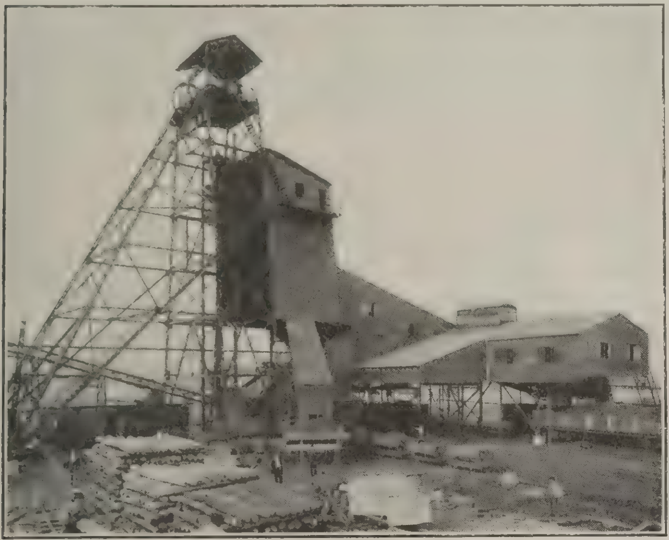

FIG. 2. ANOTHER VIEW OF THE TIPPLE, SHOWING SHEDS OVER LOADING BOOMS

A brief description of the tipple equipment will be of interest not only on account of the magnitude of the screens, weigh hopper, etc., but because of the excellent preparation that is given to the coal by the introduction of the two combined picking tables and loading booms. While picking tables and loading booms have been quite commonly used in some other states, they are a new feature of preparation in Illinois.

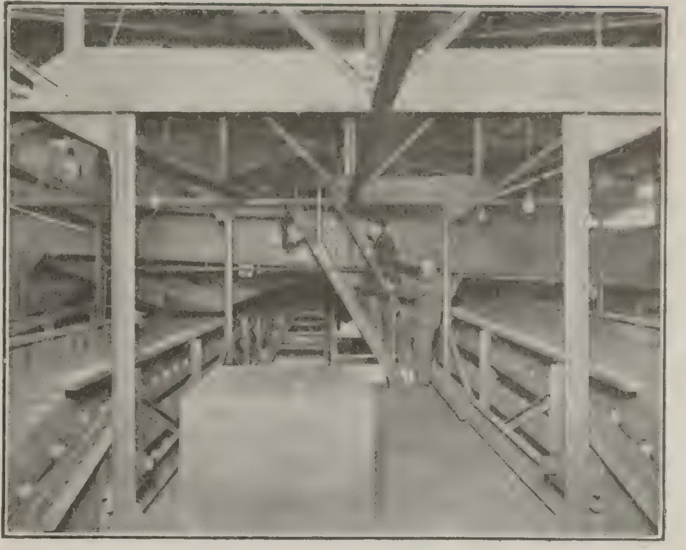

FIG. 5. HORIZONTAL PORTION OF THE LOADING BOOMS

On account of the depth of the shaft, which is about 600 ft., it was necessary to use a large mine car and self-dumping cages to reach the desired capacity of 5000 tons per day. The pit cars, therefore, at this mine are designed to hold about four tons of coal, which being mined on a run-of-mine basis, is dumped directly into the weigh basket, from which it is discharged into a receiving hopper large enough to hold the contents of some two or three pit cars. From this receiving hopper the coal is delivered uniformly by a reciprocating feeder onto the shaking screens. This regularity of the flow of coal onto the screens enables them to take care of a larger tonnage and secure a better preparation than otherwise could be attained.

LARGE SCREENS ARE EMPLOYED

Fig. 3 is a view of the shakers taken from the lower end and to one side, in order to illustrate the driving equipment for this massive pair of screens, which are 10 ft. wide and about 57 ft. long and are double decked on the rear portion.

Fig. 4 illustrates particularly how the shaking screens deliver coal onto the lump-picking table. Only a portion

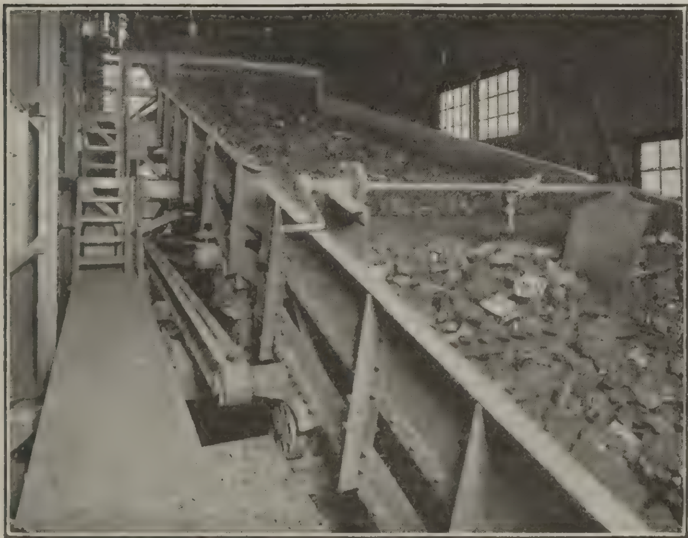

FIG. 3. VIEW LOOKING UP THE SHAKING SCREENS

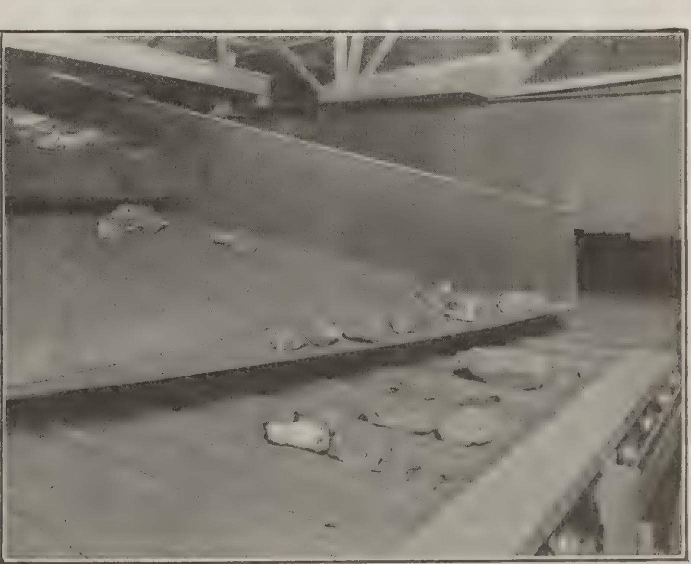

FIG. 4. THE DELIVERY OF SHAKING SCREENS TO THE PICKING TABLE

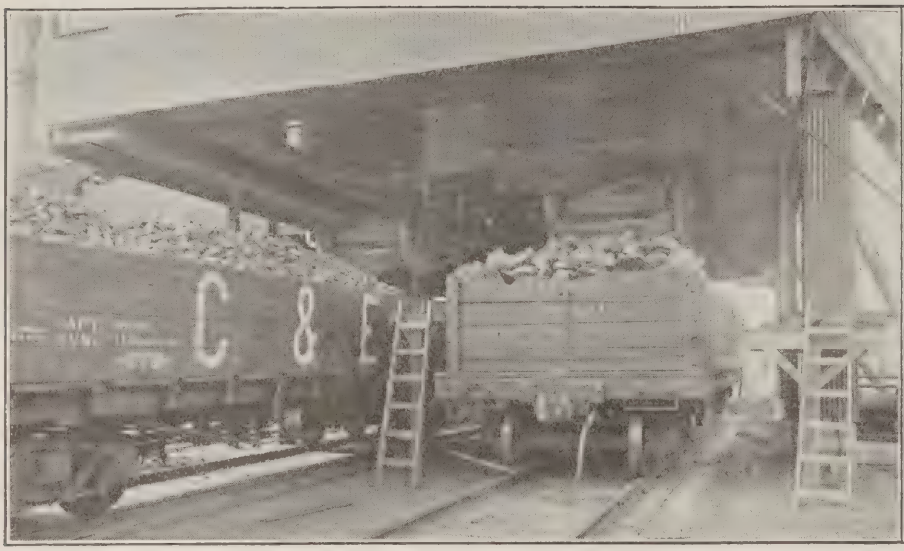

Fig. 6. End View of Loading Booms

Fig. 7. Interior of Weigh House

of the screen is shown, but enough to indicate that the coal is practically laid onto the picking table.

Fig. 5 illustrates that portion of the booms next to the shaking screens which is placed on the horizontal and is used as a picking table. This view shows readily the facilities for picking both the egg and lump coal.

Fig. 6 gives an end view of both the lump and egg booms, showing how nicely they deliver the coal with the least breakage and at the same time trim the cars without manual labor.

Fig. 7 is an interior view of the weigh house showing the beams of the four 80-ft. railroad track scales, by the use of which not only all the empties, but all the loads are weighed.

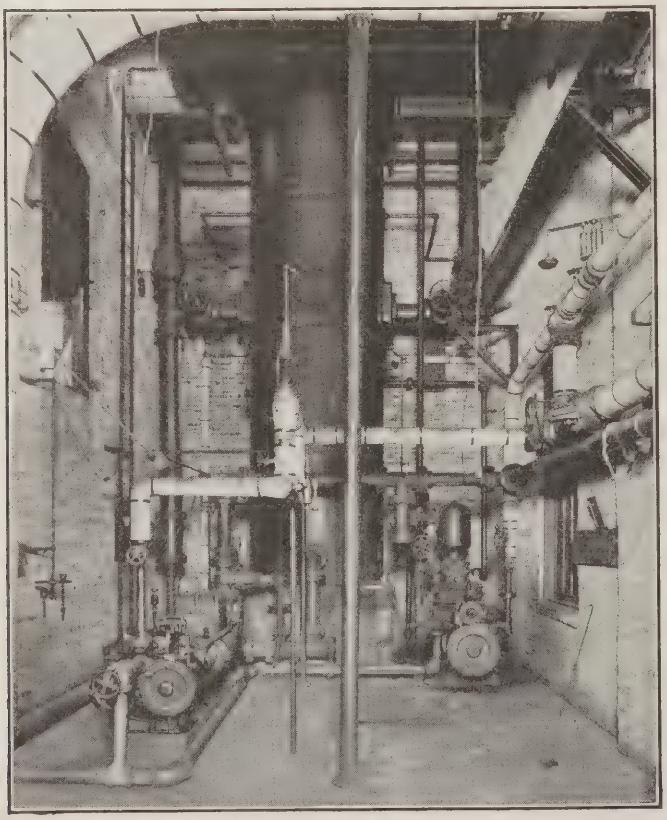

Fig. 8. Interior View of Pump Room, Showing Pumps and Feed-Water Heater

The engine house contains one of the largest hoists in Illinois, consisting of a pair of 28x48-in. direct-connected engines, operating a double drum 10 ft. in diameter. These are standard engines with all modern safety appliances, and are fully capable of handling the four-ton car of coal, which together with the weight of the self-dumping cage, cable, etc., makes a total load of 14 tons.

Fig. 8 is an interior view of the pump room, which is located between the hoist and the boiler rooms of the power house. This pump room not only contains the boiler feed pumps, but the large vertical heater shown which heats the boiler feed water with the exhaust steam from the hoisting engines.

While this mine is still comparatively young, it has already attained a tonnage of about half its ultimate capacity, and with the present rapid development of the underground work, with the resumption of normal business conditions which would make it advisable to increase the production, it will not be long until the ultimate capacity for which the mine and plant were both designed, namely, 5000 tons in 8 hours, will be reached.

The Roberts & Schaefer Co., engineers and contractors, of Chicago, designed and built this complete plant.

Who Is the Most Successful Coal-Mining Man You Know?

The SUCCESS number of Coal Age, Apr. 3, will be devoted to men engaged in mining, as well as to methods and machines used in getting out the coal. You undoubtedly have in mind, or number among your acquaintances, some man engaged in this industry who has created for himself quite a successful career. Perhaps the man you are thinking of has worked in a lowly position without any educational advantages, and in spite of such a handicap has been thrifty enough to purchase a home, raise and educate a family. Or, it may be that the man you have in mind has fought his way to a position of authority in the mining field. Both such men are successes, and nothing is more interesting and inspiring than the true story of how they have overcome difficulties. Pick out your man and prepare a sketch of his life at once. Send it to us immediately, and if possible include a photo of the person you write about.

Effects of the European War on Our Export Trade--I

By J. S. Burrows*

SYNOPSIS—The following views of a fuel expert of one of the oldest coal-exporting firms in the country are of particular interest in connection with prospective developments in the foreign trade. Commerce is gradually adapting itself to the new conditions and it is now possible to anticipate with fair accuracy what we may reasonably expect to gain in the world's coal markets.

It is generally believed that the European conflict is America's opportunity to establish herself in the coal markets of the world and to accomplish, in a short time, what it has taken England and Germany decades to do. There has been much extravagant speculation concerning export business and many statements have been made which are plainly illusory. Among other things it is hoped that we will be able to increase our foreign markets for coal, and it is the purpose of this paper to substitute for mere conjecture a rational basis on which to formulate an estimate of our prospects.

The World's Coal Supply

We are in a unique position as regards the European conflict and all of the usual economic factors which govern supply and demand have been completely upset. At the same time the war itself has brought about certain new conditions which have now had time to crystallize as governing trade factors for the war period, and it is now possible to arrive at some logical conclusions as to the outlook. As both the supply and demand for coal have been greatly curtailed, the subject will be divided under these two general heads, and the normal and extraordinary conditions now in effect will be reviewed.

TABLE 1. PRINCIPAL COAL-PRODUCING COUNTRIES OF THE WORLD

Country	Output[1]	Loss[2]	Remarks
Great Britain	287	20%	Production exceeds consumption. Largest exporter of coal
France	40	75%	Consumption exceeds production. Imports coal
Russia	30	?	Consumption exceeds production. Imports coal
Japan	21	nil	Production exceeds consumption. Exports coal
English allies	378		
Germany (coal and lignite)	275	Note[3]	Production exceeds consumption. Second largest exporter, and imports some coal
Austria	51	Note[4]	Consumption exceeds production. Imports coal
Belgium	22	Prob. 100%	Consumption exceeds production. Imports coal
German allies	348		
Total, belligerents	726		
India	15½	10%	Production exceeds consumption. Exports coal
Australia	12½	10%	Production exceeds consumption. Exports coal
New Zealand	2½	nil	Production exceeds consumption. Exports coal
Canada	13½	nil	Exchanges coal with U. S. Balance in favor U. S.
South Africa	10	nil	Imports and exports coal
Spain	3½	nil	Consumption exceeds production. Imports coal
Other countries	19		Mostly importers
Total, foreign neutral countries	76½		
United States	509	nil	Production exceeds consumption. Exports coal
World total	1⅓ billion		

[1] Normal output based on the returns for 1913. Figures indicate millions of gross tons.

[2] Reduction in output during the war period.

[3] Now German territory.

[4] Reduced to home requirements and those of Austria, Belgium and possibly Holland.

In normal times, the world's coal production and consumption (since coal is mined as needed) are, in round figures, one and one-third billion tons. Table 1 gives a list of the principal countries which contribute the bulk of this vast total. The belligerent nations have been grouped according to their alliances to show the normal productive capacity of each side, and the neutral countries have also been grouped together to show the tonnage which has not been directly affected by the war. It will be seen that nearly 90 per cent. of the world's supply of coal is furnished by the United States, Great Britain, Germany, France, Belgium and Austria, of which the United States' proportion is 40 per cent., while 50 per cent. is mined in the other countries mentioned, all of which are now at war.

These coal-producing countries may be separated into three classes, as follows:

Class 1—Those countries which have a productive capacity of all needed varieties of coal in excess of home requirements and are normally exporters of coal.

Class 2—Those countries which produce less than their own requirements and must normally import coal to make up the deficiency.

Class 3—Those countries which lack certain varieties of coal for special industrial purposes, such as gas making, and which must import these grades.

In the first class (those which have an excess production over home needs) are the United States, Great Britain, Germany, Australia and Japan. These countries can provide their own fuel under any conditions, or in other words, are independent of the rest of the world in this respect, and in normal times they have to seek a foreign market as an outlet for their surpluses. Germany, it is true, has always imported some coal from England, but she need not do so, and to offset this, it may be said that quite recently the London gas works purchased a considerable tonnage of German coal.

In the second class (those countries which find it necessary to supplement their home production with imported coals to meet their own requirements) are France, Russia, Austria, Belgium, Spain, and miscellaneous smaller producers.

The third class, embracing countries which find it necessary to import coal for special purposes, includes Canada, South Africa, New Zealand and India. Most of the countries which come within this class, notably Canada, India and South Africa, could, if the necessity arose, take care of themselves. For instance, Canada annually buys over four million tons of anthracite from the United States, which is preferred to the home product for domestic heating purposes, but which could be replaced with her own bituminous coal in the event of her being unable to obtain supplies from us.

From this classification it will be seen that the countries enumerated in class two must depend, to a very great extent, on the countries which are fortunate enough to be-

---

*Fuel expert, Castner, Curran & Bullitt, Inc., Norfolk, Va.

long in class one, while under present conditions the countries which come within class three will play only a small part in the readjustment of trade.

PRODUCING COUNTRIES THAT IMPORT COAL

It is interesting to note in passing that the strongest nations in the present crisis fall in class one, which bears out the economic theory that the progress and strength of a nation depend primarily on its fuel resources. It is also interesting to note that the principal countries in the second class are now the theater of war. For this reason we may dismiss them from consideration with a few words.

Belgium—The Belgian coal trade, along with other industries, has been practically destroyed; her coal fields have been overrun by the armies of both sides, and it will be a long time before the damage is repaired and anything approaching normal conditions established, even should an attempt be made to work the mines under German control.

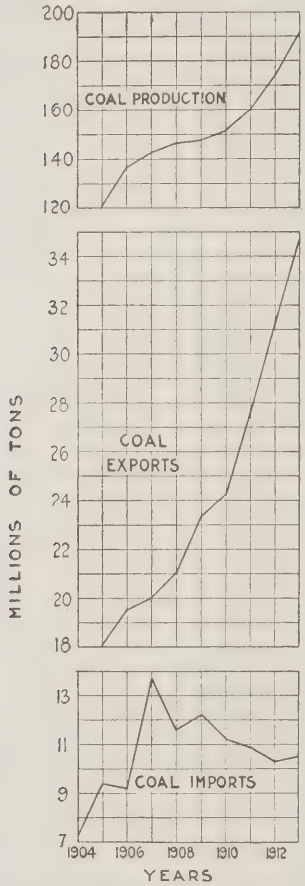

CHART I. GERMAN PRODUCTION, EXPORTS AND IMPORTS

Austria—While the Austrian coal trade is affected to a far less extent than that of Belgium, her normal production of 50 odd million tons will probably be seriously curtailed through the requisitioning of both men and transportation for military purposes.

France—The French output is normally about 40 million tons per annum. An English estimate* places the war period production of this country at the rate of six million tons per annum, or a reduction of about 75 per cent.

The coal fields of the Pas de Calais and Northern France are now in the war zone, and even after the fighting has shifted to other districts, a return to anything like normal production will be greatly delayed by repairs to transportation facilities, as well as to the mines. These fields supply nearly three-fourths of the coal mined in France, the balance coming from the Southern part of the country, where Messrs. Hailey & Davies estimate the reduction in output through enlistment to be fully 50 per cent.

Russia—While at no time a very important factor as a coal producer, Russia may be expected to make every effort to increase her normal output to as near her reduced home demand as possible, for cut off from England as she is, she will have to stand on her own resources.

Spain—The remaining country in class two is of so little consequence as a coal producer as not to affect the general situation in one way or another. It is probable that, as a neutral country, her production has been unaffected by the war.

To briefly summarize class two we are safe in concluding that they have practically ceased to be producers for the time being and that such reduced quantities as they require, must be largely obtained from other sources.

THE EXPORTING COUNTRIES

Class one, embracing the United States, Great Britain, Germany, Australia and Japan, covers all of the potential competitors for foreign trade and represents about 90 per cent. of the world's coal production. Japan and Australia are somewhat limited in their export opportunities, the former by the quality of her coal and the latter by her smaller tonnage. At the same time, these countries are factors to be reckoned with in the world's markets, the United States having felt this competition even at home, where Australian and Japanese coal is perhaps better known on the Pacific Coast than the American product.

The coal exports of Australia aggregate from two to three million tons annually, while those of Japan are around four million tons. On the West Coast of South America, Australia proves a most formidable competitor of ours, while Japan may be expected to take such trade as she is in a position to handle, besides being the dominant factor in the Far East.

During the war period, while it is hardly to be expected that the output of coal in Japan and Australia will increase, there is every reason to believe that the supply will be about normal and that these countries will have their usual surplus for export purposes. In Table 1, I have allowed a reduction of 10 per cent. in the case of Australia to take care of a possible loss in output caused by her contribution of men to the British forces, although it is not known to what extent the supply of labor has been affected.

With Australia and Japan disposed of, we come to the two dominant factors in international trade—Great Britain and Germany. In normal times we can scarcely be classed as a competitor of these countries except in our own markets. While we lead the world as a coal producer, we stand far down in the list as an exporter, Great Britain leading with Germany second. These three nations produce over a billion tons, or more than 80 per cent. of the world's supply.

By reducing their productions and exports to percentages of the totals for the three nations, as shown in the following table, we get a fair comparison of the United States with the two principal exporting countries:

TABLE 2. PRODUCTION AND EXPORTS OF THREE LEADING COUNTRIES

	Total Production	Total Exports	Proportion of Output	
			Exported	Used at Home
United States	48%	16%	4%	96%
Great Britain	27%	56%	26%	74%
Germany	25%	28%	13%	87%

GERMANY

As Germany is the most seriously affected of the three leading countries in this class, we will first examine into her supplies. In normal times she produces, in round numbers, 275 million tons of fuel, of which about 85 million tons is classed as lignite. Her lignite is used mainly at home, while her exports are taken almost wholly from her bituminous supply.

A better idea of her production may be had from the following tables where the detailed figures are shown by districts.

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*Messrs. Davies & Hailey, of Cardiff.

TABLES 3 AND 4. GERMAN OUTPUT OF COAL AND LIGNITE FOR 1912 AND 1913

Coal Table 3

District	1912	1913
Prussia:		
Dortmund	100,265,000	110,722,000
Breslau	46,584,000	49,077,000
Bonn	17,736,000	20,657,000
Clausthal	708,000	948,000
Halle	9,000	8,000
Total Prussia	165,302,000	181,412,000
Saxony	5,066,000	5,471,000
Alsace Lorraine	3,539,000	3,817,000
Bavaria	791,000	811,000
Total	174,698,000	191,511,000

Lignite Table 4

District	1912	1913
Prussia	67,476,000	70,256,000
Saxe-Altenburg	4,162,000	
Saxony	5,332,000	6,316,000
Brunswick	1,726,000	
Anhalt	1,492,000	
Hesse	444,000	
Bavaria	1,700,000	1,895,000
Other states	8,000	
Total	82,340,000	78,467,000

Note. Figures are in gross tons.

About 25 per cent. of the lignite is used in briquetted form, in which industry Germany may be considered the leader. Six million tons of coal briquettes are also manufactured annually, and it is appropriate to state here that the attention the Germans give to the preparation of their coal for market is far above that of any other country. Wherever German and British coal has competed on anything like an equal basis, and the decision between the two fuels has been close, the superior preparation of the German product has frequently proven the deciding factor. Thus the successful German invasion of the French market against English coal a few years ago has been credited entirely to the perfect manner in which the German fuel was prepared for French requirements.

Germany's exports for 1913 are shown in detail in Table 5. This table also includes coke, which is given here solely as a matter of interest, a review of the coke situation not being contemplated in this paper. Germany's enormous byproduct industry, on which depends her position as a producer of chemicals, dyes, etc., gives her a considerable surplus of excellent coke for export, some of which finds its way to the Pacific Coast of the United States.

Up to the beginning of the war, German exports had grown to more than 40 million tons which, however, does not represent her surplus, for she has always imported some coal from England (11⅓ million tons in 1913). Her home consumption is in round figures 250 million tons (including both coal and lignite), which would indicate in comparison with her production an actual surplus of something less than 30 million tons. The accompanying chart, No. 1, shows a comparison of her production, exports and imports over the past ten years.

TABLE 5. EXPORTS OF COAL FROM GERMANY IN 1913
(Gross Tons)

			Briquettes		Total	
Neutral Countries:	Coal	Lignite	Coal	Lignite	Fuel	Coke
Denmark	219,711	....	95,600	55,240	370,551	52,337
Italy	892,463	....	304,707	....	1,197,170	183,456
Netherlands	7,217,606	10,133	140,871	282,225	7,650,835	285,223
Norway	19,170	....	....	....	19,170	44,492
Sweden	177,656	....	....	....	177,656	208,107
Switzerland	1,638,745	....	652,093	210,587	2,501,425	363,596
United States	....	....	....	....	....	18,549
Spain	279,015	....	....	....	279,015	37,276
Mexico	....	....	....	....	....	68,599
Egypt	90,003	....	....	....	90,003	....
South America	9,850	....	36,393	....	46,243	126,417
Total	10,544,219	10,133	1,229,664	548,052	12,332,068	1,388,052
Countries at war with Germany:						
Belgium	5,728,406	....	442,843	103,720	7,174,969	936,516
France	3,242,175	....	319,908	64,075	3,626,158	2,354,918
Great Britain	11,064	....	....	....	11,064	5,418
Russia (European)	2,103,210	....	....	....	2,103,210	546,191
Total	11,084,855		762,751	167,795	12,915,401	3,843,043
German Allies:						
Austria-Hungary	12,152,500	49,527	....	116,756	12,308,783	1,051,670
Total exports	33,781,574	59,660	1,992,415	832,603	556,252	6,282,365

The enormous growth of the German coal exports, as shown on this chart, has been a matter of grave concern to the British shippers who in many markets have felt keenly the effect of this growing competition.

It has been estimated that the German production will be curtailed 40 per cent. during the war period, which will give her an output of 110 million tons. The exact figures, however, are of little value in the present calculations, for it must be evident that in her present position, and with Great Britain in command of the sea, Germany will have no surplus of consequence beyond home requirements and the needs of her allies and neighbors; it must be remembered that she is connected with the Italian markets by the Gothard Railway and has continued to make some shipments over that route.

It should be understood that, like other industries in this methodical country, the coal trade is thoroughly organized, is under government control and the distribution and sale of coal are strongly centralized. Hence the supply is systematically regulated to meet the demand, and in this respect, Germany stands alone.

We have ample evidence of her preparedness for war in more than a military sense, and it is not far amiss to assume that this preparedness includes a complete program for the coal industry to cover all conditions. Besides coal for naval use, railways and other direct military purposes, the byproduct ovens may have to operate at above their normal rate to obtain benzol for motor fuel in the event of the petroleum or gasoline supply being shut off. It is safe therefore to assume that the German mining industry is not as badly disorganized as might at first seem.

The shipping situation and outside factors, however, take Germany out of foreign markets for the immediate future, and it is quite probable, until the end of the war.

(To be Continued)

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Coal and Coke Production in Pennsylvania

Following is a tabulated list showing the production of coal and coke, by the several operating companies in the second bituminous inspection district of Pennsylvania, C. B. Ross, mine inspector for the district. All of these operations are situated in Westmoreland County.

Name of Operator	Tons of Coal	Tons of Coke
Jamison Coal & Coke Co.	3,280,250	553,340
Latrobe-Connellsville Coal & Coke Co.	838,036	250,103
Keystone Coal & Coke Co.	610,559	226,434
Hostetter-Connellsville Coke Co.	579,621	366,847
H. C. Frick Coke Co.	521,391	328,706
New Alexandria Coke Co.	434,844	......
Latrobe Coal Co.	318,454	70,855
The Shenango Furnace Co.	317,783	29,501
Atantic Crushed Coke Co.	317,537	30,767
Loyalhanna Coal & Coke Co.	225,091	......
Donohoe Coke Co.	205,019	82,147
Westmoreland-Connellsville Coal & Coke Co.	172,336	101,580
Ligonier Coal Co.	153,182	......
Ligonier Diamond Coal & Coke Co.	145,044	......
Greensburg-Connellsville Coal & Coke Co.	124,802	23,250
Bessemer Coke Co.	102,965	......
Saint Clair Coal Co.	96,185	......
Unity Coal Co.	75,582	......
Unity-Connellsville Coke Co.	67,270	45,284
Mount Pleasant Coke Co.	61,203	38,838
E. A. Humphries Coal & Coke Co.	47,017	26,649
Ramsey Coal Co., Inc.	43,386	......
South Ligonier Coal Co.	37,727	......
Westmoreland Coal & Coke Co.	21,424	......
South Fayette Coke Co.	17,000	10,352
Fort Ligonier Coal Co.	16,591	......
Marietta-Connellsville Coke Co.	9,462	5,516
W. E. Brown & Co.	8,405	......
Connellsville Coke & Fuel Co.	3,582	......
Whyel Coke Co	3,100	......
Totals	8,854,848	2,190,169

The Wendell Continuous Centrifugal Drier

By E. A. Holbrook*

SYNOPSIS—Early history of the development of the continuous centrifugal drier invented by Carl A. Wendell. The difficulties to be overcome in drying the washed coal as it comes in a continuous supply from the washing machines. A detailed description of the drier and its continuous operation, together with the tabulated results of three of these machines installed at the Woodward Iron Co.'s washery at Woodward, Ala.

Prominent among recent improvements in coal-washing machinery is the Wendell Continuous Centrifugal Drier, now in operation at the new coal washery of the Woodward Iron Co., Woodward, Ala. Its unique principle and possible field of application demand the close attention of all engineers interested in centrifugal drying.

The inventor of this machine, Carl A. Wendell, is experimental engineer for the Joliet works of the Illinois Steel Co. Several years ago, while engaged in testing work at the company's coal washery at Joliet, Ill., Mr. Wendell encountered the universal difficulty of economically drying the finer sizes of washed coals—an operation that is a prerequisite to successful coking. After four years of work and the expenditure of many thousands of dollars by the people interested, a satisfactory continuous centrifugal drier was perfected and given exhaustive tests at the coal washery mentioned above. Last summer a battery of three of these driers was installed at the Woodward washery. Their continuous operation, night and day, for four months has since demonstrated their ability to stand up under the hard knocks of a large commercial washery and in the hands of the usual washery labor.

General Considerations

In washing coal, the finer the preliminary crushing to which it is subjected the more perfectly will the coal and fine refuse contained be disengaged from each other, and the more perfect will be their separation in the coal-washing machines. This is especially true of the finer flakes of pyrite, the removal of which is usually so necessary before a coal is fit to be made into metallurgical coke. Furthermore, since modern practice in coke making often demands that 80 per cent. of the coal shall pass through a 1/8-in.-mesh sieve, it would seem that fine crushing and washing would produce an ideal product for coke making.

Coal washing is a process involving submergence in water, and only those who have tried to drain and save the finer sizes of the washed coal, say the sizes below 5/8 in. in diameter, realize the outlay and loss of time involved in the usual arrangement of draining bins. An enumeration of these difficulties would disclose the weaknesses and failure of most coal-washing plants, in respect to the finer sizes of coal. The ridding of the coal of its moisture, by means of a centrifugal drier, is not in itself a new idea. Several forms of centrifugal dewaterers, among which may be mentioned the English "Wilton" machines, have been applied to drying washed coal, but have met with the following difficulties:

1. The tonnage to be handled is far greater than that used in the usual centrifugal-drying processes. 2. These older driers had to be loaded, then started, brought up to full speed and finally stopped before their content could be discharged. This involved delay, and as the weight of a large centrifugal drier and its load was considerable, the horsepower expended in bringing the machines up to full speed at each charge was excessive. 3. This intermittent action interfered seriously with the feeding of the machine, as the washer preceding it is continuous in its action and, consequently, a storage had to be provided between the washer and the intermittent drier. 4. All previous attempts to make a drier continuous have involved the introduction of a stationary or differential plow or scraper inside the screen of the machine. As the coal lying against this screen is moving with a peripheral speed of over 6000 ft. per min., with the consequent great centrifugal force, such a scraper will either pulverize the coal and become quickly worn and broken itself, or it will tear and ruin the containing screen.

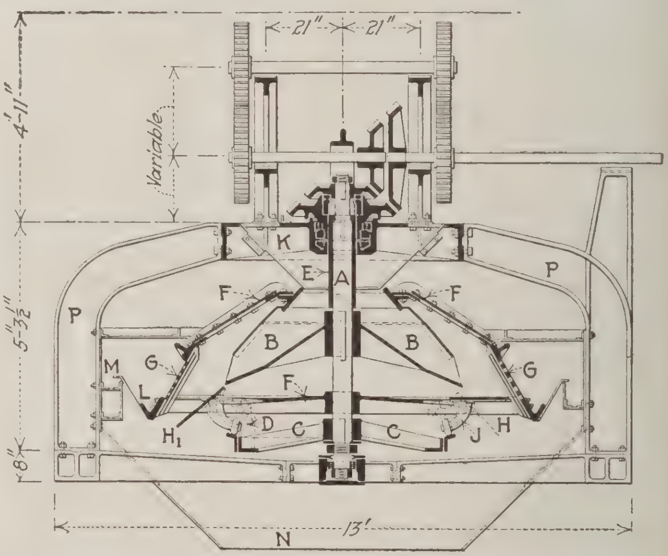

Fig. 1. Sectional Diagram of the Wendell Centrifugal Drier

Description of the Drier

The sectional diagram, Fig. 1, has been carefully prepared to show the essential parts only of the machine. The following detailed description of principle will refer to this figure, which is an elevation of which the plan would be circular. Fig. 2 is a general view showing the Wendell drier and frame, with all gears inclosed, for safety, as installed in the Woodward washery.

The following illustration will assist the mind to better understand the principle of the drier. Given a railroad train moving at 75 mi. per hr., any attempt to get aboard a train moving at that speed would naturally result in disaster. If, however, one was on another train, running parallel with the first and moving at a rate of either 74 or 76 mi. per hr.—a difference of only one mile an hour—no difficulty would be experienced in passing from one train to the other. This is the general basic principle on which is based the method of charging and discharging the drier while in rapid rotation: namely, differential speeds.

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To the central shaft *A* (Fig. 1), which revolves at, say 249 r.p.m., are attached the two feed-spouts *BB* and the cam frame *C* with its cam *D*. Outside of this shaft revolves the hollow retainer shaft *E* to which is attached the retainer *F*, the screens *G* and the discharge gates *H* and H_1. The speed of the outer shaft *E* is 250 r.p.m., or 1 r.p.m. faster than the inner shaft *A*. The gates *H* and H_1 are 16 in number, four in each quadrant. Each gate is attached to a tappet *J* and, normally, stays closed, as at *H*. When, however, the cam *D*, which is moving at a speed 1 r.p.m. less than the gates, is overtaken by a tappet *J* the gate is opened gently and without shock, as at H_1, letting out the dried coal contained in this section. When the cam has passed, the gate returns to its closed position, as at *H*, and the section is then ready to receive another charge of coal from the feed-spouts *BB*, the discharge from which is continuous. The position of the feed-spout on the shaft *A* is slightly ahead of the cam *D*, thus giving time for the gate *H* to close before the section will receive a new load of coal from the retainer.

From the above description it will be seen that the course of the coal is as follows: The coal, fed wet into the hopper *K*, falls into the revolving feed-spout *B*, from where it is thrown against the screen *G*. For a minute only, it stays in this section, revolving at a peripheral speed of over 6000 ft. per min. Any contained water is, of course, thrown through the screen into the water collector *L*, from which it is lifted by centrifugal force into the water sluice *M*. Each minute, as before stated, the cam overtakes and opens the gate of the compartment. Discharge takes place immediately, the outward slope of the screen *G* giving a downward component to the centrifugal force, which aids gravity in discharging the coal which has been dried and falls through the conical spout *N*, into a car or belt below. A heavy cast-steel frame *P* completes the necessary parts of the drier.

Fig. 3 shows the retainer *F* separated and removed from the outer shell of the machine and exposes to view the screen-plates *G* mentioned above. In the machines now in commercial use, these plates are double, made up of an outer ¼-in. steel plate, with ⅝-in. perforations on ⅞-in. centers, which act as a support for an inner plate of monel metal with $\frac{1}{16}$-in. perforations on ⅛-in. to ¼-in. centers. Of course, any other sizes might be used. Mr. Wendell has found that monel metal meets all the requirements better than any other that has been so far tried, it being noncorrosive and standing up well under the service to which it is subjected.

ENGINEERING DATA CONCERNING THE DRIER

The original design of the Wendell drier was estimated to handle 30 tons of coal per hour. The new design installed in Alabama has proven able to handle 50 to 60 tons of coal per hour continuously. Run at a speed of 250 and 249 r.p.m., the driers received washed coal from a ⅝-in. round-hole screen which contained from 30 to 40 per cent. of water. This mechanical moisture was reduced by the drier to 6 per cent. Wishing to have about 8 per cent. mechanical moisture in the coal charged to the coke ovens, the Woodward company decreased the speed of the drier to 215 r.p.m., and is now averaging the desired moisture. About 18 hp. is used per drier.

The weight of the revolving parts and the thrust of the vertical shaft are taken by four sets of ball bearings, which, being of the finest imported steel, secure the low, rolling friction that is necessary with heavy, high-speed machinery. As one shaft revolves in the same direction and at a speed of only 1 r.p.m. different from that of the other, practically all the wear usual in such cases is obviated.

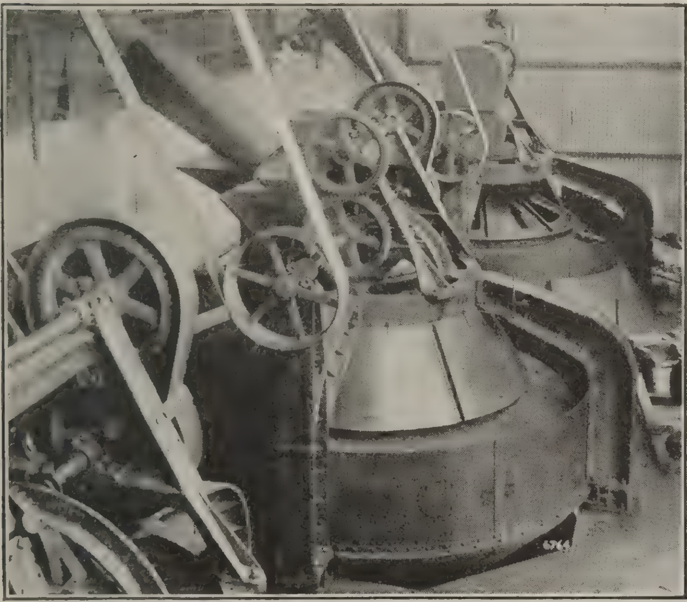

FIG. 2. WENDELL CONTINUOUS DRIERS, WOODWARD WASHERY, WOODWARD, ALA.

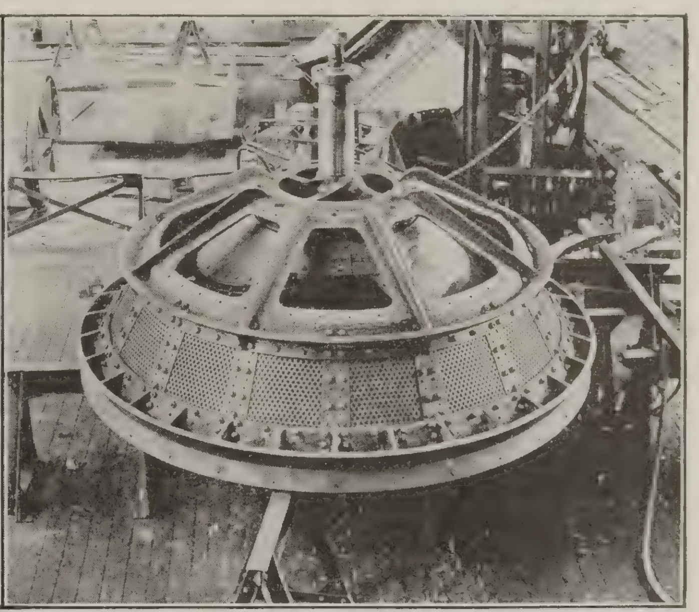

FIG. 3. DRIER WITH OUTER SHELL REMOVED, SHOWING RETAINER AND SCREEN PLATES

The drier may be fed directly from the washer or, by dewatering-bucket elevators, from recovery tanks. In spite of the larger amount of water in the direct feed, no greater amount of sludge was found in the water coming from the drier, under these conditions. It is probable that, as soon as the centrifugal action begins in the drier, the finer coal fills the interstices between the larger pieces, thus acting as a screen in itself.

BREAKAGE, LOSSES, ETC.

The following tests show the total breakage in the washery and drier combined, as now being made at the Woodward plant:

	Through ⅝-In. Round-Hole Screen, over ¼-In. Round-Hole Screen, Per Cent.	Through ¼-In. over ⅛-In. Per Cent.	Through ⅛-In. Per Cent.	R.p.m. of Drier
Raw coal to washery.....	27.5	32.3	40.2	
Washed coal, No. 1 drier..	15.2	34.1	50.7	227
Washed coal, No. 2 drier..	18.1	40.7	41.2	214
Washed coal, No. 3 drier..	19.6	43.1	37.2	204
Average of three driers...	17.6	39.3	43.0	215

It is obvious that both the breakage and the resultant moisture content may be changed by: 1. Changing the speed of the machine as a whole, thus increasing or decreasing the centrifugal force directly as the square of the speed. 2. Changing the gear ratio between the inner and outer shafts, thus changing the period of time that a charge is contained in the drier. 3. By reducing the capacity of a given machine, thereby reducing the thickness of the layer of coal on the screen plates through which water is to be driven.

To the engineering profession, in general, an inspection of the drier suggests, with modifications to suit different requirements, a wide field of application. As driers in sugar refineries, in sewage-disposal plants, in the manufacture of ammonium sulphate or even in the treatment of sands and slimes in an ore-dressing plant, such a machine has interesting possibilities.

In conclusion, the author wishes to thank Mr. Wendell for allowing the inspection of drawings and of the original machine; and also the Link-Belt Co. of Philadelphia and Chicago, by whom the machines are manufactured, for the photographs used.

Chicago Coal Dealers Visit New River Field

About fifty of the most prominent retail coal dealers of Chicago, and a few from other points in the Middle West, were guests of the C. & O. Ry. and the sales agencies and operators of the New River field last week. Four days were spent inspecting the mines in this field, and the visitors were enthused over the section, the quality of the coal and the care exercised in mining and handling it.

The party, which left Chicago on Sunday, was entertained on a special train throughout the week. They were joined in this section by a number of local men, who accompanied them throughout the trip. The itinerary included Loop Creek, Piney Branch, Winding Gulf, and other points on the C. & O. lines in the New River field.

CHICAGO COAL DEALERS AT ECCLES, W. VA.

On Tuesday evening a smoker was tendered them at the Dun Glen Hotel at Thurmond, which proved a most enjoyable affair. In addition to a number of talks and an evening of good fellowship, they were entertained by the Pork Chops Orchestra of Cincinnati.

This trip, in which business and pleasure were combined, was planned and managed throughout by H. M. Hall, general agent of the C. & O. at Chicago. The move met with the coöperation of the New River operators and sales agencies, who shared in the expense of the week's entertainment for the entire party. Several other prominent officials of the C. & O. also accompanied them.

Altogether the trip was a most pleasing one to the visitors and they were loud in their praise of the splendid entertainment accorded them and of the wonderful coal section they inspected.

Autogenous Welding by the Thermit Process

By Frank H. Kneeland

SYNOPSIS—When powdered aluminum is mixed with iron oxide and a portion of the mixture heated to a certain temperature, a self-propagating reaction is started whereby the oxygen leaves the iron and unites with the aluminum. This chemical transfer of the oxygen evolves intense heat and results in the formation of highly heated liquid low-carbon steel which may be employed for autogenous welding.

The chemical element aluminum has long been known to exist, being the most widely distributed metal in nature. In the natural state, however, aluminum is never found free, but always in combination with oxygen. The affinity between these two elements is so strong that, although aluminum has long been known to chemists, it was not until the invention of the electric furnace that this metal has been produced in anything like commercial quantities.

But aluminum in the form of kitchen utensils, electric transmission cables, etc., is by no means the only state in which it may be made to serve the purpose of man. Its strong affinity for oxygen when in a heated condition may be taken advantage of with results which are at once highly spectacular and utilitarian.

When finely divided aluminum is mixed in the proper proportions with a metallic oxide—barium, molybdenum, copper, iron—and the mixture heated to a certain temperature, a chemical reaction takes place accompanied by the evolution of heat, and the oxygen leaves the other metal, uniting with the aluminum. The resultant mass is thus composed of a liquid slag (aluminum oxide) and an almost pure metal in a molten state and well above the melting temperature.

For many years chemists knew of this reaction, and many attempts were made to utilize it for the reduction of various metals from their oxides. The greatest difficulty was encountered, however, in governing the reaction, since if this were started by heating the entire mass, its rapidity was practically equivalent to an explosion.

Dr. Hans Goldschmidt, while attempting to produce pure metals to be used in the alloying of steel for the famous German steel-making firm of Krupp, discovered that if the reaction were started only in a small portion of the mass it was not only self-propagating and would spread to all portions of the mixture, but that it was easily controlled. The first experiments of this nature were conducted with chromium oxide, resulting in the production of practically pure metallic chromium. Later experiments were made on other oxides, sulphides and chlorides and manganese, ferrochromium, molybdenum, ferrotitanium and other pure metals, and alloys were produced.

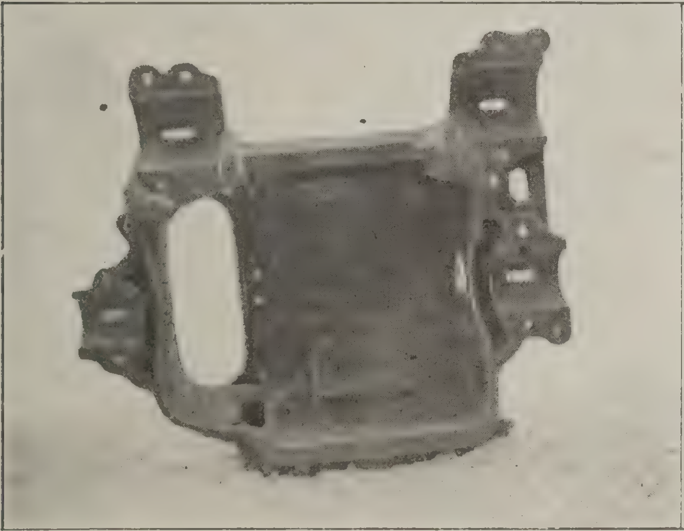

Fig. 1. Thermit Welds on Electric Motor Case

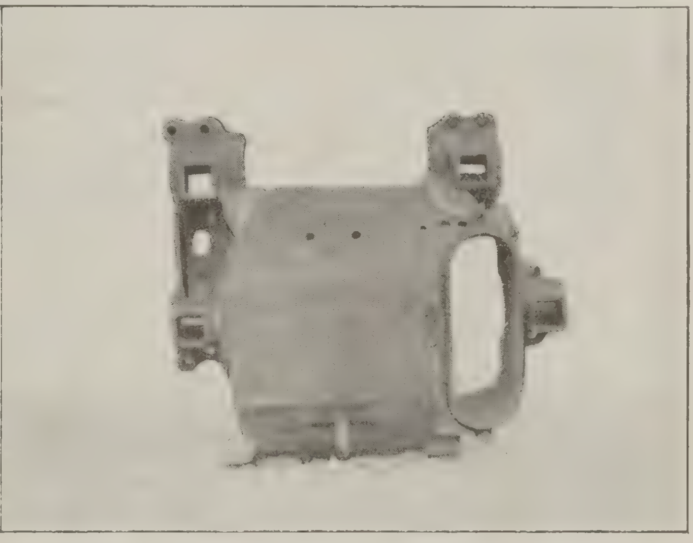

Fig. 2. Another View of the Same Motor Case

The Experiments with Iron

Among other substances with which Dr. Goldschmidt experimented was the oxide of iron. It was here found, however, that the reaction not only produced a very pure low-carbon steel, but that the heat evolved was extremely intense. The temperature attained was so high that it could not be measured by pyrometer, but has been calculated theoretically at 4881° F.

Dr. Goldschmidt at once decided that this extreme heat, produced quickly and easily and resulting in highly heated molten steel, could be advantageously employed in the arts and sciences. The mixture of powdered aluminum and iron oxide was named "thermit," and since its commercial introduction in 1901 has been steadily growing in favor for certain purposes, especially for heavy autogenous welds in steel or iron, cast or wrought.

It is needless to say, however, that like many another process spectacular in application and results, thermit has been the subject of much popular misconception and has been often credited, even by those who should know better, with powers and accomplishments which it does not in reality possess. The ability of a handful of this powder to melt a hole in a steel safe, for instance, is absurd.

On the other hand, the rapidity and violence of the thermit reaction are nothing short of spectacular and have called forth from various observers some extremely vivid expressions in lucid English.

After witnessing the welding of a 14-in. shaft for a rock crusher at the plant of the Goldschmidt Thermit Co. in Jersey City, one of the editors of the *Scientific American* described the reaction in the Nov. 18, 1911, issue as follows:

> After adding a teaspoonful of ignition powder (barium peroxide and aluminum flake) to each hopper, the reaction is started by introducing a red-hot iron bolt. A flash, a glare, a hiss and sputter, and clouds of smoke envelop all, as the elements wrestle in fierce combat for union with the coveted oxygen; the greater affinity of the aluminum quickly asserts itself, and after a 40-sec. round the iron is vanquished, thrown out of combination and enslaved in the service of man.

A TYPICAL APPLICATION

The application of thermit to welding is extremely simple. Let us assume, for instance, that a broken shaft, say 8 in. in diameter, is to be repaired. If this shaft is accessible for a distance of about 12 in. on all sides of the fracture, there is in certain cases no necessity of removing it from its bearings. In any case by means of drilling, chipping or hacksawing, the metal upon one side of the break is cut away for a distance of 1 or 2 in. so as to allow the thermit steel ample space to flow readily between the two parts and amalgamate with them.

The two portions of the shaft are next carefully aligned and secured in position, suitable allowance being made for the contraction of the metal forming the weld upon cooling. Wax is next forced between the ends of the two pieces of the shaft and built up in the form of a collar around the entire circumference. This wax forms the pattern for the weld and should be constructed accordingly. A mold-box, or flask, is next built around the shaft where the weld is to be made, leaving a clear distance of 10 to 12 in. on all sides.

The mold proper is now made and rammed. A mixture of fire clay and silica sand is used for the body of the mold, while brickdust is added to this mixture for the portion immediately surrounding the wax pattern. A pouring gate, a heating gate and a riser must also be provided, the two former passages connecting to the bottom of the wax pattern, while the riser of course leads upward from its highest point. The heating gate must slant downward from the pattern and out through an opening in the mold-box. The pouring gate may extend either vertically or on a slant upward through the mold. These passages, as well as the riser, are made in the ordinary manner by means of removable wooden patterns.

When the mold is complete and the gate and riser patterns are withdrawn, a gasoline heater is applied through the heating gate. This first melts out the wax pattern and then heats the inside of the mold and the ends of the shaft. The action of this torch should be continued until the parts to be welded have attained a bright red color.

In the meantime the crucible in which the thermit reaction takes place is made ready. This crucible is conical in form, lined with magnesia tar and provided with a tapping hole in the bottom. The latter is plugged in such a manner that a slight blow or push upward on a pin extending down through the hole will release the thermit steel, which will then flow into the pouring gate.

The proper amount of thermit to use may be found by multiplying the weight of the wax employed by 30, but for most classes of work tables of dimensions and weights of thermit have been compiled.

After the pieces to be welded have been made sufficiently hot the torch is withdrawn and the heating gate plugged with brickdust, sand and clay. The thermit reaction is next started in the crucible by means of a small amount of ignition powder, which is in reality barium thermit—a mixture of barium peroxide and powdered aluminum. The reaction of this powder, which may be started with a match, develops enough heat to start the reaction of the steel thermit.

The chemical reaction which takes place in the powdered thermit is represented by the following equation:

$$Fe_2O_3 + 2\ Al + heat = Al_2O_3 + 2\ Fe + heat$$

or

$$3\ Fe_3O_4 + 8\ Al + heat = 4\ Al_2O_3 + 9\ Fe + heat.$$

When the reaction is complete the tapping gate in the crucible is opened, and the highly superheated liquid steel is allowed to flow into the mold. Because of the cutting away of the broken ends of the shaft and the reinforcing collar originally formed in the wax pattern, the thermit steel entirely surrounds the ends to be welded; and possessing several hundred degrees of superheat, it actually melts and fuses with the original metal of the shaft, making a perfect and homogeneous weld.

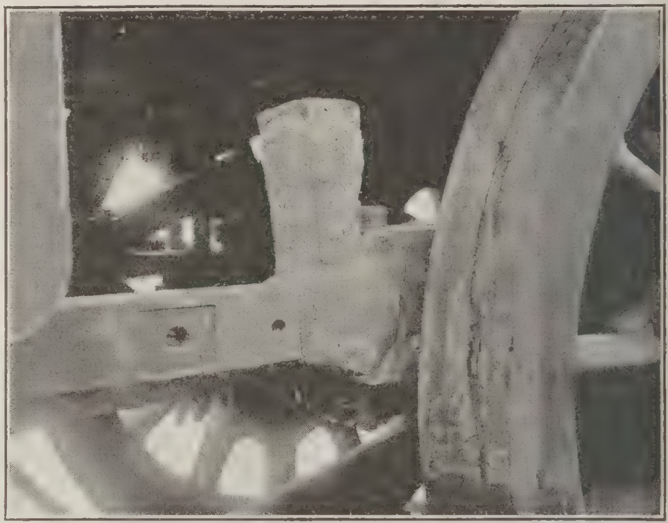

FIG. 3. WELD IN FRAME OF KELLYS CREEK COLLIERY CO.'S LOCOMOTIVE NO. 2

THE MOLD SHOULD BE LEFT IN PLACE FOR SOME TIME

To prevent chilling and consequent undue hardening of the steel, the mold should be left in place for several hours, mold and weld gradually cooling down together, thus tending to anneal the metal. When sufficiently cold, say in 12 hr., the mold may be knocked to pieces, the weld in the shaft cleaned by rapping or with a scratch brush, the gates and riser chipped or drilled off and the shaft put to work again.

Shafts are, however, by no means the only machine parts that may be repaired by the aid of thermit. Broken spokes in gears or flywheels may be easily mended; broken teeth in gearwheels may be recast and finished up either by hand or in a shaper; broken bedplates, frames, rocker-arms, connecting-rods, cylinder heads, the end or side plates of steam or electric locomotives, motor casings, locomotive drive wheels, pump casings or frames, etc., may be repaired with equal facility. A long crack in cast-iron is perhaps the most difficult repair to make by this method, and one which is seldom, if ever, accomplished with success. This is due to the fact that thermit steel possesses different physical qualities from cast-iron and has a greater coefficient of expansion. It consequently shrinks more than the iron in cooling, and since the crushing strength of the iron is greater than the tensile strength of the steel, the latter tends to pull apart. This action usually results in the formation of small cracks extending transversely across the weld. Repairs of this kind, especially if they must be water- or air-tight, can usually be better accomplished by some other means.

THERMIT IN PIPE WELDING

Another use for thermit, or rather for the intense heat which it generates, has been recently developed in the butt or end welding of pipe to form water, air, steam or ammonia lines. Here the ends of the pipe are faced off square and placed in a special mold. The thermit reaction is started in a flat-bottomed crucible, and when complete, both slag and metal are poured into the special mold around the pipe. The slag floating on top of the steel of course enters the mold first and thinly glazes both pipe and mold. The steel following later does not come into actual contact with either, but the heat developed is such that when the ends of the pipe are forced together under the action of suitable drawbars a perfect butt weld is secured. On cooling, the mold may be removed and the slag knocked off. A pipe line thus built up is, when completed, practically one continuous length of pipe and is correspondingly free from leaks.

Although most lines of industry, particularly the railroads of the land, have long since adopted the use of thermit in many classes of repair work, but few mining companies have seen fit to use this method of repair. Thermit is used at present, however, by several of the larger companies, both in West Virginia and Pennsylvania. Some of these firms have employed it for several years and are annually saving many hundreds of dollars in repairing broken parts that otherwise would be consigned to the scrap heap.

As all mining men know, the cost of repairing a breakdown in mining equipment can by no means be measured by the expense of repair parts. The real measure of the cost is the loss of output. The welding of a broken locomotive frame, a motor case, the main frame or bull wheel of a coal cutter not only renders useful at small expense material that would otherwise be lost, but also, since it can be accomplished in a few hours or at most in a few days, keeps equipment in operation which would otherwise be idle.

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The SUCCESS Number of "Coal Age" on Apr. 3 will be the most practical number of this paper so far issued. The reason is that every story in this number describing a method or a machine must cover an instance of actual operation at a coal mine. These are the facts we are looking for, and it is such data as these that come in handy for application in our own daily work. Several of our readers are sending in little stories covering the life and work of men with whom they are acquainted or associated. All of these stories are interesting and tell how the subject of the sketch fought his winning fight in life. Have you sent in something yet? Do it today.

Extracts from a Superintendent's Diary

We have in our camp one man at least who is well versed in the science of political economy, assuming that his own estimate of his learning is correct. His discipleship might be described as a composite influence of Ricardo, Adam Smith, Mill, Marx and others, and he can quote from any of them, impromptu and at great length whenever occasion demands. It is more than possible that at times he takes liberties, innocently, no doubt, with the principles of his Patron Saints and gives them credit for ideas which they would not have been able to identify, but as none of his hearers are the wiser, and as the effect of his remarks, as concerns his audience, is always satisfactory, his accuracy is never questioned.

Like most self-appointed leaders of the downtrodden masses, he has a way of working himself up to the haranguing point on very slight provocation and with the first manifestation of approval from his audience, he braces up preparatory to taking the weight of the world upon his shoulders.

In reading any of the great works on political economy, sentences are occasionally encountered that seem to suggest rather faintly that the author felt that some of the evils of society could be remedied if his ideas might be intelligently carried out. It is not strange then that our economist, in absorbing the thoughts of all of the economists, should feel confident of his ability to lead his comrades out of the capitalistic mire and reform modern industry.

As an introduction for all of his set speeches he starts off with a statement alleging that capitalistic control over labor dates back several centuries to the time when the English owners of small farms allowed themselves to be deprived of their land by laws secretly demanded by the owners of the large town factories that were just beginning to spring up. Then he goes on to explain that changing conditions compelled many of those small land owners to abandon their farms, law or no law, but even they might have been able to regain their lands in time had it not been for the secret influence of the capitalists on the lawmakers. Capitalists never fight in the open, if he is to be believed.

Today I received a letter from our general manager in which he stated that for some time he has been receiving anonymous letters, sent to him by someone in our camp, complaining about many things in general but in particular about me and my efforts to discourage the public celebration of some holidays. The manager went on to say that at first he rather enjoyed the letters but now they were becoming annoying and he requested me to locate the writer if possible and deal with him as I saw fit. One of the anonymous letters was inclosed and I recognized the authorship at once.

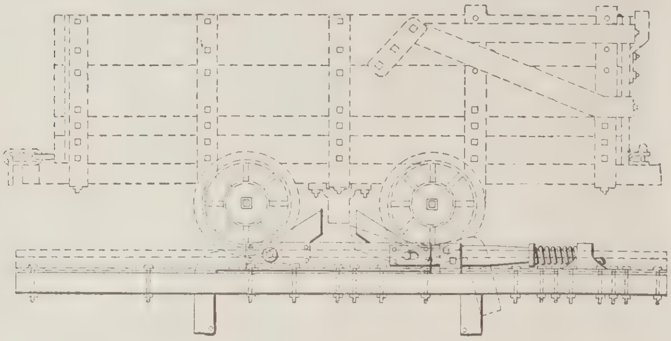
It happened that its author, the camp's political economist, the decrier of capitalistic duplicity, came into my office a few moments later to borrow a certain volume on taxation. I had the book in one of the drawers of my desk and just before passing it over to my visitor I picked up the letter from our manager and slipped it in between some of the pages. As he was leaving I remarked that I hoped that after he finished reading everything that he found in the book he would come back and give me his views as to an honorable way to deal with people who would not fight in the open.

A New Car-Stop and Shock Absorber

A device of interest to coal operators has just been placed on the market. It is the invention of Edwin W. Baum, of Nokomis, Ill., and is patented. The device is used as a car-stop and shock-absorber.

There has always been a loss of time connected with the caging of coal cars, due to the fact that cages heretofore have been constructed in a way that compelled the car being brought practically to a standstill before the signal to hoist was given.

The sketch shows the device installed on a cage platform in position to stop car and absorb shock of the same. This overcomes any and all loss of time in the caging of coal cars, as there is no limit to the speed with which they may be caged.



THE CAR STOP IN POSITION ON THE CAGE

This invention has been in daily use at the Nokomis Coal Co.'s mine, at Nokomis, Ill., since Sept. 19, 1914, and has been thoroughly tested with loaded cars weighing 7 tons which were released from automatic cagers located on a 4 per cent. grade.

This device overcomes all the weak points found in many other styles of cages as regards speed and safety.

The following is what the inventor claims for his invention: This device receives and absorbs the shock of the loaded or empty mine car when run on the cage, reducing to a minimum the wear and strain on cages, also preventing the breaking of lugs on the bottom of mine cars, and absorbing the shock of the rebound of the car when the cage leaves the dump. It requires practically no attention after once installed, and by reducing the number of daily wrecks, effects a considerable saving for the operating company.

Mineral Exhibit at San Francisco

To illustrate the development of the mineral resources of the United States the Geological Survey exhibit at the Panama-Pacific International Exposition includes a graphic representation of the output of the various mineral products of the country, based on the production per capita during the centennial year, 1876, and at the present time. Bituminous coal is represented by a block of coal weighing 1600 lb., the per capita production in 1876, and by another block weighing 5 tons (10,000 lb.), the per capita output in 1913. The anthracite blocks, on the other hand, indicate relatively small gain, from 1140 to 1880 pounds.

The per capita production of coke has increased from 134 lb. in 1876 to 700 lb. in 1913. At the earlier period no other than beehive coke was manufactured in the United States, but since then the interesting feature of coke manufacture has been the development of the retort oven, by which valuable constituents of the coal other than coke are recovered. The exhibit at San Francisco shows the quantity of coal consumed in retort ovens in this country in 1913, the quantity of coke produced from it, and the quantity of coal tar, benzol, and sulphate of ammonia recovered as byproducts. The quantity of gas recovered and utilized is also properly shown.

Rockefeller Secures Interest in Consolidation Coal Co.

It was recently here stated that John D. Rockefeller had acquired a substantial interest in Consolidation Coal Co., with a view to diverting some of its profitable coal traffic to Western Maryland Ry., in which Mr. Rockefeller is also heavily interested.

It is confirmed that he purchased, or what is its equivalent, underwrote, the issue of $7,000,000 7% two-year convertible debenture bonds, principal and interest of which can be converted into stock when the bonds fall due. This will give Mr. Rockefeller $8,000,000 Consolidation Coal stock at expiration of two years, in addition to which he has a two years' option on certain large blocks of other stock owned and held by interests close to the management.

Exercise of conversion privilege on debenture bonds and of stock option at end of two years will place Mr. Rockefeller in control of the management; and although it can be truthfully stated by officials that no stock has changed hands, and no immediate changes in board or officers will occur, it is also confirmed that Mr. Rockefeller is exercising enough influence at this time to divert 5,000,000 tons of Consolidation Coal traffic to Western Maryland, and that every preparation is being made by Western Maryland to handle this increased business.

While Senator Watson pointed out that many of the Consolidation's properties were not tapped by Western Maryland, and that the Somerset properties in Pennsylvania were 40 miles from the Western Maryland lines, it was also pointed out here that this traffic could be secured eventually by extension of Western Maryland lines into the Somerset fields, as well as others. Only last week Pres. Gray of Western Maryland, with a party of engineers, made a personal reconnaissance into the Somerset field, and is reported highly pleased with results of the trip.

Immediate accession of Consolidation Coal traffic for Western Maryland will, however, come from the company's properties in Maryland and West Virginia, at present accessible to Western Maryland. Evidences of this new traffic are expected to begin to show in Western Maryland's earnings before the close of this month. Fourteen million gross and five million net is the talk for next year.—"Boston News Bureau."

Proposed Combine of Indiana-Illinois Operators

The most important move to consolidate coal interests in America has just been started in Chicago. If the negotiations are carried through as now planned, the final organization will amalgamate the bituminous coal interests of Indiana and Illinois. It is estimated that more than $700,000,000 will be involved in the deal. Represented in the proposed combine are the Rock Island interests, the Peabody companies, the Miami Coal Co., the Bogle Coal Mining Co., the Dering Coal Co., also the Clinton, Vandalia, Monon, Green Valley, Jackson Hill, Schirke, New Central, Sugar Valley, Coal Bluff, Clove Valley, United Fourth Vein and a number of other companies. Active in perfecting the plans are W. S. Bogle, Carl Scholz and John T. Connery.

The general idea of the combine is to form a merger whereby the coal producers will be afforded an improved system of selling. Most careful attention is being paid to all the legal phases of the matter, as those interested are determined that whatever final plans are developed shall be within the law and meet with the approval of federal statutes.

The reasons for this merger will be published in "Coal Age" next week.

The Labor Situation

SYNOPSIS—Not while the union has money will the eastern Ohio strike end. The union and the miners are united in that determination. The Gallagher amendment of the Ohio Assembly will practically wipe out the Green antiscreen bill. The strike near Fairmont, W. Va., ends as suddenly as it began. The Rockefeller Foundation may provide for the wants of the gunmen of the union in Trinidad, Colo.

There are only two ways to end the Ohio strike within a reasonable time; either the operators or the miners must be compelled to make concessions. Neither side will willingly concede anything, and discussion is useless. The operators show their sense of right dealing by agreeing to arbitrate without reservations as to the arbitrators. The miners' representatives try to appear equally well disposed. They have deceived people several times with fair words relative to arbitration and discussion, but when any definite plan is broached, the representatives of the miners are unalterably opposed to it.

Another Conference Fails

As we stated last week, the negotiations between the operators and the miners' representatives and Secretary of Labor Wilson failed to bring about a settlement. On Mar. 3 the union leaders returned to Ohio, for it developed that they had no power to act on a settlement and their parleying was merely an attempt to give the public the idea that they were open for argument.

When they returned to Ohio they called a conference and the miners showed again, as they have frequently shown before, that they are unalterably for 47c. per ton of machine-mined run-of-mine coal. It is useless for the operators to deny this fact, for it is clearly established. The officials of the union called a meeting at Bridgeport, Ohio, on Mar. 5. About a thousand miners appeared to attend the meeting and it was evident then that there was no hall large enough for such a crowd. So the meeting adjourned to the Auditorium in Wheeling, W. Va. A resolution was passed criticizing Senators Howard and Moore, of the counties of Harrison and Jefferson, for their vote in favor of the Gallagher amendment to the Green antiscreen law.

Albasin Voices the Popular Demand

C. J. Albasin, president of the subdistrict on strike, made the following statement:

> We are going to stick for 47c., immaterial of what the benefits might be. We have been able to pull through the winter and can certainly do so in warm weather. We condemn Senators Moore and Howard for supporting the Gallagher bill, no matter what the legislature may do with the measure. Such a law will only complicate matters. This strike cannot be settled by legislation. We have worked for many years to have a mine-run law passed, and now the senators from our two big mining counties are trying to beat the miners. There will be no compromise other than on the 47c. basis.

The reader will please note the words "immaterial of what the benefits might be." There are distinct benefits to be gained by a reasonable wage in Ohio with its assurances of steady work. A higher wage than that formerly obtaining would mean a larger measure of idleness than ever before in eastern Ohio.

The Gallagher Amendment Is Popular

Whatever the miners and the union may think of the Green anti-screen law, the state senate of Ohio is almost unanimously disposed to give the miners and operators a chance to contract without reference to its provisions. The Gallagher amendment, passed by the state senate on Mar. 4, permits miners and operators to negotiate wage contracts on any basis they see fit and to disregard the mine-run provisions of the law. Where, however, they fail to agree the only basis on which a scale can be made is the mine-run plan.

The law thus remains, but it is for all practical purposes a dead letter when the amendment is duly signed. The emergency clause providing that the amendment, when passed by the assembly and signed by the governor, shall be immediately effective, was adopted by a vote of 24 to 8. Otherwise a referendum vote would have been necessary and a final decision would have been delayed till after the November election.

The discussion which preceded the vote could hardly be called a debate, as no strong opposition to the amendment developed. It is believed that the House of Representatives will adopt the amendment and that it may solve the situation in eastern Ohio. Many operators favor its passage, especially in the eastern Ohio district. Party lines were broken in the vote of the senate; 15 Republicans and 8 Democrats voted for it, and 4 Republicans and 5 Democrats against it. The leaders of both parties voted for the amendment.

Ohio to Oust West Virginia Coal

As part of a campaign to increase the use of Ohio coal, Chairman Whitacre of the house committee on labor has undertaken to father a bill compelling all public institutions in the state to use Ohio coal exclusively. It is alleged that the Ohio University and the Athens State Hospital, both located at Athens, Ohio, almost within a stone's throw of coal mines, have been using West Virginia fuel.

Governor Willis, in a recent speech at Cleveland, Ohio, declared that business was suffering from excessive regulation and said he believed that new legislation should not be passed to further restrict the operations of commerce. He is thus in declared lack of sympathy with such legislation to regulate coal freight rates as has been introduced by Senator Vorheis, of Guernsey County, but it is believed that in this particular matter his opposition to business regulation will be overborne by the force of the arguments favoring low freight rates for coal. The railroad men say that the rates named are too low to permit the railroads to make a profit.

No Allowance for Women and Children

The miners have been receiving $3 a week, 50c. additional where married and 25c. for each child. These additional payments have been stopped, but on Mar. 6 the matter was brought up at the Wheeling, W. Va., meeting and was satisfactorily adjusted. The men were notified at the meeting that the meager strike pay they were receiving might shortly be reduced, but the miners are in no relenting mood and voted to continue the strike "till death."

Arthur J. Morgan, owner of the Edgehill coal mine, north of Bellaire, Ohio, announced on Mar. 7 that he would accept the union scale of 47c. for machine-mined run-of-mine coal. The A. J. Morgan Coal Co. employs at the Edgehill mine about 100 men. It is easy to see that his secession from the operators' ranks is of little importance.

The Strike of the Jamison Men Ends

The strike at the Jamison Coal & Coke Co.'s mines in Farmington, W. Va., is drawing to an end. On Mar. 1 about 325 men returned to work at mines Nos. 7, 8 and 9. On Mar. 2 the number at work increased to 755. Over 100 men were at one time locked in jail for participation in the riots in which Constable W. R. Riggs lost his life.

Negotiations are still proceeding between the subscale committee of the United Mine Workers of America and the New River coal operators at Cincinnati, Ohio. The contract between the parties expires on Mar. 31, and the miners ask for a 10 per cent. increase, the check-off and the short ton.

Poverty in Colorado

The strike in Colorado has left much poverty in its train. The companies operating in that state had nearly all the men they needed when the strike came to an end. The Colorado Fuel & Iron Co. employed some of the strikers, but did not have places for the bulk of the men. Joe Rizzi, of Trinidad, wrote to John D. Rockefeller, Jr., appealing for relief for needy miners. Mr. Rockefeller replied to the chairman of the Chamber of Commerce of that town Feb. 25:

> At my request, Mr. Welborn has had an investigation made and advises that Mr. Weitzel has reported to him that in conference with several representative citizens of Trinidad none of them could give the names of any former employees of the Colorado Fuel & Iron Co. in need of help. As you doubtless know, the company is seeking to do all it can for its former employees and their families.

The Trinidad Chamber of Commerce replied the following day, asking for help to "relieve the distress in this community among other than your former employees by enlarging the scope of the work being done by the local officials of your company."

Kirchwey Was Right—The Rockefeller Foundation May Support Gunmen

Mr. Rockefeller replied that if the local authorities could not take care of the distress, "a situation would be presented which the Rockefeller Foundation might properly consider on representations from leading bodies and the governor of the state as to the extent of their inability to cope with the need." It is hardly probable that the state will do as suggested. It appears, however, that with the founders' good-will the Foundation may well aid in helping the gunmen of the union in the extremity which overpowers them, now that the union no longer supports them

Editorials

Trail-Hitting and Mine Safety

The movement to require strict temperance of the officials in the coal mines in Scranton, Penn., has its roots in the remarkable awakening to better living resulting from the recent religious campaign in Scranton.

Jenkin T. Reese, the mine inspector of the fourth anthracite district, in his annual report points out the increased tonnage per fatal accident and ascribes the improvement to the fact that "many of the miners have cut out booze and are now going to the nickelettes and concerts" instead of the saloon. He adds, "Many are trail-hitters and there is increased reading due to the war and this operates against the booze."

The men in the office and those in jeans are one in realizing that safety and efficiency demand that an end be made of alcoholism.

Success

It is not difficult to sail high and maintain an even keel when skies are clear and breezes light, but it is a different matter when the storms and winds of troublous times are on us. In these days of world war, the men who can smile and show a cheery countenance are those who have built their business structures on a solid foundation. They are the ones who have foreseen rough weather and prepared for the squall.

It is just this lesson that strikes home to all of us at present and causes the publication of a real SUCCESS number of Coal Age. This issue, as you have already been told, will appear April 3. Every reader and friend of the paper is specially requested to add his quota to the total matter that will be printed. The story may describe a man, a method or a machine. The only stipulation is that the facts of the description bear out conclusively the idea—success.

This particular issue of Coal Age will be greatly enlarged, and we propose to make its contents so diversified, interesting and valuable that no one will be able to lay the paper aside until all of the articles have been read. If we accomplish this aim, the SUCCESS number itself will be a SUCCESS, and the men who read it will know more and be greater successes than before.

Failure

It is a question in the minds of many men whether it is better to know what to do to attain success or to know what to avoid to escape failure. Perhaps a knowledge of both is the winning card. At any rate, we would like our readers, wherever it is possible, to submit a story for our SUCCESS number, telling how a man, a method or a machine has failed; what action or lack of action has brought on disaster.

It is through such knowledge that we all learn to avoid the pitfalls that beset our path, and if this can be done, we are well on our way to success.

What a lot of trouble and worry might have been avoided if John had only known that Tom had tried a certain scheme or followed a certain plan and failed. Talk about conservation! If we could only eliminate the duplication of failure by turning the bright rays of public attention on all great mistakes, a lasting benefit would accrue to humanity at large.

Therefore, if you can't tell us the story of a big success, write an account of the biggest failure you know about. The interest and value to the reader will be equally great in either instance.

Do it today.

The Outlook on Ocean Freights

In event of the war being prolonged indefinitely it is clear that ocean freights will still be attractive to the colliers already engaged. Under these conditions the reserve stocks of coal all over the world will be depleted sufficiently to create an emergency demand for American coal whatever the freight, and the shippers having off-shore tonnage available will be relatively independent of the coastwise market. There are recent developments that give color to that prospect.

The other factor is the state of general business. The bottoms now withdrawn from the coast will still be considered surplus, if conditions are not improved over 1914. The crucial time will be Apr. 1 probably, when coasters are released from last season's contracts. If more go off-shore, and the increasing number of sailing vessels loading export cargoes seems to tend that way, then New England will have to do business with the coal operators on the best terms obtainable. If it is decided that these boats shall take their chance on the coast, and business doesn't improve, or the export demand doesn't materialize, then it will be for the shipper and the transportation owner to meet each other on common ground.

This is a vital matter to a good many West Virginia operators, and developments this spring are bound to be closely watched.

Some Intimate Points on the South American Trade

The representative of one of the largest coal corporations in the country, who has just returned from a protracted visit to South America, has offered some interesting remarks on the coal situation there. Many of the points he covers have been repeatedly pointed out in these columns before, but there are other and more recent developments which have so far received little consideration.

Thus, for instance, in the matter of financing and arranging credits, the National City Bank of New York is proving a most important factor in the situation. This is a matter that has long been a stumbling block to the progress of American trade, our practice in this direction varying notably from that of European concerns, American operators having displayed an inflexible determination to have their own way in these matters. This financial house has been found extremely accommodating and too much credit cannot be given to its efforts to facilitate American trade.

The work of Mr. Barrett, of the Pan-American Union, is also most highly commended and recommended for hearty support. But, on the other hand, the work of the *attachés* of the American Commercial Service is proving ineffective and it is believed that this department leaves much to be desired.

It is also becoming clear that the opportunities for smaller concerns, with limited working capital, are at least questionable. Before a profitable business can be established, a considerable expenditure will be necessary; docks and bunkering facilities must be provided, while exhaustive tests of the American coal will be necessary in order to convince the buyers of its quality, and in addition to this, our operators are facing a competition with European producers of the bitterest kind, which cannot be lightly ignored. Obviously, these foreign companies will not tamely permit American coal producers to supersede them in these markets until they have exhausted every resource at their command.

To build up a satisfactory business we must send high-grade men, well informed in both a commercial and technical sense, and they should be able to speak the Spanish language. American commercial houses have already made some progress in the South American trade during the past five years, and there are still enormous possibilities for stronger concerns that are prepared to make a relatively heavy initial expenditure and approach the problem in a systematic and businesslike manner.

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Ueber Alles

On the fifth of March the New York section of the American Institute of Mining Engineers held a banquet, and, as after dinner speaker, G. O. Smith, director of the U. S. Geological Survey, discussed "The War's Opportunities to Make America Mineralogically Independent."

E. G. Spilsbury was chairman and he critically declared that he thought we should desire commercial rather than "mineralogical independence." He was, however, willing to be "shown." Mr. Smith is a forcible speaker when he is attacked. He is a trifle diffident, however, when his fighting blood is not aroused. So his speech, which he described as an "exciter" to larger electrical units, was not equal to what it would have been had it been a reply rather than a prelude.

Without saying anything to which the most squeamish of foreigners could take offense, Mr. Smith took a ground commonly regarded as patriotic and which is the cause of much bad feeling between nations. Clearly the aim of the United States should not be to undertake to do that for which it has no marked fitness.

The ideal of some people is to ship all kinds of minerals to all parts of the world and take none in return—except gold and silver, which are also minerals and which also we are well fitted to produce. It is obvious that we cannot succeed in sending everything abroad and taking nothing in return. All we should try to do is to mine here whatever, like coal, we can mine best and take in return readily whatever other peoples can mine or manufacture to most advantage.

We should feel when we see the foreigner with something we want like the man in a store who sees a gewgaw which he desires. He is glad, not sorry, it is there, and he figures out how he can buy it. But nationally we are not so built; we want to sell all the time and never buy, and we hope thus to assure ourselves of our overlordship over the rest of the world.

And we are not alone in believing that our self-interest lies in antagonism to all other people. It was a Scotchman with a strong accent who said at the banquet mentioned that we should not allow our phosphates to be exported and then lauded the least happy utterances of that recent bulletin of the Geological Survey which has excited unfavorable comment abroad and which can hardly be said to comport with our national dignity.

And that Scotchman is only one of many Britons who have just that "Ueber Alles" way about them that we also too often have. We stole the expression "Made in U. S. A." from Europe, only we made, of course, a trifling and obvious change. This evidence of insularity is Europe's and not ours, though in our way we have our faults. Where England gave free trade, we fostered a protective tariff. In fact we have placed this so high that a "Made in U. S. A." campaign seems somewhat superfluous as a device to misdirect commerce.

All coal and other trade should be free not only of tariff, as this paper has often urged, but of sentiment. If there is any coal in Canada which serves our needs for certain purposes in certain places, let us by all means use it. Unfortunately for Canada, the Canadian coal along the sea coast must compete with the very best West Virginia and central Pennsylvania coals, which are as high as any in the world in evaporative efficiency, far superior to the coals of western Pennsylvania and Ohio—fuels with which Central Canada is supplied by the United States.

This is what makes competition in New England peculiarly difficult to Canadian operators. The good coals of Canada must compete with the superlative coals of the United States. The Canadian coal should, however, have some compensatory transportation advantages, provided the freight rates of Canada are as reasonable as our own. In the central part of the Dominion the quality is more equal, and the shipping facilities being well balanced, it is strange that Canada allows western Pennsylvania to carry off so much desirable trade.

In the West let not the Canadian worry. So long as G. O. Smith has the valuing of the lands, there is no probability of a great mineral development which will seriously compete with the Canadian minerals in British Columbia, Alberta and Saskatchewan. If, however, such a development took place, those provinces of the Dominion could not fail to profit.

After all, it is a folly to look upon the nations as rivals. The individuals in the same trade may be, but the nations are not. That for which a nation or part of a nation has no aptitude it should not strive to perform. There is certainly no patriotism in such a course. For no nation will ever prosper if it insists on "doing stunts," mineralogical or manufacturing, simply to show that such things are possible if it puts enough time, effort and capital into them and shows a necessary indifference as to the profits to be derived. For after all the nation lives for the welfare of its citizens and not *vice versa*.

Sociological Department

Education in Colorado Fuel & Iron Co. Villages

SYNOPSIS—The schools have found some difficulty in combating the general apathy. Nevertheless, much good institutional work is being done with the help of the sociological department. The opportunities for education are excellent for those who desire to embrace them.

The sociological work of the Colorado Fuel & Iron Co. is not so markedly developed in its schools for adolescent children as in its kindergartens. But most large corporations outside Cincinnati, Ohio; York, Penn., and Hammond, Ind.,* do absolutely nothing in the matter of promoting the education of children, regarding this with reason as the work of the school board.

Why Operators Have to Interest Themselves in Schools

In mine villages, however, the coal company, opening its mines often during the course of a brief year and anxious to obtain working men who are mostly married and have children, is obliged to urge, and sometimes to provide, the necessary schoolhouse accommodation. From the very first, therefore, a relation has existed between operating companies and school boards in the coal regions.

It has been found also in mixed mine and farming regions that the period of the school term is all too short—the farmers being desirous of saving the money they would have to spend in providing full-term education, the teachers being drawn from the farms and being anxious to aid in the farm work during the busy seasons, and the farmers themselves needing, or believing that they need, the help of both children and teachers at a time when a few hours' work may mean the making or the marring of the crop.

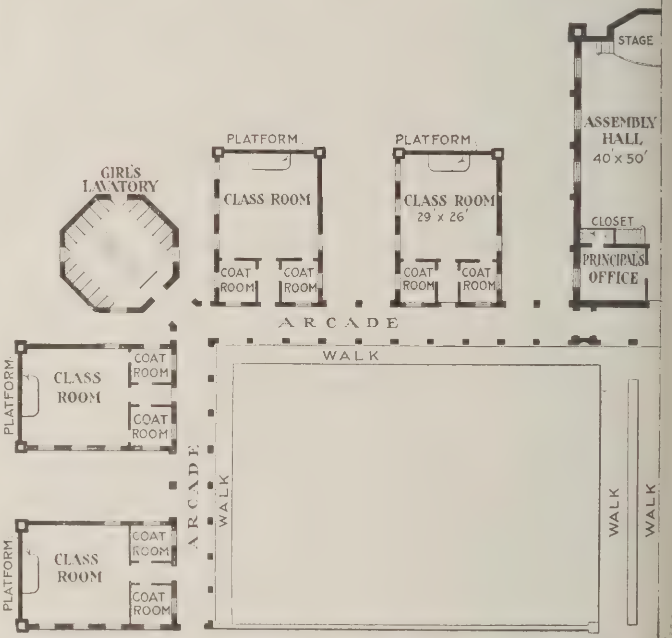
This being the case, the corporations often have difficulty in securing the longer terms of school customary in cities and often obtain the necessary funds by an assessment from the miners, which the latter voluntarily agree to pay. In other cases the company has to supply by a special appropriation the money needed for the extended period of school. Often, also, the corporation may have to erect the schoolhouse.

Schools and So Called Politics

This relation appears menacing to socialists and others who fear that the goodwill of the teachers toward the company may influence them in their instruction. The menace is perhaps not wholly a daydream. It is always a mistake and a lowering of one's manhood to let another do for one what one should do for one's self; but unfortunately there has been little disposition on the part of the body politic in the mining villages to do their part and manifestly little ability to perform it even if the disposition were present—so the difficulty must inevitably continue to exist. It is only part of the general menace which foreign tongues and alien illiteracy are constantly placing upon us.

The Colorado Fuel & Iron Co. has endeavored to develop the public schools wherever it has planted its villages. The school boards have been assisted in obtaining good teachers. Architects' plans have been loaned to school districts preparing to build.

At first, when the communities are too small to warrant the erection of a schoolhouse, the children have been transported to some neighboring village at the expense of the company. Thus the Cuatro children were carried to Tercio and back daily till Cuatro was provided with a school. Occasionally where funds were not otherwise available, as at Madrid, N. M., the teacher has been placed on the payroll of the corporation to prevent the closing of the schools.



Half Plan of a Block of One-Room Schoolhouses Exemplifying the Pueblo Plan

The room opposite the principal's office in the assembly hall is to be used by teachers

No Lack of Schools at Mine Villages

But though care is taken to provide schools, they are not as well attended as they should be. There is not a sufficiently general desire on the part of the parents to educate their children. This is not due to a deficiency in the teachers, who are claimed to be even more intelligent and better paid than those in the adjoining states.

The buildings are all new and attractive frame, brick or cement structures, admirably adapted for their purposes. Those at Pictou, Berwind-Tabasco, Rouse, Sopris, Segundo, Primero and Tercio are two stories high, with attractive, cheery classrooms, a kindergarten room and a hall for lectures, concerts and the social gatherings of the community.

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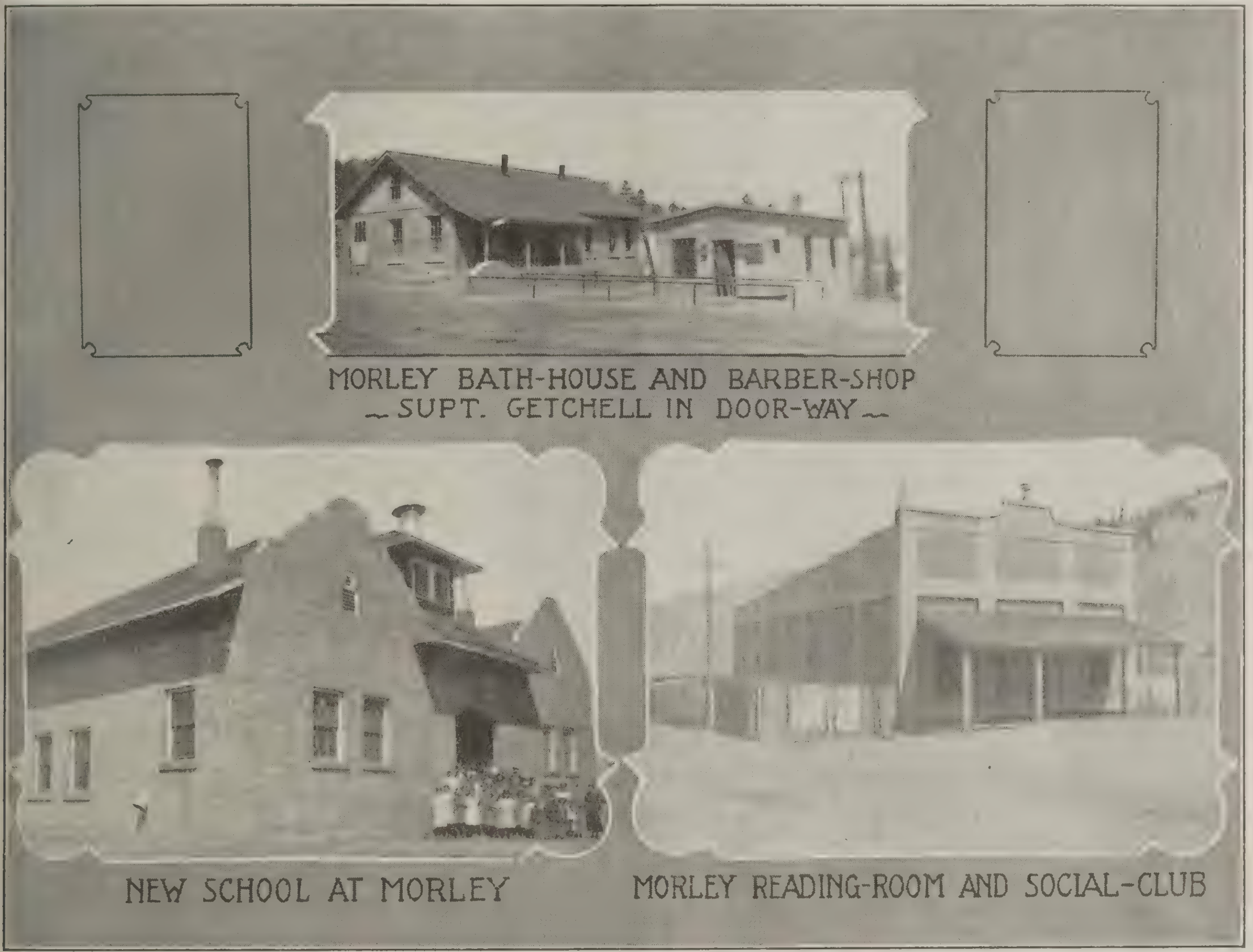
*See article on "The Half-Time System" in Coal Age, Vol. 3, pp. 579-580.

In the schoolyards of several of these schools play apparatus has been installed, consisting of swings, teeters, rings and horizontal bars. The interior of the schools is hard finished throughout; the walls are adorned with good pictures, and each child has its individual desk. Where children live too far from the school building to walk, a conveyance calls for them at their homes in the morning and takes them home from school in the afternoon.


MORLEY BATH-HOUSE AND BARBER-SHOP
—SUPT. GETCHELL IN DOOR-WAY—
NEW SCHOOL AT MORLEY
MORLEY READING-ROOM AND SOCIAL-CLUB

Some of the Buildings at Morley, Las Animas County, Colo., near Trinidad. Morley Is One of the Colorado Fuel & Iron Co.'s Villages

Several of the school boards have established teachers' houses, following the practice of the sociological department of the Colorado Fuel & Iron Co. in dealing with its kindergarten teachers, and have also followed that lead in providing Christmas presents for the children.

The surgeons resident in the mine villages have used the schools for monthly talks on hygiene to the benefit of both teachers and pupils. The stereopticon has been used to assist in this work.

The Trip to the St. Louis Exposition

In 1904 all the teachers in the company's villages, both public-school and kindergarten instructors, were invited by the sociological department to visit the World's Fair at St. Louis, that they might study the educational and sociological exhibits. This took the place of the regular summer course for teachers held at Pueblo. The teachers agreed, in return for their transportation, to remain in St. Louis not less than two weeks, to visit the educational exhibit at least three mornings each week under the direction of members of the department, to submit to the department a thesis of two thousand or more words on some phase of the educational or sociological exhibit, and to return to teach at one of the Colorado Fuel & Iron Co.'s villages during the following year. For approximately three weeks about 20 teachers availed themselves of the opportunity.

The teachers wrote their theses on regulation and inspection of factories and mines; the insurance of the aged and the invalided; the erection of improved dwellings by employers, by individuals and by public authorities; general efforts for betterment of housing conditions; legal regulation and public management of the liquor trade; efforts for lessening intemperance; social settlements; humane societies; church and other institutional work; German kindergartens and public schools; training and certification of teachers; value of manual training in school work; plans and models for small schools; education of negroes; summer schools; school furniture and appliances; day nurseries; vacation schools; Japanese kindergartens and public schools; pay of school teachers; manual training; and Indian basketry in public schools.

In the 1903-1904 report, which was quoted so extensively in a previous article, occur the following remarks on the circulating libraries and social-industrial features in the schools:

Circulating Libraries

The circulating library is no longer an experiment, for the books have become increasingly popular and are more widely read than ever before. Especially is this true of the juvenile books, of which we have altogether too few. Here again we have found a point of contact between our department and the public schools, for the teachers have taken a great interest in these libraries and in several instances have offered prizes for the most intelligent reviews of the books read by the children. In one camp there was always a long line of children in waiting when the hour arrived for the exchanging of books. Of the 45 boxes comprising the Colorado Fuel & Iron Co.'s Circulating Library, 29 are devoted to English books for adults; 12 contain juvenile works and 4 contain works in the Italian language.

The increased circulation of the books has been very gratifying, averaging about 1200 books per quarter. The banner stations were Madrid, N. M., and the Minnequa hospital.

The most serious difficulty that the department has had to contend with has been the failure of some of the libraries to move promptly. In some instances the condition of the stage-roads at certain seasons of the year is responsible for this, but often it is due to the failure on the part of readers to return books promptly. Time and practice will no doubt satisfactorily solve this problem.

Mounted Photographs

The department has a collection of mounted photographs composing 30 sets of 12 pictures, each arranged according to artist, school or type. Each set has its own wooden shipping-case and is provided with a typewritten description or interpretation of all the pictures contained in it, together with a brief survey of the artist, school or type. Following is a list of the pictures in set No. 21, composed of Spanish paintings, which we give as a fair example:

Murillo—"Immaculate Conception," "Virgin of Seville," "Birth of the Virgin," "Madonna and Child," Flight Into Egypt," "Beggar Boy" and "Holy Family of the Bird."

Velasquez—"Portrait of the Artist," "Reunion of the Artists," "Philip IV of Spain," "Infanta Maria Theresa" and "Infanta Marguerite."

These groups of photographs are loaned to the public schools in the camps and moved from time to time.

Framed Pictures and Casts

The department also has a small fund given by interested parties for the purchase of casts and framed pictures with which to adorn the interior of the school buildings. Already several hundred dollars has been received and expended for this purpose. An effort has been made to keep in mind the needs and requirements of public schools and kindergartens.

Boys' and Girls' Social Clubs

Wherever the kindergarten teachers are located, there you will find groups of boys and girls organized for social and recreative purposes and still other groups whose aim is industrial education. For the kindergarten teachers are in a true sense social-settlement workers and conduct in the afternoons clubs and classes, mothers' meetings and all those forms of social effort which have become a recognized form of settlement-work.

Games and stories are still the source of interest for the smaller groups; while for the older boys and girls club-swinging, dancing, physical culture, basketball and target shooting form the chief attractions. Light refreshments also form a frequent innovation at the club meetings.

Special mention should be made of the physical-culture classes at Pictou, under Miss Mary Mason, the basketball teams at Starkville, under Miss Gertrude Heenan, and the Beaman Club at Tercio, under Miss Angie Gilbert. The last-named club has grown from a purely social to a literary organization, officered by its own members and conducted on strictly parliamentary lines. At the Thanksgiving dinner given by the club the toasts and speeches would have done credit to persons of maturer years.

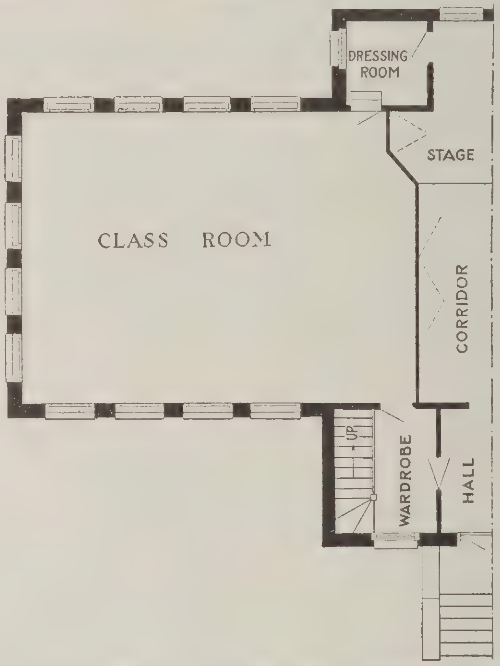
The club is now editing and publishing a little bimonthly newspaper, the "Tercio News." During the school year the teachers aided the children in this work; Miss Irene Haskell, of Tercio, was their helper and adviser during the summer. The children now have their own printing-press and hope soon to be able to do their own presswork. Thus the social club is developing into an industrial class. The basketball and physical-culture clubs were crowded, and during the year several excellent entertainments and exhibitions were given—in some cases free, in others to raise money for apparatus or uniforms.

Industrial Classes

One of the chief objects of the normal and industrial school conducted during the summer of 1903 by the department in its school building at Pueblo was that each of our kindergarten teachers should receive adequate instruction in cooking, sewing and basketry for the purpose of teaching these subjects in the camps.

The success of the experiment has been gratifying, for not only has the department been saved the salaries of two special teachers of sewing and domestic science, but the classes in these branches have been much better attended because of the greater confidence the camp residents have in the kindergarten teachers, who are with them all through the school year. Especially is this true concerning the foreign residents. A teacher who comes to a camp for a few weeks' course and then is gone again fails to gain the confidence and coöperation of the people.

The most noticeable feature of the year's work along industrial lines has been the increase both in the attendance and in the interest. Last September at the beginning of the school year, before our teachers could begin to organize their clubs and classes, the children came urging them to start the work and begging for admission.



Half Plan, Ground Floor of a Modern School Building with Rooms Lighted from Three Sides. One of the Alternative Plans Advocated by Dr. R. W. Corwin

In some of the camps the classes have had to be divided as they were too large for the teacher to handle. Especially has this been true of the sewing, which has been very popular. The girls have learned to do fine darning, stitching, hemming and embroidery, and many of them are making undergarments. The coming year they will be taught to make skirts, shirtwaists and dresses. Raffia classes have also been popular, probably because "in the spring a young maid's fancy lightly turns to thoughts of hats." Some of these hats were very pretty and original in design and handsome enough to be worn as "best" all summer.

Some of the boys in the manual-training classes have made their own looms and are weaving small—but pretty and useful rugs. Their heavy work-aprons of blue denim are also the work of their own hands. At Pictou the boys carved match-safes, penracks, picture-frames and similar articles, samples of which form part of the sociological exhibit at the World's Fair at St. Louis.

The strike has made little difference in any of the club activities; and in the cases of the older boys thrown out of work, many have attended the afternoon clubs, thus swelling the enrollment.

Cooking

Classes in cooking have been conducted by several of the teachers as part of the work of the girls' clubs and in connection with the mothers' meetings. The sociological houses

Side Lights on the School Training in the Colorado Fuel & Iron Co.'s Mining Towns

were the centers of this work, and in each case the object was to teach simple cooking with ordinary utensils—the proper preparation of vegetables, meats, eggs and fruits. Lessons on the proper care of the cupboard, on housekeeping and on the duties of the housekeeper were also given. The "inner woman" has by no means been neglected.

Clubs for Adults

In addition to sewing and cooking classes for adults, flourishing clubs of women, for the study of child-life or for basket-making, have been maintained with especial success at Engleville, Sopris, Rouse, Primero and Tercio. The large ladies' basketry class at Rouse calls for special mention because of the superior excellence of the finished product. Some of these baskets were sent to the World's Fair with our exhibit, and those who made a careful comparison felt that they were quite as fine as any in the Educational Building.

Pueblo Normal and Industrial School

The normal course, under the direction of Prof. J. F. Keating, held at our industrial-school building during the summer of 1903, was highly successful. There were 67 teachers in attendance from Colorado and the adjoining states. In addition to the regular normal course, classes were conducted in sociology, domestic science, physical-culture, etc. Peculiarly attractive was the course in freehand drawing offered by Mrs. E. Scofield Wright, and her studio and exhibit of ceramics, water-colors and burnt-wood designs are a constant delight to visitors.

She it was who conceived and prepared the dainty green and gilt school pins which the normal students wear. A neat certificate of the work done was given at the conclusion of the course, and this was accepted by the public-school authorities in lieu of an examination in the branches covered. The dormitory capacity of the school building was taxed to the utmost. The efficiency of our camp school teachers was greatly increased by this special training, and now the employment of special teachers of domestic science is no longer needed.

The course for the summer of 1904 was given in St. Louis in the Educational and Social Economy Building at the Louisiana Purchase Exposition and has been referred to elsewhere in this report.

In the wintertime the normal school building is used as a dormitory and social center for steelworkers and others who desire to avail themselves of its privileges. A night school for steelworkers was conducted in the large rooms in the basement and was well patronized until the Christmas holidays.

Industrial Home

This feature of the work at the "old hospital building," while perhaps the most important that could engage the attention of the department, having for its object the care of employees who have been seriously injured or have grown old in the service of the company, is still in the experimental stage.

The manufacture of mattresses carried on during a part of the year has been given up, owing to the fact that the work has proved too heavy for the men now at the home. It is probable that several lines of work will have to be introduced adapted to men of different degrees of infirmity. Several forms of light occupation are now under consideration, and this fall one or two of them will be tried with the men now under our care.

Of course it is not expected that this branch of the work will be self-supporting, but enough will be realized to make the men feel that they are at least earning something and are not dependent on charity. The industrial school was represented at the State Fair by an interesting display of canned fruits and jellies and also by mattresses made by a blind man at the school.

Lectures and Entertainments

The need of popular lectures and entertainments in the camps was felt the past winter much more than usual, due to the fact that employees were compelled to remain in camp for fear of violence from strikers. They were thus shut off from outside entertainment in nearby towns. Fortunately the department was in a position to furnish the necessary social life in good measure. The lecture season opened with a series of stereopticon lectures given by Charles A. Payne, of Milwaukee, Wis., the first being entitled, "A Trip Half Way Round the World."

In addition to the lectures delivered monthly to the school children by the camp surgeons, several of these physicians have delivered evening lectures for adults, the most popular being those of Dr. T. D. Baird at Pictou. At the close of these lectures a social hour always followed, during which light refreshments were served. No entertainments in Pictou draw so well as Dr. Baird's popular evening lectures. We wish more of the local surgeons would adopt Dr. Baird's plan in this regard.

The department owns two stereopticon lanterns and has access to nearly two thousand lantern slides, covering a wide range of subjects, and these were in almost constant use all winter. Over forty lectures were delivered by members of the department in addition to those by the local surgeons in the camps in the southern part of Colorado.

Of a more popular nature were the socials, musicales, Washington's Birthday parties, Japanese festivals, drills, basketball contests and amateur theatricals given under the leadership of members of the department.

But doubtless the most popular entertainments given last winter were those at Primero, under the direction of Louis Smith, the mine clerk, and of Will Chamberlain, of the Denver office, in which only home talent took part. Under their able direction several original sketches were produced and some excellent talent developed. The schoolhouse theater was always taxed to the limit at these entertainments.

Dances were of course popular all winter, and of almost weekly occurrence. Perhaps nothing is so enjoyed in a mining camp as a good social dance, especially before people have begun to get wearied.

Some Other Studies in the Art of Living

Many are the activities in connection with the schools, which lack of room compels us to overlook or pass over hastily. At Tercio the children have been taught pyrography. In some of the schools housekeeping classes have been held, in which fire-building, table-setting, dishwashing, bedmaking, sweeping, dusting, scrubbing, washing and ironing and, more important yet, the care of the baby, have been taught. In connection with this the scholars have been instructed in the making of towels, dust cloths, caps, aprons, napkin rings and similar articles.

A large club of boys at Engle has been taught weaving, and they have made large rugs for the floor as well as their own looms and working aprons. Other boys at Sopris have been trained in the use of Indian clubs and roller skates. Other groups of boys have engaged in chorus singing, basketry and making Venetian ironwork. In the Rouse schoolhouse electric light and attractive stage scenery have been installed, and entertainments of an elaborate order are possible.

The night schools for teaching English to foreigners have not been very successful, but attempts to maintain these have been made everywhere.

The "Pueblo Idea"

The sociological department is continually endeavoring to raise the standard of the public-school buildings and is anxious to introduce what is known as the "Pueblo idea" in schoolhouses. Of course, facing the fact that most of the buildings were completed before the "idea" originated, the opportunity for such changes no longer presents itself frequently. At a new camp, however, known as Katchina, a commencement has been made.

The idea is to put each schoolroom in a building of its own instead of building all the elements into one common edifice. The introduction of such a scheme is the more feasible in a mine village where land is comparatively cheap. The reasons for the "Pueblo idea" are many.

Why Overcrowd in the Country?

1. The number of schoolrooms may be made always to meet the demand, which is not the case with a building of many rooms. The many-room building is usually ahead or behind the needs of the district. There are vacant rooms intended for future requirements, or crowded rooms, waiting for the schoolboard to build. The plan suggested admits of erecting a building or room when there is need for it, hence there is no room unused and none overcrowded.
2. When several districts are crying for more room and the school treasury is low, the school board can accommodate each district at least cost.
3. It is cheaper than any other plan.
4. There is less waste room as there are no halls or stairs.
5. There is less chance of fire.
6. In case of fire there is less probability of loss of life or property or damage by water.
7. There is no particular need of fire drill with its nervous strain on certain children.
8. The danger to pupils in case of fire is reduced to a minimum.
9. Light may be obtained from any direction. The object of universally diffused light in a schoolroom is especially for the purpose of giving the left-handed child a chance equal to one of more normal habit. The one-sided lighting of a room may be perfect for the right-handed child, but how about the 3, 5 or 8 per cent. of children who are left-handed? High windows allow space for blackboard drawings or pictures on all sides of the room. If the building is located so that there is objectionably strong light from the east or west at certain times of day, it can be easily overcome by frosting the windows through which the strong light enters. If the windows are hinged at the bottom and the top swung into the room, ventilation is made most satisfactory and causes no drafts.
10. Ventilation may be obtained from all directions. As one of the teachers remarked, "Fifty pupils scarcely vitiate the air in the least." Not only is the sanitation of the multiple-room building objectionable, but often criminal.
11. There are no large hallways to receive dirt from the shoes of all the pupils.
12. Less work for the janitor.
13. No sweeping of dust from one floor down upon another.
14. No steps or banisters to clean.
15. No stairs to climb up or fall down. This is a relief to the small child and of vital importance to the young girl.
16. No noise from the passing classes.
17. It is easier for the principal to supervise grounds and rooms on this plan.
18. The teacher finds the discipline of her class both in the room and on the playground easier.
19. There is greater field for individuality on the part of both teacher and pupil.
20. A five-minute recess may be taken outdoors at any time without disturbing other classes.
21. The homelike atmosphere which may pervade the one-room building is not possible in the larger structure.

Co-operation

We want to interest all of the readers of the sociological department of Coal Age in the special SUCCESS number of this paper, which will be published Apr. 3. Doubtless you have already read some of the brief announcements we have made with reference to this particular issue, but we are not certain that all of you understand that this SUCCESS number will cover every problem and every phase of coal mining concerning which a real SUCCESS story can be written. All kinds of sociological work, whether it pertains to training in first-aid or to night schools, or to miners' houses and gardens, or anything else of a similar nature, will come in for its share of public notice. Ever so many coal companies have accomplished welfare work of a most beneficial nature, and all such instances should be properly described in our SUCCESS issue. Get busy at once and send us the story of the particular work your company has carried on.

Discussion By Readers

Recognition of Bravery

Letter No. 3—The suggestion of COAL AGE, made in its issue of Jan. 16, p. 109, in reference to the adequate and tangible recognition of the heroic services of many mine workers who, in times of danger, are wont to rise to a supreme degree of courage in the attempt to rescue fellow workers, certainly deserves the hearty approval and support of all true-minded men.

While I heartily indorse such a movement, I cannot agree with the statement made by I. R. Packard, COAL AGE, Feb. 27, p. 383, to the effect that "such recognition would go far toward increasing the efficiency of rescue work," etc. I know too well the spirit of resolute self-sacrifice that animates the rescue worker to harbor, for a second, the idea that, in a moment of dire peril to his fellow worker, a miner would waste a thought on either the mercenary reward or the empty plaudits of hero worshipers that he might gain by his act.

To the mine worker whose every faculty is taxed to its capacity in time of peril, there is but one subconscious, unformulated thought that, perhaps, a human life may be saved or a human service rendered. It is not given to every man to be able, at will, to master his fear and screw up his courage to the sticking point that will enable him to save another's life at the risk of his own. To those who possess such masterful self-control, due recognition of their act should be awarded as a token that an appreciative people acknowledge their indebtedness to his bravery.

I feel that the bestowal of this recognition should be for no other reason than the all-sufficient one that it is eminently right and just that such heroic self-abnegation should be publicly recognized, not to say rewarded. It must be acknowledged, however, that human nature is so constituted that such recognition of a brave act would not be without its practical effect. The records of the early history of our own states as well as those of other countries prove that many acts of chivalry and heroism were prompted purely by the spirit of *noblesse oblige*, which interpreted is, "Upon a gentlemen certain things devolve." It is true, also, that in time of disaster a publicly recognized hero would feel it incumbent on him to act up to his acquired reputation for bravery.

I want to suggest that recognition of bravery should not be bestowed too freely, but only after the most careful investigation has revealed the merit of the act or service performed. Such a safeguard is necessary to avoid the cheapening of the award in the eyes of the public.

It is evident at once that the most difficult feature, in considering the means and methods to be employed in providing a recognition of bravery that will be void of ostentation, is the finding of someone willing to take the initiative and organize a suitable *foundation* devoted to that purpose. The thought comes to me, Why could not COAL AGE, as the leading American periodical devoted exclusively to coal mining, foster this movement, which it has had the honor to initiate by suggestion? The fund required as a foundation for the purpose need not be large—better that it should not be very large, as the most suitable recognition would probably take the form of an inexpensive medal. I would suggest that the fund set aside for such purpose could be known as the "Coal Age Hero Foundation," or some other appropriate title.

The administration of the fund and the granting of awards could be placed in the hands of a general committee, while advisory committees could be selected in each mining district. Such advisory committees could be composed of five members of high reputation and unquestioned integrity. It would be their duty to make recommendations for awards in their particular districts, to be acted upon and approved by the general committee.

I shall be most glad to read the opinions of the many COAL AGE readers in regard to these suggestions.

FLAT TOP ENGINEER.

Crumpler, W. Va.

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The Formation of a Flame Cap

I was much interested in the inquiry of W. H. Moore that appeared in COAL AGE, Jan. 30, p. 220, and the reply appended by the editor. Mr. Moore draws attention to the flame cap formed in pure air containing no gas when a lamp burning gasoline or naphtha is used to make the test.

I might state that I have had quite an experience with lamps of this type, and have also noticed the same phenomenon. I have called this a "fuel cap." As I have observed it, the cap is hardly perceptible, except the lamp has become somewhat heated, when the fuel cap becomes very plainly discernible. This cap is of a much brighter color than one formed by the presence of marsh gas (CH_4) or the ordinary firedamp mixtures that occur in mines.

In this connection, I desire to relate, briefly, several experiences I have had with such false flame caps and to say that the observations made by myself in company with others have been such as to confirm my opinion that such caps have often been mistaken for gas caps.

In one instance, while superintendent of the International Coal & Coke Co.'s mines at Coleman, Alberta, Can., the fan ventilating the mine was stopped about 6:15 a.m., owing to a slight accident to the generator in the power house. The repairs were quickly made and the fan was again running, at 6:45 a.m. Although the firebosses had previously completed their work and reported the mine as safe, the stoppage of the fan for one-half hour made it necessary to repeat the inspection before permitting the workmen to enter the mine.

To expedite this work, I deputized a number of competent and certificated men to make this second examination, giving to each a small separate district to examine and report upon. As a result, all parts of the mine were soon reported clear of gas and safe, except the inside district of No. 2 seam, where the fireboss who made the inspection stated that he got a cap on the flame of his lamp, at a point possibly 1000 ft. from the face of the main-intake entry. He stated that he also found the same conditions on the counter-entry.

I was much surprised at this report, since the fireboss who examined the adjacent section on the return side had not reported any gas and stated that the air current was traveling normally. In view of this fact, I concluded that a trap door had been set open between the intake and return, thereby short-circuiting the air at that point. Further inquiry, however, showed that this was not the case and, as the mine was well timbered, it could not be supposed that a heavy fall of roof had occurred to create such a condition.

To solve the mystery, I took a safety lamp and, in company with the fireboss who had examined this section, hurried into the mine. We proceeded cautiously and inspected the air current at intervals, both on the intake and return air courses but found no trace of gas whatever. We concluded that the cap previously observed was a fuel cap caused by the evaporation of the gasoline in the lamp, which had become somewhat heated in the examination. A further examination of all the pitch workings of the two inside districts showed them to be absolutely free of gas. There were no roof falls and the mine was in perfect condition.

A similar instance occurred while I was developing a property for the Columbia Coal & Coke Co., at Coalmont, B. C., Can. Two practical coal-mining men paid a visit to the mine and were accompanied through the workings by the general manager and myself. At the face of the main-intake entry, one of the gentlemen raised his lamp (which was a naphtha-burning lamp of approved type) to the roof to test the place for gas. On carefully pulling down his flame as low as possible, he detected a small cap surmounting the flame and called my attention to it, remarking that there was a small percentage of gas present at that point. Being confident that there could be no gas in the place, I assured him that the cap he saw was a fuel cap and offered to prove this assertion by getting the same cap out in the main rock tunnel that formed the intake-air course for the mine and where no gas could possibly be present. This we did to the satisfaction of all.

I heartily agree with the opinion that has frequently been advanced by Coal Age that such a cap is formed on the flame of a naphtha-burning lamp in pure air, owing to the vaporization of the volatile oil. The heating of the lamp may slightly expand the wick tube, besides rapidly increasing the vaporization of the oil. The effect is greatly increased, also, by a small-sized wick. Again, the absorbent cotton in the oil vessel is sometimes allowed to get dirty and gummed in which condition it does not absorb the gasoline, which retains its liquid form and is vaporized more easily. The combustion chamber of the lamp then becomes filled with a mixture that will show a small percentage of gas. I have found that this fuel cap is always of a maximum size immediately after drawing down the flame from normal when preparing to make a test; but, after a few minutes, its size is gradually reduced. I shall be glad to hear from other readers, in reference to their experience in the same line.

J. W. Powell.

Windham, Mont.

Drying Washed Coal

Letter No. 6—Referring to the article by F. E. Butcher on the subject of Drying Washed Coal, Coal Age, Feb. 20, p. 325, in which he alludes to the four centrifugal driers his company installed at Steelton, I desire to offer the following notes on the performance of these machines. These are not, however, as complete as it will be possible to give some two or three months hence.

We have operated three of the driers almost continuously, 10 hr. per day, for just about one year. In that time we have made some radical alterations in the drier-accessory equipment as well as in the driers themselves. The original equipment was as follows: The primary-washing outfit consisted of three units, each unit being composed of two double-compartment jigs, one centrifugal drier and three settling cones, 11 ft. 10 in. in diameter and about 9 ft. in height. At the overflow of each jig is a dewatering screen over which the washed coal passes. A large amount of the water and a considerable amount of fine coal pass through the dewatering screens and are conducted to a pump sump, while the coarse coal and about an equal portion of the water pass over the screens and go directly to the drier. The water thrown off by the drier together with considerable fine coal that gets away through the screen plates in the driers is also conducted to the pump sump. All of the water and fine coal in this sump is delivered by a centrifugal pump to the three settling cones. The sludge coal is drawn off at the point of the cone and conducted to the drier, entering the same receiving hopper as the coarse coal from the jigs. The overflow water from the cones is returned to the jigs.

As the best coke-oven results are obtained when the moisture content of the coal is nearly constant, the attempt was made to draw the cone sludge constantly, as nearly as possible, and with the above arrangement we averaged about 10 per cent. of moisture in the product of the three driers. The overflow water from the cones carried from 5 to 9 per cent. of solids or coal, and this resulted in "hutch product" from the jigs. With no cone sludge delivered to the driers, the power consumption of each drier was from 20 to 25 hp. and the moisture content of the drier product averaged about 7.5 per cent. Upon delivery of the cone sludge, the power consumption varied from 40 to 55 hp. From six to ten 75-amp. fuses were frequently blown out in a day. The centrifugal pump handling the water and fine coal from the sump to the cones, in each unit, consumed 15 hp.

In regard to repairs, we now have drier screens that will handle from 10,000 to 15,000 tons of coal before requiring to be replaced. The eight scraper blades in each drier must be replaced about once a month, but the adjustable scrapers installed give a much longer life before entire replacement is necessary. The rotor casting supporting the scrapers requires replacement in about one year. The same is true of the cast-iron spider supporting the screen basket. We are making these replacements at the present time. Ball bearings and miter gears require replacement about every six months but we have altered the machines and are obtaining better results at present. The pump impellers require replacement in from 60 to 90 days; the pump casings every four to six months. The piping from the pump to the cones cuts through in about eight months. The control gates or valves on the cones had to be replaced in four months and the cone body cut through in spots, in six months. The loss of fine coal in the water leaving the plant averaged about 7 per cent. of the raw-coal input.

The cones and all of the dewatering screens on the jigs have been abandoned. By means of a system of settling tanks and dewatering elevators, the washed coal is delivered to the driers, without separating the fine from the coarse and with about 25 per cent. of moisture. The water from the driers carries about 40 per cent. of solids and is returned to the settling tanks. It requires 6 hp. per unit for the dewatering elevators and a constant power consumption of 27 hp. for each drier, and there are no "peak loads," as we had while using the cones. By means of the settling-tank system, a small tonnage of fine sludge is collected as secondary coal, and a pump requiring 35 hp. returns all the water to the jigs and does not have to handle water containing a high percentage of solids. It is expected eventually to reclaim the above mentioned sludge as primary coal. There will then be no water constantly flowing away from the plant and creating a continuous coal loss

One of these units has operated 39 days under the new system, another 12 days and the third 5 days. The average moisture content of the coal from all three driers, for the entire period, is 6.5 per cent. We have had nine days' operation of one machine in which the average moisture content was 4.5 per cent.

The result of this one year's experience, I believe, shows that a combination of dewatering elevators and centrifugal driers is essential for the successful use of the drier where the percentage of fine sludge coal is as high as what exists here. I am not as yet prepared to give conclusive data on the cost of this method but our experience to date strongly indicates a considerable saving over the original installation.

G. R. DELAMATER,
Consulting Engineer.

Harrisburg, Penn.

Mining Laws, Legislation and Mine Regulations

Letter No. 38—While the Pennsylvania bituminous mining laws (1911) seem to be generally good and sufficiently strong to insure the required protection of life and property, there are some portions deserving of criticism. For example, the last clause of Sec. 3, Art. 10, prohibiting the use of open lights on return airways reads:

> The provisions of this section shall not apply to any mine wherein explosive gas is generated only at the face of active entries.

Again, Sec. 2, Art. 28, reads:

> The provisions of this act as to mines or portions of a mine generating explosive gas in quantities sufficient to be detected by an approved safety lamp shall not apply to any mine wherein explosive gas is being generated only in live entries.

The last section quoted has reference to the entire bituminous law relating to the generation of gas in mines. From the reading of the two passages quoted, it would appear that the law applies only to entries that *are being driven* in mines—"live entries"—and does not apply to rooms and pillar work where explosive gas frequently accumulates in greater and more dangerous quantities than in live entries. In other words, these passages seem to annul or completely destroy the protection that would otherwise be afforded by the law in this respect.

Another seeming incongruity occurs in Sec. 1 and 2, Art. 10, and Sec. 1 and 2 of Art. 20, both of which provide for an appeal from the judgment of the mine inspector; and, not only this, but a further appeal from the joint decision of other inspectors called to investigate the case may be made to the courts if the parties interested are still dissatisfied.

The law thus makes it possible for a mine operator, superintendent or foreman to give the district inspector much trouble and cause him worry and annoyance, all of which has the effect to undermine the authority of an inspector. In my opinion, the repeal of these sections of the bituminous law to which I have referred would do much to improve the work of mine inspection in the state and assist to enforce the instructions and recommendations of the inspector in every district.

I want to mention briefly a few of the features that I believe should be incorporated in every mining law. They are as follows:

No person should be permitted to work inside of any mine who cannot speak and understand the English language.

No person shall be competent to act as mine superintendent until he has successfully passed an examination and obtained a first-grade mine-foreman's certificate.

In order to double the frequency of inspection visits in all mines, the law should provide for an assistant mine inspector in every district.

The law should regulate and control the company-store curse of some mining districts.

A workmen's compensation act providing needed assistance for disabled workmen and the support of their dependents, in case of fatal accidents, should be in force in every state.

The law should provide for an interchange of state certificates or for a universal certificate that would qualify the holder for filling the same position in any coal-mining state in the Union.

The law should prohibit the sale of intoxicating liquors in all mining towns and districts.

If these and similar provisions were made a part of our mining laws, the result would be to produce safer, cleaner and healthier conditions in and about the mine. In closing, I want to say that I fully believe that the appointment of mine inspectors by the governor of the state is the best method that can be adopted in order to secure competent men for the position.

H. R. K.

Curtisville, Penn.

Letter No. 39—In the discussion of needed mining laws and legislation, it seems to me it would be well to draw attention to the fact that, in many mining states, the assistant mine foreman is not required to pass an examination or to hold a certificate of competency, while he is often called upon to discharge the mine foreman's duties in the absence of the latter. This is the case in respect to the assistant mine foreman of nongaseous mines, in the bituminous districts of Pennsylvania. The bituminous-mine law of Pennsylvania (1911) does not appear to require the assistant mine foreman to pass an examination or to hold a certificate of competency.

Art. 4, Sec. 1, reads, in part, as follows:

> * * * If the mine is generating explosive gas in quantities sufficient to be detected by an approved safety lamp, the mine foreman must possess a first-grade mine foreman's certificate. If the mine is nongaseous, the mine foreman must possess either a first-grade mine foreman's certificate or a second-grade mine foreman's certificate.
>
> When the mine workings become so extensive that the mine foreman is unable personally to carry out the requirements of this act pertaining to his duties, he shall have the right to employ a sufficient number of competent persons to act as his assistants, who shall act under his instructions in carrying out the provisions of this act. If the mine is generating explosive gas in quantities sufficient to be detected by an approved safety lamp, the mine foreman's assistants must possess first-grade assistant mine foremen's certificates.
>
> In case of the necessary temporary absence of the mine foreman, he may deputize his work, for the time being, to his assistant, who shall perform all the duties of the mine foreman.

Sec. 24, of the same article, reads as follows:

> When assistant mine foremen are employed, their duty shall be to assist the mine foreman in complying with the provisions of this act; and, in the absence of the mine foreman, they shall perform the duties of the mine foreman and shall be liable to the same penalties as the mine foreman for any violation of this act.

Art. 24, Sec. 4, provides for mine foremen's certificates of two grades—the first requiring an average of 80 per cent. in examination and entitling its holder to perform the duties of mine foreman in *gaseous* mines; the second requiring the same average percentage in examination and entitling its holder to perform the duties of mine foreman in *nongaseous* mines. The law then concludes as follows, in reference to assistant foremen:

> Certificates of qualification as assistant mine foremen shall be granted to persons who have given to the board of examiners satisfactory evidence of their ability to perform the duties of assistant mine foremen in gaseous mines and who shall have received an average of at least 70 per cent. in the examination.
>
> All applicants for certificates as mine foremen and assistant mine foremen in gaseous mines must also undergo an oral examination in the presence of explosive gas.

It is clear, from the above quotations of the law, that the assistant mine foreman is not only required by law to perform the duties of the mine foreman, but is held responsible for such performance and made liable to the same penalties as the mine foreman, for any violation of the act. The question may well be asked, Can the law impose a penalty on an assistant mine foreman for any violation of the act when he is not required by that law to qualify for the position he holds? If the mine foreman in charge of a nongaseous mine has been required by law to qualify for that position, why should not all of his assistants be required to do the same if they are held liable, by law, for the discharge of his duties?

MINER.

Bolivar, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

HAULAGE FORMULAS

The following formulas apply to all locomotive haulage, but care must be taken to give values to the several coefficients that will correspond closely to the conditions relating to track resistance and adhesion of the driving wheels to the rails. Assume the following symbols:

W_m = weight of locomotive resting on drivers (*tons*);
W_t = weight of loaded trip hauled (*tons*);
$T.E.$ = tractive effort of locomotive (*lb.*);
c = coefficient of adhesion of wheels to rails (0.15 to 0.35, *sanded rail*);
T_t = track resistance (*lb. per ton of moving load*);
R_g = grade resistance (*lb. per unit per cent. of grade*);
g = percentage of grade of track (*not exceeding* 10 *per cent.*);
S = speed of hauling (*mi. per hr.*);
$D.P.$ = drawbar pull (*lb.*).

Tractive Effort vs. Resistance—In locomotive haulage, there are two main factors; namely, the **tractive effort** of the locomotive acting to produce motion; and the resistances—**track resistance** and the **grade resistance** acting to oppose motion on upgrades. On downgrades, the grade resistance becomes an equal **grade factor** acting to produce motion.

The **tractive effort** of a locomotive is found by multiplying the weight on the driving wheels by the coefficient of adhesion (c) of the wheels to the rails or the **tractive coefficient.** The tractive effort per ton on the drivers is therefore 2000 c.

The **track resistance, grade resistance** and **grade factor,** as the case may be, are estimated, respectively, in pounds per ton of the entire moving load ($W_m + W_t$).

The following equations express the equality of the opposing factors in a moving train, on a level track and on ascending and descending grades, respectively:

Level track, $(2000\,c)\,W_m = R_t\,(W_m + W_t)$ (1)

Ascending grade, $(2000\,c)\,W_m = (R_t + 20\,g)(W_m + W_t)$ (2)

Descending grade, $(2000\,c)\,W_m = (R_t - 20\,g)(W_m + W_t)$ (3)

The **ratio of weight** on drivers to entire moving load, for each respective case is shown as follows:

Level track, $\dfrac{W_m}{W_m + W_t} = \dfrac{R_t}{2000\,c}$ (4)

Ascending grade, $\dfrac{W_m}{W_m + W_t} = \dfrac{R_t + 20\,g}{2000\,c}$ (5)

Descending grade, $\dfrac{W_m}{W_m + W_t} = \dfrac{R_t - 20\,g}{2000\,c}$ (6)

From the above ratios is easily obtained the following: ratios of load hauled to weight on drivers:

Level track, $\dfrac{W_t}{W_m} = \dfrac{2000\,c}{R_t} - 1$ (7)

Ascending grade, $\dfrac{W_t}{W_m} = \dfrac{2000\,c}{R_t + 20\,g} - 1$ (8)

Descending grade, $\dfrac{W_t}{W_m} = \dfrac{2000\,c}{R_t - 20\,g} - 1$ (9)

The Coal Age Pocket Book

Conditions of Hauling on Downgrades—It is important to observe that when descending a grade the grade resistance, as previously stated becomes a **grade factor** acting to produce motion. Hence, when the grade factor becomes equal to the track resistance, the necessary tractive effort of the locomotive becomes zero and the entire train gravitates down the plane at a uniform speed. This occurs when

$$20\,g = R_t; \quad \text{or } g = \frac{R_t}{20} \qquad (10)$$

Expressed as a rule, the grade of this **self-acting incline** is one-twentieth of the track resistance. For a track resistance of 30 lb. per ton, the self-acting grade is 30 ÷ 20 = 1.5 per cent. When a locomotive is operating on such a grade, no tractive effort is required on the part of the locomotive to maintain the speed of the descending train.

Drawbar Pull—The drawbar pull is the force required to move the trailing load or the load hauled (W_t). It is found, for a level road, by multiplying the track resistance in pounds per ton, by the weight of the trip hauled in tons; thus,

Drawbar pull (level road), $D.P. = R_t W_t$ (11)

When **hauling on an upgrade** the grade resistance must be added to the track resistance and their sum multiplied by the weight of the trip hauled, as before; thus,

Drawbar pull (upgrade), $D.P. = (R_t + 20\,g)\,W_t$ (12)

When **hauling on a downgrade** less than what is self-acting the grade resistance must be subtracted from the track resistance and the difference multiplied by the weight of the trip hauled in tons; thus

Drawbar pull (downgrade), $D.P. = (R_t - 20\,g)\,W_t$ (13)

Difference between Tractive Effort and Drawbar Pull—The tractive effort of a locomotive is the force it is able to exert to move the entire load including its own weight and as previously stated, this force depends only on the weight (W_m) resting on the drivers and the tractive coefficient (c), as express by the formula

$$T.E. = 2000\,c W_m \qquad (14)$$

Tractive effort is only a possible force which may or may not be wholly utilized in moving the train, depending on the load hauled and the track and grade resistances. The grade of a road may be so steep that the tractive effort is wholly consumed by the grade resistance of the locomotive, which can then only propel its own weight up the plane. Then,

$$20\,g W_m = 2000\,c W_m$$

and

$$g = 100\,c \qquad (15)$$

Or, assuming a tractive coefficient c = 0.16, the limiting grade is

$$g = 100 \times 0.16 = 16 \textit{ per cent.}$$

Drawbar pull, on the other hand, is a positive factor that is always determined by the net resistance of the trip hauled, which depends on the weight of the trailing load, and the track and grade resistances. The drawbar pull, under the varying conditions of haul is expressed by Formulas 11, 12, 13.

Inquiries of General Interest

Electric-Haulage Problem

(Concluded from last issue)

Having decided on the weight of the locomotive necessary to haul the desired number of loaded cars over the given grades, the next step is to determine the power of the motors that will be required to produce a given speed of haul, say from 6 to 8 mi. per hr. As a basis of this calculation, it is important to observe that the effective power, in foot-pounds per minute, is equal to the tractive effort in pounds, multiplied by the speed in feet per minute, as expressed by the formula

$$\underset{\text{(ft.-lb.p.m.)}}{Power} = \underset{\text{(lb.)}}{tractive\ effort} \times \underset{\text{(ft.p.m.)}}{speed.}$$

Now, estimating the horsepower required per ton on drivers, per mile-hour, assuming a tractive coefficient $c = 0.16$, we have

$$Tractive\ effort\ (per\ ton) = 0.16 \times 2000 = 320\ lb.$$

$$Speed\ (per\ mi.\text{-}hr.) = 5280 \div 60 = 88\ ft.p.m.$$

$$Horsepower\ (per\ ton\text{-}mi.\text{-}hr.) = \frac{320 \times 88}{33{,}000} = 0.85\ hp.$$

This is the effective horsepower per ton-mile-hour, or the power that must be available to produce a speed of 1 mi. per hr., for each ton of weight resting on the drivers. Assuming an efficiency of 85 per cent., the input to the motors should be 1 hp. per ton-mi.-hr.

Using a 25-ton locomotive for this haulage and assuming that the entire weight of the locomotive is on the drivers, the actual horsepower of the motors required for a speed of 6 mi. per hr. will be 25 × 6 = 150 hp., which corresponds to a wattage of 150 × 746 = 111,900 watts delivered to the motors.

It is interesting to note here that the effective wattage per mile-hour, in electric mine haulage, is practically twice the tractive effort of the locomotive, in pounds. This is shown by the following simple calculation, since a speed of 1 mi. per hr. is equal to 88 ft. per min. and 1 hp. is equivalent to 746 watts:

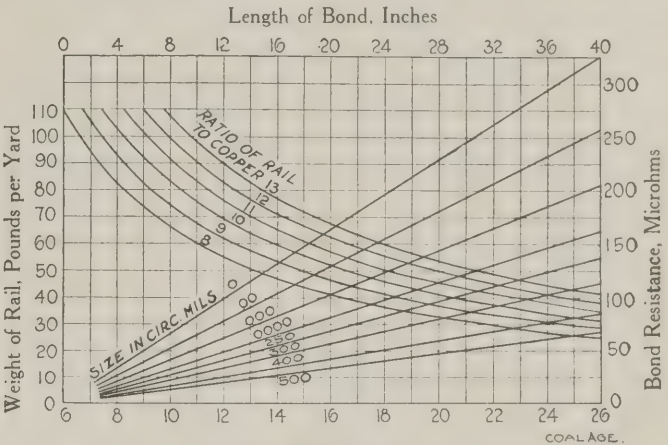
$$Effective\ watts (per\ mi.hr.) = 746\left(\frac{88 \times T.E.}{33{,}000}\right) = say\ 2\ T.E.$$

Under the assumed conditions, it was previously estimated that the total tractive effort when hauling up a 3-per-cent. grade is 110 lb. per ton of moving load, which makes the effective wattage required in that case 2 × 110 = 220 watts per ton-mi.-hr. In like manner, it was estimated that the total tractive effort when hauling up a 1½-per-cent. grade was 80 lb. per ton, which makes the effective wattage required to haul up that grade 2 × 80 = 160 watts per ton-mi.-hr.

In electric mine haulage, it is customary to estimate on hauling at a speed of, say from 6 to 8 mi. per hr. Taking the actual power of the motors at 1 hp. per ton-mi.-hr., to give an input of 111,900 watts on a 500-volt circuit will require a current of 111,900 ÷ 500 = say 224 amp.

The weight of rail in pounds per yard, in locomotive mine haulage, may be taken as twice the weight of the locomotive in tons, or, in this case, 2 × 25 = 50 lb. per yd. In estimating the size of wire required to transmit this current from the generator to the siding at the foot of the slope in the mine, we will assume a rail-return, using 50-lb. rails for the track, bonded with compressed-terminal bonds, 24 in. long. The length of track from the end of the siding at the foot of the slope to the tipple is about 5400 ft. The length of trolley wire extending to the power plant will be assumed as 5600 ft.

Referring now to the diagram shown in the accompanying figure, first find the resistance of 5200 ft. of the two 50-lb. rails in the track-return, including the resistance of the bonds, assuming a rail to copper ratio of 1 : 11 and rails 30 ft. long, making 5400 ÷ 30 = say 180 bonds in a single length of rail. Following the horizontal line marked 50 on the left of the diagram, to its intersection with the curved line indicating a rail-to-copper ratio of 1 : 11; and, from that point, following the vertical line to the scale at the bottom of the diagram, we find a resistance of 18 microhms per foot of rail or 30 × 18 = 540 microhms per rail. In like manner, for a 24-in., 4-0 bond, follow the vertical line marked 24 on the top scale down to its intersection with the diagonal 4-0; and, from this point, follow the horizontal line to the right-hand scale, which shows a bond-resistance of 100 microhms.



Resistance Diagram for Bonded Rails

The total resistance for 180 bonded rails is, therefore, 180 (540 + 100) = 115,200 microhms, or 0.1152 ohm. The resistance for a two-rail return is one-half this amount, or 0.0576 ohm. The voltage absorbed in the rail-return is $E = CR = 224 \times 0.0576 = 12.9$ volts. The line drop for 5600 ft. of T. B., 4-0, copper wire, carrying a current of 224 amp., as taken from wire tables, is 5.6 (224 × 0.0489) = 61.3 volts. The difference of potential at the generator is therefore 61.3 + 12.9 + 500 = 574 volts.

Finally, assuming an efficiency of 90 per cent., the power required to run the generator is:

Input to generator,

$$(574 \times 224) \div (0.90 \times 746) = say\ 190\ hp.$$

Boiler horsepower, efficiency of engine being 90 per cent.

$$190 \div 0.90 = say\ 210\ hp.$$

Examination Questions

Hoisting Engineers' Examination Held at Terre Haute, Ind., Sept. 10, 1914

(Selected Questions)

Ques.—(a) An engine cylinder is 12 in. in diameter and 18 in. long; what is its sectional area? (b) Find the cubical contents of this cylinder.

Ans.—(a) The sectional area of the cylinder is $0.7854 \times 12^2 = 113.1$ sq.in.

(b) The cubical contents of this cylinder is $113.1 \times 18 = 2035.8$ cu.in.

Ques.—What parts of a stationary engine should receive particular attention at the beginning of each shift?

Ans.—Before running the engine, all oil cups should be examined and filled; the engine guides and other bearings properly cleaned; the brake, cable-fastenings and all bolts and nuts carefully examined to see that they are secure. In addition to this, the engine should be operated for one or two hoists, after taking the precaution to first open the dripcocks to allow the expulsion of any water of condensation that may be in the cylinder.

Ques.—How may the water consumption of an engine be calculated?

Ans.—The water consumption, or water rate, depends on the style or type of engine in use, and may be calculated by a formula involving the mean-effective, steam-cylinder pressure, the dimensions of the steam cylinder and the percentage of clearance. Without these data at hand, a water rate of, say 40 lb. per hp. per hr., may be taken as a fair average weight of steam required for an ordinary slide-valve engine of the type commonly employed for hoisting in many mining districts. On this basis, the indicated horsepower of the engine multiplied by 40 will give the water consumption of the engine per hour.

Ques.—(a) Why are spring safety catches to be preferred to those operated by a weight and lever, on cages in a hoisting shaft? (b) How would you make a test of safety catches?

Ans.—(a) A safety catch dependent on the action of a weight attached to a lever would be practically inoperative in case of accident. When the cage started to fall the weight would fall with it, the two having practically the same velocity, except for the friction of the guides in the shaft, which would slightly retard the descent of the cage and cause the weight to act feebly with insufficient force to operate the catches, until the cage comes to rest at the bottom of the shaft. On the other hand, the action of the spring is not impeded by the fall of the cage, the force of the spring remaining unchanged at the time of the fall.

(b) The best method of proving safety catches is to put them to the actual practical test. For this purpose, the empty cage may be first raised a few feet above the landing and a fastening arranged that can be easily detached, allowing the cage to fall. If the catches prove sufficient, and the fall of the cage is arrested before it reaches the landing, the same test may be repeated with a loaded car of coal on the cage.

Ques.—How is the horsepower of an engine determined? Show the method by figures.

Ans.—In practice, the horsepower of a steam engine is calculated from an indicator card taken while the engine is in operation. This card shows the varying steam-cylinder pressure throughout each successive stroke of the engine. From the card, the mean-effective pressure in the cylinder is determined. To find the horsepower of the engine, multiply this mean-effective pressure by the area of the cylinder, in square inches, and that product by the piston speed, in feet per minute. Dividing this result by 33,000 will give the indicated horsepower of the engine.

For example, assume a single engine 10x12-in. cylinder, mean effective pressure 50 lb. per sq.in., running at a speed of 300 r.p.m., and find the horsepower developed. The diameter of this cylinder is 10 in. and its area $0.7854 \times 10^2 = 78.54$ sq.in. The length of stroke is 12 in. or 1 ft., and the engine makes $2 \times 300 = 600$ strokes per min. The horsepower of the engine is, then,

$$H = \frac{plan}{33{,}000} = \frac{50 \times 1 \times 78.54 \times 600}{33{,}000} = 71.4\ hp.$$

Ques.—What care should be taken of steam boilers to secure the best results from their use?

Ans.—Steam boilers should not be forced; that is to say required to generate more steam than what can normally be expected from the particular type of boiler and the area of its heating surface. For example, a return-tubular boiler will give, normally, an evaporation per hour, of from 2 to 2½ lb. of water from and at 212 deg. F., for each square foot of its heating surface; and a flue boiler about one-half again as much or, say from 2 to 3 lb. of water from and at 212 deg., per square-foot-hour. When, by a forced draft or overfiring, a boiler is made to generate a much greater quantity of steam there is danger of the fire-plates being burned and injured, especially if these plates are covered with scale.

Steam boilers should not be run continuously for too long a period; they should be blown off at regular intervals of time, say not to exceed one month; but when using a poor feed water that forms scale in the boiler, these periods should not exceed a week or ten days. Boilers should be thoroughly examined and cleaned regularly. If any repairs are needed or a leaky joint is discovered these should be given prompt attention.

Steam boilers should not be subjected to sudden changes of pressure or temperature; they should be evenly and regularly fired by an experienced fireman. Such sudden changes of pressure and temperature cause alternate contraction and expansion of the boiler sheets, which opens the joints and otherwise injures the boiler. The boiler foundation and settings should not be allowed to settle without immediate attention, as this settlement will throw undue strains on certain parts and weaken the boiler. The water level in the boiler should be kept as nearly uniform as possible.

Coal and Coke News

Washington, D. C.

The House of Representatives Committee on Mines which was directed to investigate the Colorado coal strike situation some months ago, rendered its report shortly before the adjournment of Congress and the document has just been published. It reviews the general conditions at the mines and makes some extremely vague and general recommendations for future Federal interference in controversies of a like sort but apparently has little or nothing to suggest with reference to the better adjustment or settlement of the present problem.

The report opens with an account of the work done by the investigators and then passes to a review of the general coal mining situation in the state which is sketched as follows:

> There are employed in normal times about 15,000 coal miners in the state. We beg to call attention to the evidence of Russell D. George, state geologist, as to the coal fields of the state, page 7, hearings. It should be remembered that in Colorado there are large coal deposits of anthracite, bituminous, and sub-bituminous coal. The seams range in thickness from 3½ to 14 feet. There are thousands of square miles of coal lands and estimated billions of tons. There is very little shaft mining in the state. The coal as a rule is easily mined. It must be remembered that a great deal of the coal lands is so situated that it is not practicable to mine the coal. In the cañons the mines on the edge have all the advantage, and where a company or individual owns the front as it is frequently impracticable to get to the coal which lies back of this so as to profitably mine it. There are many coal companies and persons operating in the state, but the three largest are the Colorado Fuel & Iron Co., which also operates steel mills at Pueblo; the Victor American Fuel Co., and the Rocky Mountain Fuel Co. The first of these companies owns and leases about 300,000 acres of coal and other lands.
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> The Victor American Fuel Co. owns and controls in the Colorado fields about 50,000 acres, besides having under lease coal lands in New Mexico; the Rocky Mountain Fuel Co. owns and controls approximately about 31,000 acres, so that in dealing with the strike these three large companies seemed to dominate the coal-producing companies of the state and were the real power. There are a number of independent companies, but they acted with the larger ones and seemed to be under their control and protection at all times. A circular was issued during the strike signed by the officials of these three companies claiming they represented 95 per cent. of the coal production of the state, and they must have had authority to issue such a circular. Colorado has been unfortunate in having a strike in its coal mines each 10 years. They are usually fierce struggles and always attended with violence, and this one was no exception to the rule.

The document here narrates the history of the various conflicts in the mines, the arming of both sides in the struggle, arms and ammunition having been purchased and imported, and finally, the intervention of the militia and troops. Both sides are severely blamed for refusal to arbitrate and a general indisposition to regard the rights of others, although the companies are subjected to the sharpest criticism on account of the methods employed for the control of the mining communities, the maintenance of business at company stores, and other acts of the same kind.

The Majority Report

In summing up the situation the majority report says:

> In Colorado it appeared that men on either side seemed to lose the respect they should have had for the rights of others, and at one time in the course of the strike there seemed to be a condition of anarchy throughout the southern part of the state. It has been unfortunate for Colorado and its people that these strikes should occur at stated periods with apparently no way to settle them except by force. We can not too strongly urge arbitration as a means of settling these disputes between capital and labor, and the people of this country are rapidly reaching the conclusion that parties to such a dispute must not be permitted to embroil a state or states in a prolonged and bloody warfare that disturbs so disastrously the peace and welfare of the Nation. To this end the Congress has created a Commission on Industrial Relations and authorized it to thoroughly investigate and ascertain the underlying causes leading up to struggles such as the Colorado strike and similar disturbances, and if possible suggest an effective remedy.
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> All concerned in the unfortunate situation that existed in Colorado for so many months are to be congratulated that at least a partial settlement has been reached. Many efforts have been made by various agencies other than those set in motion by the President and by the Congress to find a solution. In the end a proposal was made by President Wilson that all future difficulties be referred to a board of conciliation or arbitration, which should consist of three members of nation-wide reputation for ability and fairness. The miners accepted this proposal and called off the strike, but the operators have refused to accept this arrangement. It is yet to be seen whether the force of public sentiment will impress itself upon them in due time sufficiently to cause a thoroughly mutual acceptance of this principle of arbitration, which, while not wholly satisfactory to either party, is unquestionably for their best interests and the best interests of the public.
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> By a gradual but sure development the coal business of the country is being conducted on a large scale and by frequent consolidations is largely being carried on by large companies. Next to the business of transportation the fuel business of the country touches the people and their business in an intimate and important way. If these strike troubles continue to break forth, it will plainly be necessary to consider seriously whether some measure of regulation shall not be adopted with reference to this business as carried on in interstate commerce, as is now done with reference to the business of transportation.

In a minority report, Representative Austin makes the following recommendations:

> That if the parties to a coal strike fail or are unable to come to an agreement, the matters in controversy be referred to the Chief Justice of the United States Supreme Court as an arbitrator, and in the event of his sickness or unwillingness to serve, he request one of the associate justices of the Supreme Court to act as arbitrator.
>
> As the importation into Colorado of alien or foreign labor has been largely responsible for the last two strikes, resulting in the loss of over 60 lives and property, business, and wages amounting to $18,000,000 in the recent strike, the passage of a law to restrict undesirable or foreign immigration is of the greatest importance in preventing a repetition of the recent deplorable trouble in that state, practically amounting to a civil war, and requiring, according to President Wilson's view, the presence of Federal troops for months. In the first strike 80 per cent. of the strike breakers were aliens. During the recent trouble 80 per cent. of the strikers were foreigners and 80 per cent. of the strike breakers were foreigners.
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> We should keep out of the United States strike breakers who do not speak our language; do not enter our country to make it their permanent home, and put forth no effort to learn our language or to become naturalized American citizens. Such a wise and patriotic measure as would accomplish this purpose was recently passed by more than a two-thirds vote by both Houses of Congress, and although Samuel Gompers, president of the American Federation of Labor, and the officers of the United Mine Workers, and thousands of others, including myself, appealed in vain to President Wilson in the name of and in the interest of organized and unorganized labor to make this bill the law of the land by signing it, he refused to do so. As a result the United States will continue to receive every year perhaps more than a million idle foreigners, ready and anxious to take the place and crowd out of employment the honest and deserving native and naturalized American citizens, and not only in Colorado but in every state in the Union. Until such a law is passed we will continue to have alien or foreign strike breakers in Colorado and other states.

HARRISBURG, PENN.

Representative Myers has introduced a bill in the House for the creation and appointment of two assistant chiefs to the Department of Mines. One to be known as the "Assistant Chief of the Department of Mines for the Bituminous Region" and the other for the anthracite. The bill provides that the assistant chiefs shall be appointed by the Governor for a term of four years. It further provides that they shall have resided within the state for not less than 10 years immediately preceding their appointments. They shall be not less than 50 years of age and shall have had at least 15 years' practical experience in and around their respective classes of coal mines. They shall both have passed examinations given for inspectors in both regions respectively and shall hold certificates of competency qualifying them to act as such inspectors and they shall have had at least 8 years' active experience as mine inspectors under the Department of Mines immediately preceding their appointment as assistant chiefs, and shall be eligible for appointment without again being required to pass a written examination, but will have to stand an oral examination. The bill places the salary at $4500 per year. The chief of the department at $6000, inspectors at $4000 and deputies at $4000. The assistant chiefs are to be located at Scranton and Pittsburgh.

Representative Holleran has introduced two bills pertaining to the bituminous region, one of which calls for an inspection of the mines by a committee of miners, the other for uniformity in the size and weight of cars where coal is mined and paid for by weight.

The first bill provides that at every bituminous coal mine the miners employed therein shall have the right and authority at their option to select and appoint two or more of their number working at the mine as a miner's committee of inspection. The committee is to have the authority to inspect all sections of the mine with respect to its safety, ventilation and drainage, at least once every three months, and report their findings to the chief of the Department of Mines and to the mine inspector of the district. It also gives them the right to investigate all fatal accidents.

The second bill provides that at every bituminous coal mine where coal is mined by measurement all cars filled by miners, etc., shall be uniform in each mine, except where by reason of difference in the thickness of the vein or veins being mined to a common tipple, such uniformity of cars is not practicable in the judgment of the mine inspector of the district. The said mine inspector is made final arbitrator in case of dispute, where cars are not required to be uniform in size and weight, and each individual car shall be branded with the proper weight of the empty car.

A bill providing for the refund of the money collected by coal dealers by reason of the anthracite tax has been introduced in the House by Mr. Garner. The bill provides that all coal companies who have collected from the people of the state any moneys by way of an increase in the price of coal, etc., when such state tax upon coal is thereafter declared unconstitutional by the Supreme Court of the state shall refund to all persons the additional moneys with interest in the manner set forth in the bill.

The Governor's Child Labor Bill appeared in the House during the week, and provides that no child under 16 years of age shall be employed inside of any bituminous or anthracite mine. It also states that every child shall, between the ages of 14 and 15 if employed, spend one full day a week in a vocational school, and the child between 15 and 16 years of age shall spend one-half day per week in a vocational school. The Governor in his inaugural address said that no child under 16 should work in Pennsylvania. He should be in school.

Representative Powell has introduced a bill in the House providing for four new inspectors in the anthracite region, three in the first inspection district, which is Luzerne County, and one in the second district or Lackawanna County.

In the event of a code for safety and regulation of operations being adopted by the committee of quarry owners, operatives and employees, the Department of Labor and Industry and the State Industrial Board it is probable that no steps will be taken by the Department of Mines to draft rules. A resolution was adopted by the last Legislature for such rules, but the state board found that it had powers to adopt rules and meetings have been held here during the week, which will be continued later in the month. If the code is adopted by the board it will go into effect in the summer.

PENNSYLVANIA

Anthracite

Almedia—There is at present considerable activity among the coal dredgers here who are anxious to get their dredges in operation on the Susquehanna River. Unless the weather prevents, work will probably start in a few days. Four dredges will be put to work.

Hazleton—John C. White, national president of the United Mine Workers of America, on Mar. 6, issued a call for a meeting of the executive boards of the three anthracite districts to be held at Wilkes-Barre, on Apr. 5. A date will then be fixed for the convention at which the next demands to be made upon the operators will be formulated. The present agreement expires in about one year.

Summit Hill—The Citizens' Committee of Summit Hill forming itself into the Summit Hill Civic Association, is negotiating for the purchase of 5½ acres of land at the place where Philip Ginter, the hunter, discovered anthracite coal in 1791, and where the first anthracite mine in the world was opened, and the coal shipped to Philadelphia to market. This land will be converted into an athletic field, and will be known as the Ginter Memorial Athletic Field.

North Scranton—Employees at the Fairview colliery of the Peoples Coal Co. were recently notified by the officials that the plant would close down indefinitely. The miners were instructed to remove their working tools and other belongings from the mine.

Nanticoke—A stubborn fire in the Lee and Ross fan house of the Susquehanna Coal Co. recently, for a time threatened the safety of the 1000 men at work in the mines, but the timely arrival of an emergency fire fighting locomotive of the Pennsylvania R.R. quickly conquered the flames. A call was sent to the Honeypot yard of the Pennsylvania R.R. and an engine was quickly equipped with the emergency outfit. The engine has 150 lb. water pressure and quickly got the best of the blaze. A fan house on the same site was destroyed by fire several years ago.

Dunmore—The Pennsylvania Coal Co. and the Hillside Coal & Iron Co. issued orders on Mar. 4, that from henceforth district superintendents, mine foremen, assistant mine foremen, outside foremen, weighmasters and clerks must not use intoxicants. Otherwise they will have to seek employment elsewhere. Binding instructions also accompany the order and the rule will be strictly enforced.

Mauch Chunk—The Lehigh Coal & Navigation Co. is making arrangements to open boating on the Lehigh and Delaware divisions of its canal on Mar. 15. Many improvements are now being made.

Scranton—In the production of 8,388,126 tons of coal in the five inspection districts of Lackawanna County and parts of other counties during 1914, 128 lives were lost; 142 mines were in operation in the five districts and more than 41,000 men and boys were employed in the industry. The coal produced in the county during the year shows no material decrease from the production of other years.

Bituminous

Uniontown—Following the marked increase in coke production since the beginning of the present year, the H. C. Frick Coke Co. recently announced an increase in wages of 10 per cent. for practically all of its 17,000 employees.

Greensburg—John F. Bell, mine inspector for the 22nd bituminous district, in his recent report, showed that 5,169,332 tons of coal were mined during 1914. There were 25 mines in the district, most of them lying in Westmoreland County. Sixteen persons were killed while at work in the district. But little coke was made; the total output for the year being 29,743 tons.

Scottdale—The annual report of Mine Inspector B. R. Blower, for the 11th bituminous district, shows that the tonnage fell off in the past year to the extent of 1,068,096 tons, the production being 5,694,568 tons. There were 12 fatal accidents in and about the mines, 408,561 tons of coal being produced per fatality.

Carroltown—A large force of men has been made idle by the closing of the Buckwheat mine, acquired some time ago by the Peale interests. It is said there was some sort of a misunderstanding regarding royalty payments, but no statement of the trouble has yet been given out.

Marianna—The commission in charge of relief work at this place has been compelled to make another appeal to the people for funds to tide the needy over to Apr. 1, when it is expected the mines at Marianna will be put in operation. About five weeks ago part of the funds of the miners' union which was tied up in the failure of the Marianna bank were secured and this amount tided the needy over until this time.

WEST VIRGINIA

Wingrove—The store belonging to the New River Coal Co. was destroyed by fire recently. The building was valued at $3000 while the stock of goods was valued at $7000. It is not known how the fire originated.

Huntington—Geologists and mining engineers are preparing to urge the legislature to make an adequate appropriation for the continuation of the West Virginia Geological Survey. It is stated that the appropriation for this Bureau has been cut from $45,000 to $7500, and that unless provision is made for a continuation of the Survey's work, it must soon be discontinued.

Charleston—More than 15,000 miners in the New River coalfield threaten to strike unless a satisfactory wage agreement is reached before the present agreement expires. The conference committee representing miners and operators adjourned their session Mar. 6 without reaching such an agreement.

Fairmont—At a recent meeting of the operating officials and sales managers of the Consolidation Coal Co., it was announced that the mines in the Fairmont district would be operating on full time in the near future.

ALABAMA

Birmingham—Chief Mine Inspector C. H. Nesbitt states that the coal production for Alabama for 1914 will not exceed 15,000,000 tons, at least 2,000,000 tons less than during 1913. Mr. Nesbitt expects to have the 1914 annual report completed within the next week. There was only one fatal accident reported to the chief mine inspector in the coal mines in this district for the month of February. This is a record for this district.

KENTUCKY

Hazard—Mining operations by the different coal companies in the vicinity of Hazard have improved 50 per cent. within the past 10 days. Orders are said to be piling up at all the plants —sufficient, it is said, to guarantee the operation of the mines daily for the next 6 months. A number of the mines will also have to increase their output in order to fill the orders. The eastern Kentucky coal field is rapidly picking up to normal conditions.

The Kentucky Jewel Coal Co. recently secured a large order for coal to be shipped to the lake trade. This is the pioneer venture in getting the Hazard coal to the large markets around the Great Lakes and in the Northwest.

St. Charles—Owing to depression in the coal business the St. Bernard Mining Co. recently laid off 40 men at this place. The force was also considerably reduced at Shamrock and at all the mines at Earlington. The men were laid off indefinitely.

Prestonburg—Beginning with the first of March the Middle Creek Coal Co., which has been employing 200 miners, began on a new scale of all mine work and loading, which was a reduction of from 10 to 20 per cent.

The Beaver Pond Coal Co.'s mine here has been closed by the sheriff, as the result of claims which have been filed by the miners, who allege they have had only one payday in the last two months. The company is capitalized at $100,000. It has a contract with the city to supply electricity for the city lights and it is understood the power plant will be kept in operation.

OHIO

Hamden—The mines of the Starr-Hocking Coal Co. have been closed indefinitely because of lack of demand.

Columbus—The Ohio Senate on Mar. 4 passed the Gallagher bill with only 9 dissenting votes. This measure allows coal miners and operators to agree independently of the Mine-Run Law enacted two years ago. The bill will go to the house where it is said to be assured of favorable consideration. This measure was designed to afford a settlement of the coal strike in eastern Ohio.

INDIANA

Oakland City—Three men who were entombed in the Ayrshire coal mine near here Mar. 7 were found dead on Mar. 8 when the débris was cleared away. These men were placing props when they were crushed by a fall of slate.

Brazil—The leases of the Domestic Block Coal Co. on about 1300 acres of land which were allowed to lapse during the period of financial difficulty of the mining company are being renewed, and it is rumored that the mine will change hands shortly.

The American Coal Mining Co., made up of Brazil capitalists and representing $1,000,000 investment, has opened near Bicknell what is said to be the largest mine in Indiana, with a capacity of 4000 tons a day, from veins 5 and 6. The officers are: President, William M. Zeller; Vice-President, H. R. McClellan; Secretary-Treasurer, W. J. Snyder; Mine Manager, H. G. Conrad. Office headquarters have been established in Indianapolis.

Sullivan—Workmen have about cleaned up the Union mine of the Consolidated Coal Co., which recently shut down because of depressed trade conditions and higher freight rates than from competing mines. The rails will be pulled and the machinery transferred elsewhere.

ILLINOIS

Carlinville—The mine of the Carlinville Coal Co. will be shut down for several months, probably until early fall. It will be closed in order to make urgent and necesssary repairs, namely, the installation of two boilers. These boilers were condemned by the inspector several months ago, and their use was discontinued. However, the company placed a traction engine at the air shaft of the mine to operate the fan. The 24 mules now in the mine will be removed until the repairs are completed.

East St. Louis—Announcement has been made by officials of the United Mine Workers that the gang that has been operating throughout the 5th and 9th Districts, selling fraudulent mining certificates to miners has been broken up. Early in January some of the ring leaders of this gang were captured and warrants were sworn out for others, who were indicted by the Grand Jury for selling to miners at prices ranging from $25 to $40 each a certificate permitting the miner to work in any mine in the State of Illinois as required by the state law. These counterfeit certificates were so perfect, both in the workmanship and in the forging of the signatures that the state officers, as well as the mine officers had a hard time in satisfying themselves that something was wrong.

Pana—Eight hundred miners at the Witt mine, west of here, were recently notified to remove all their tools from the mine, as it was going to shut down for an indefinite length of time. Four hundred miners employed at the Taylor Springs mine, near Hillsboro, were also notified that that operation would shut down for an indefinite period. These mines are controlled by the Peabody Coal Co., of Chicago.

Panama—The tipple and top works of the Shoal Creek Coal Co. at this place were destroyed by fire a short time ago. This will shut the mine down for many months.

MISSOURI

Rich Hill—The shaft on the property controlled by the Atlas Coal Mining Co., near Rich Hill, where a disastrous explosion occurred last month, killing five miners, has been abandoned by order of the state coal mine inspector. The company is removing the machinery and equipment for use elsewhere. According to the owners of the land, another shaft will be put down near the old mine.

COLORADO

Denver—The Victor-American Fuel Co., J. C. Osgood, president, has purchased a large area of valuable coal land in Routt County, Colo., between Steamboat Springs and Hayden on the line of the Denver & Salt Lake R.R., also the mine of the Pinnacle Coal Co., in the Pinnacle vein of coal, near Oak Creek on the same railroad and likewise in Routt County. This mine has an output of about 1000 tons per day and is one of the best mines in that section. The coal is 12 ft. thick and a high-grade domestic and steam fuel.

PERSONALS

Andrew Fitzsimmons, a veteran employee of the Pennsylvania Coal Co., has been placed on the pension list. He served the company about 65 years.

Edward H. Coxe, of Knoxville, Tenn., is spending a couple of weeks in Wyoming, making an examination for the Union Pacific Coal Co. of its properties with reference to safety and welfare.

B. F. Riggs, chief of the construction department of the Consolidation Coal Co., has resigned his position, and in the future will devote all of his time to the management of the Fairmont Building & Investment Co.

Harry S. Bott, of Altoona, in company with J. P. Laughery and W. A. Elder, has leased an extensive tract of coal land bordering on Coal Pit Run near Ligonier, Penn., for the purpose of developing the upper Freeport vein of coal.

L. M. Dorsey, superintendent of the Piney Mining Co. at Riley, W. Va., for the past 11 years, has given up that position and moved to Winding Gulf, to become assistant superintendent of the operation of the Winding Gulf Colliery Co.

F. K. Day has been appointed division engineer in charge of the engineering works in West Virginia of the Consolidation Coal Co., in place of E. B. Moore, chief engineer resigned. Loman Riggs of the same company has been promoted to assistant division engineer.

Edward Cunningham, of Thurber, Texas, president of the United Mine Workers of Arkansas, Oklahoma and Texas, has resigned. William McLachlin, of Huntington, Ark., has been temporarily appointed to succeed Mr. Cunningham, who it is understood is to become state mine inspector in Texas.

Joseph Meister, president and general manager of the Meister Coal Co., together with Jacob Meister, secretary of the same firm, both of Flushing, Ohio, recently made a trip to West Virginia to look over some coal lands in the Kanawha County field. They are contemplating taking over a block of coal in that district and opening operations.

T. A. Bennett, who for the past 5 years has had charge of the conveyor and elevator belt sales of the B. F. Goodrich Co., Akron, Ohio, has severed his connection with the Goodrich company, to become the assistant to the general sales manager of the New Jersey Zinc Co., with offices in New York City. Mr. Bennett will be succeeded by J. D. Mooney, formerly special mining representative for the Goodrich company.

OBITUARY

Harvey S. Robins, a wealthy coal dealer, of Shamokin, Penn., died recently at Charleston, W. Va., where he had been spending the winter. The body was brought back to Shamokin and interred in the family plot at Reed Station Cemetery.

Edward F. Boyle, 41 years of age, died at the Uniontown Hospital Mar. 5 from the effects of injuries sustained through the bursting of a sheave wheel at the plant of the H. C. Frick

Coke Co., where he was mine foreman. Mr. Boyle has been employed at the mine for many years. He began at the Valley Works, but was later transferred to Leisenring No. 1 as fireboss. Mr. Boyle was born in Ireland and came to America about 20 years ago. He married Miss Sarah Walsh, sister of Mine Inspector Walsh at Scottdale. His widow and four children survive. Interment took place at Scottdale.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines—"Hand Firing Soft Coal Under Power Plant Boilers," by Henry Kreisinger. Eighty-three pages, 6x9 in., illustrating and describing the best methods of hand firing boilers with soft coal.

Department of the Interior, Bureau of Mines—Miners' Circular 21, "What a Miner Can Do to Prevent Explosions of Gas and Coal Dust," by George S. Rice. Twenty-four pages, 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines—"Procedure for Establishing a List of Permissible Miners' Safety Lamps, Character of tests, conditions under which lamps will be tested and fees." Ten pages, 6x9 in., unillustrated.

CONSTRUCTION NEWS

Hazard, Ky.—The Lexington & Eastern R.R. has announced its intention of building a 3-mile branch line of road up Buffalo Creek just above Hazard to reach a rich undeveloped coal field. Coal development work is to be started at once on Buffalo Creek.

Whitesburg, Ky.—It is said that an Eastern syndicate is purchasing coal lands in Knott County for the purpose of beginning early developments. A large part of the new purchase lies along Carr's Fork of Kentucky River. A new extension of the Lexington & Eastern will be necessary.

Cadiz, Ohio—The construction of a branch railroad from the Wheeling & Lake Erie at Adena, which will extend to this place, opening up a considerable territory heretofore inaccessible is assured by the filing of a mortgage in Cleveland for $600,000 by the Short Creek Coal Co. The new line is to be known as the Adena, Cadiz & New Athens Railroad.

Exeter, Penn.—The Pennsylvania Coal Co. will shortly begin the erection of a new pump house in the Muddy Brook Colliery. This structure will be in the 11-ft. coal bed and be built of solid concrete with steel reinforcing. The roof will be arched. An idea of the size of the proposed structure may be gained from the statement that it will cost upward of $10,000.

Kemmerer, Wyo.—The Lincoln-Kemmerer Coal Co., a recently formed corporation with a capital stock of $250,000, is opening a new mine near here and within a short distance of the main track of the Oregon Short Line. A slope is being sunk on a 12-ft. bed of coal of unusual quality, and the product of the new mine will be on the market within a few weeks.

Barbourville, Ky.—Pennsylvania owners of 30,000 acres of coal and timber land in Clay County, Ky., recently met with a delegation of Clay and Knox County land owners and went over plans for a proposed railroad extension from Barbourville to Manchester, a distance of 24 miles. Clay is one of the few remaining Kentucky counties without a railroad. It is understood that the Pennsylvania interests want a free right of way and a moderate bonus, which it is believed will be forthcoming.

Du Quoin, Ill.—On or about the first of April engineers will begin the surveying for a continuation of an electric line operating through the coal fields of Perry, Franklin, Williamson and Saline counties, with the objective point opposite Paducah on the Illinois shore. This line will open up an entirely new territory practically all the way through. From here it will go through Royalton, on to Herrin and Marion, then east through Williamson County to Carrier Mills in Saline County, and south through Hardin County to the Ohio River. It is understood that foreign capital is behind the road, and that it will be a continuation of what is now known as the Southern Traction Co. operating a short distance out of St. Louis, but which has a franchise to operate to this city.

Boston, Mass.—The trustees of the Boston City Hospital will receive proposals for a coal pocket and coal handling apparatus to be constructed at the Boston City Hospital until 12 o'clock noon Mar. 16, 1915, at which time these proposals will be publicly opened and read. All proposals must be made on blank forms obtainable at the office of the engineers of the work, Bensmore & LeClear, 88 Broad St., Boston. All bidders will be required to give the trustees satisfactory assurance of their competency, experience and responsibility. Proposals must be accompanied by a certified check on a Boston bank for $500, payable to the City of Boston. The right is reserved to reject any and all bids and to waive any defect or informality at the discretion of the trustees. John J. Dowling, M. D., is superintendent.

NEW INCORPORATIONS

Cleveland, Ohio—The Cambridge Colliery Co. has increased its capital stock from $1,600,000 to $2,000,000.

Nashville, Tenn.—The King-Harlan Coal Co. has been organized with a capital of $150,000. The incorporators are Tyler Calhoun, A. H. Wood, A. L. Childress, Harry Ward, and Harold C. Trabue.

Chicago, Ill.—The John A. Logan Co., of Chicago, was recently organized with a capital stock of $50,000 to mine, buy and deal in coal and other minerals. The incorporators are Andrew J. Ryan, James E. Condon and Thomas J. Condon.

Mullins, W. Va.—The Mead-Toliver Coal Co. and the Wood-Sullivan Coal Co. both of Mullins, were recently organized with a capitalization of $100,000 each. Both firms were organized with the same list of incorporators, namely, J. B. Sullivan, of Mullins, J. E. Toliver and Joe L. Smith, of Beckley, and H. P. Mead, of Maben.

Mullins, W. Va.—The Devils Fork Coal Co. was recently organized with chief works at Barkers Ridge in Wyoming County. The capital stock is placed at $100,000 and the incorporators are James Collins, of Bramwell, L. M. Franz, of Mullins, William Rezzonico, of Good Will, E. E. Hargsock, also of Good Will, and S. P. Franz, of Mullins.

INDUSTRIAL NEWS

Liverpool, England—The coal-heavers strike which tied up shipping at this port for some time has been settled. Some of the men returned to work Mar. 4 while the balance resumed work Mar. 5.

Huntington, W. Va.—Huntington will probably be the scene of the proposed gathering of West Virginia coal operators when the matter of organizing a self-defense league is taken up. Plans are now being made for the operators to organize an association which shall have for its purpose the protection of the coal mining industry of the state.

Charleston, W. Va.—State officials estimate that nearly $200,000 will be paid out of the workmen's compensation fund to the families of the men who lost their lives at the Layland mine of the New River and Pocahontas Consolidated Coal Co., where a recent explosion occurred. The widows of the men lost will receive $20 per month with $5 per month for each child under 15 years of age.

West Middletown, Penn.—It was recently learned that John A. Bell of Carnegie has renewed the options on 5000 acres of coal in the eastern part of Hopewell Township in the vicinity of Buffalo Village. The renewals are for 6 months, and it is generally believed throughout the district that the coal will be sold before the expiration of that time. The majority of the options are at $100 per acre while some are at $150 per acre.

Point Pleasant, W. Va.—Harold W. Poysell and Edwin Marmet, receivers of the Marmet Coal Co., recently filed a report for the year ending Feb. 1, 1915, showing that the business made a profit during only four months of the year. These four months showed a profit of $14,558.98 while the remaining 8 months footed up a total loss of $28,593.74, leaving a net loss of $14,034.75.

Washington, D. C.—A complaint against the rate on coke from the Connellsville region to the Buffalo district in New York, was recently filed with the Interstate Commerce Com mission by the Buffalo Union Furnace Co. and the Wickwire Steel Co., in which it is stated that the rate on coke from the Connellsville district to the Buffalo territory is $1.85 per ton, whereas the rate on coal from the same origin to the same destination is but $1.40 per ton.

Coal Trade Reviews

General Review

Anthracite shipments show a heavy decline. Outlook for April business rather unfavorable. Bituminous buyers forcing concessions on new contracts. Negotiations progressing slowly. Pessimistic outlook for the Lake trade.

Tangible evidence of the extremely adverse conditions prevailing in the anthracite market is seen in the current statement of shipments for the first two months of the year, which are the lightest in the modern history of the anthracite trade. This situation was fully anticipated, however, since all the collieries have been curtailing to a greater or less extent during this period—a most unusual condition in the mid-winter season. The low temperatures and storms at the beginning of the current week arrived too late to stimulate any important buying, and the agencies are now turning their attention to the outlook for April business. These minimum prices of the year invariably create a rush of orders, but this season finds the consumers less interested than usual, and conservative observers are beginning to anticipate a light month.

The bituminous agencies are still concentrating their entire attention on new contracts, the situation on which is generally unsatisfactory. Business is being closed with the greatest difficulty, and keen competition of the most aggressive kind is forcing the producers to make substantial concessions on old figures in many instances. In addition to this, the amount of business being closed is falling substantially behind previous records. The offshore movement from Hampton Roads has increased, but the accumulations continue large there, as well as at other Tidewater points, though prices are fairly well maintained, principally for the reason that there is little to be gained by cutting. Persistent rumors of a break in Coastwise freights was one of the features of the week.

The warm weather, the extreme conservatism on the part of the retail dealers, and a relapse in the manufacturing and industrial demands from which so much has been expected, has created a distinctly adverse sentiment in the Pittsburgh district. Bids are exceedingly low on what few contracts come up, operators appreciating that this will be necessary to land the business. Lake shippers are still showing little or no interest in purchases, while the market is glutted with even more coal than during the past several weeks, and prices are softer.

Ohio dealers are busily engaged in cleaning up stocks and manufacturing is not showing any increase, so that the demand is light in every direction. It is clear that the opening of the Lake trade will be slow. The Southern markets are heavily over-stocked, while the mines are running at half capacity, and some are even closed down entirely.

Summer conditions prevail in the Middle Western market, with prices at unprecedented low levels. On new contracts buyers are deferring definite action, and using every means to force concessions on last year's figures. Requisitions on current contracts have been restricted to the lowest minimum specified, and there are still large tonnages of consignment coal on track with more en route. The labor officials complain that there are more idle men than for a number of years.

ATLANTIC SEABOARD

BOSTON

What interest there is in Hampton Roads coals is confined to the freight market. Georges Creek shippers begin to enter market for season business. Anthracite orders accumulating for April delivery.

Bituminous—The market shows a very sluggish tone. On Hampton Roads coals there is very little doing; prices are more or less soft, and the outlook disappointing. The dullness has spread to water freights and there are persistent rumors that recent charters have been made at lower figures. This makes the buyers who have stayed out of the market all the more resolved to wait developments, and 5@10c. concessions no longer interest them. Most of the contracts already closed include a rather generous protection clause and at present writing it looks as if some of the early prices would have to be revised.

Meanwhile Pocahontas and New River are in heavy supply at the Virginia piers and occasionally low prices are made to free cars. At distributing points here stocks are still large and inquiry very light. Receipts here are mostly for contract application, only a fortnight or so remaining now for coal on the 1914 basis.

There are signs of the Georges Creek interests entering the market now for season business with delivered prices on a competitive basis. In a good many quarters buyers are partial to this coal, but it seems almost inevitable that this year its tonnage here will be materially reduced.

Shippers of the better grades from Pennsylvania continue active in this market but nothing significant as to tonnage can be reported. The prospect for a larger volume of these coals in New England is very much involved with the situation on water freights. If the latter are high it means a larger opening all-rail and by reason of the difference in price f.o.b. a more favorable prospect at tide-water.

Water freights are believed to be on the point of weakening; that is, for current charters. The $1 rate that has been held very firmly for several weeks has receded to 90c., Hampton Roads to Boston, and there are rumors, not yet confirmed, that an even lower rate has been named. The fact is, orders are so scarce that owners of coastwise transportation, barges in particular, are unable to place their tonnage.

Anthracite—The weather continues so mild that there is no current business. The only present interest is in April delivery at the anticipated 50c. reduction in the circular. These prices have been discounted by individual shippers for several weeks but New England buyers have heard rather less of such offers than if outside freights had been lower.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.90@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*.....	2.15@2.65	2.40@2.85	2.92@3.02	
New York*.......	2.45@2.95	2.70@3.15	3.22@3.32	
Baltimore*.......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.70@2.80
Boston†........	....	....	....	3.70@3.90
Providence†.....	....	....	....	3.58@3.73

* F.o.b. †On cars.

NEW YORK

Buyers are forcing concessions on old contracts. Anthracite down to an irreducible minimum. Full April circulars prevail generally.

Bituminous—The salient feature of the bituminous market continues to be the extremely sharp competition on new contracts which is having the expected result of forcing concessions on last year's figures in many instances. This applies more particularly to those contracts where moderate advances were made last year; the reductions are back to the former level in most instances, but the agencies are meeting these figures only as a last resort, since they quite frequently mean the elimination of practically all their profit.

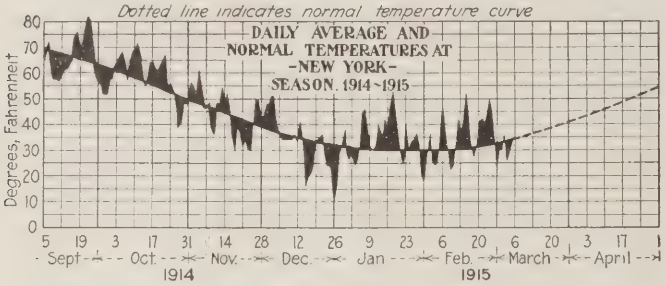
The spot market continues in a rut and prices are very uncertain. The supplies at Tidewater continue excessive and there is considerable coal reported on demurrage at different times which is accentuating the difficulties of the situation and causing a wide fluctuation in quotations. The bunkering trade so far for the current month has been somewhat above the average. We continue prices on the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15 Georges Creek, $3.15@3.25.

Anthracite—The local anthracite market has seldom, if ever, been so completely flat. The customary season's end slowing up characteristic of March, has been doubly accentuated this season by the exceedingly poor business throughout the year, and the unfavorable outlook over the future. The individuals are making no pretense of obtaining anything above the April circular, with the possible exception of egg coal, on which the very best qualities command a very slight advance on the Apr. 1 schedule. Stove coal is impossible to move except when a certain proportion of egg is offered as an inducement. Pea coal is very slow. A shortage of the steam grades is developing as would only be expected under the heavily curtailed mining operations.

Working schedules have seldom ever been so severely restricted; the Delaware & Hudson have closed down for a straight week, while the Delaware, Lackawanna & Western and the Jersey Central will work only three days and the Lehigh Valley two days. The Reading Co. worked only three days last week.

We quote the New York market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	4.85@5.35	5.30	4.80@5.30
Chestnut	5.60	5.10@5.60	5.55	5.05@5.55
Pea	3.55	3.40@3.55	3.50	3.30@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.90@2.25
Barley	1.80	1.70@1.80	1.75	1.30@1.75



BUFFALO

Slight stir in bituminous, which seems likely to continue. Prices will remain low, as indicated by the bids for spring contracts. Consumers curtailing purchases to the minimum. Anthracite very quiet.

Bituminous—There is some increase in demand, but nothing to compare with what there should be at this time of the year, when so many contracts are to be made. Bidding is low, as otherwise there is little chance of getting the business. Competition apparently is not likely to be very sharp, as the chance of getting contracts depends so entirely on low bidding that many prefer to stay out entirely, in the hope that there will be small contracts and general orders enough to keep them going. It has often happened that when a spurt did come a great many operators and jobbers were without surplus and had to turn everything in on contracts, which had been taken at low prices.

There is some coal on track and some consumers are buying all their coal in this way, entirely at their own prices. Indications point to another season of prices made practically by the consumer. The mines still run at a slow rate and their capacity is so much greater than even a normal consumption, that any increase of demand would be quickly absorbed.

Pittsburgh operators have not signified that they will make a Buffalo price for spring and it may be that they will not do so at all, which leaves prices as per unofficial circular on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower than Pittsburgh.

Anthracite—The demand is very light. Independent anthracite operators have been selling at April prices and even at such a reduction have not been able to stimulate much demand. March is always a slow selling month, however, unless it happens to be unusually cold, which has not been the case so far.

The mines are running about as slow as they ever do and still there is a surplus; some shippers report that two or three days a week is a good average with them. Both stove and chestnut are in excess of the demand but oddly enough there seems to be no more egg than is needed, though it was very plentiful last fall. There is now about 175,000 tons of anthracite afloat here, a third company having taken some tonnage. Vessels are scarce, though they will usually take coal cargoes as fast as they discharge their winter grain.

PHILADELPHIA

Snow fall early in week had little effect in increasing the anthracite demand. Steam sizes the only active department. Better inquiry in bituminous, but little business showing as yet.

Anthracite—Contrary to expectations, the snow storm late last week caused little or no increase in the anthracite demand. It is comparatively easy at the present time to fill up incomplete stocks with April-price coal, and interests maintaining the maximum circular, find themselves hard pressed to dispose of their heavily curtailed output. Even with the inducement of the low prices, dealers hesitate to take on additional supplies.

April offerings appear to be the rule rather than the exception among the individuals; pea coal sells as low as $2.10 at the mines, which is a flat concession of from 40 to 50c. from the circular. Steam sizes seem to be in fair demand, and the market is absorbing the curtailed production. Contracting on the broken and steam sizes has about been completed, and the prices realized compare favorably with last year, during the previous coal season, namely, $3.35 for broken, $2.35 for pea, $1.30 for buckwheat, and 90c. for rice.

Predictions as to the outlook for April and May are varied. While it is undoubtedly true that the dealers are well stocked, those still desiring to take on coal at the low prices will probably cause a demand which will be difficult to fill; most dealers feel that they should receive shipments on all the orders they place for April consignment. But there has never been a period when there was such an apparent lack of interest in April business.

Prices ruling at Tidewater are about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.60@4.70
Stove	5.00	4.90@5.00
Chestnut	5.25	4.90@5.00

Bituminous—There seems to be a slightly better feeling in the trade, due to the fact that there appears to be a little more business in the market.

HAMPTON ROADS

Export shipments for the week show up well. Dumpings for month of February 880,075 tons. Still an excessive supply in the yards.

Dumpings over the Hampton Roads piers for the week have shown up satisfactorily under existing conditions. The export cargoes have gone forward by both schooner and steam vessels and there has probably been the largest number of schooners sailing from Hampton Roads during the week just closed, in the history of the port; it is also understood that several others are now in port loading and due to clear in the next few days. Some little coal has been taken by the government and the coastwise movement has been fair.

The railroad yards still have more than the normal supply of coal on hand but this has in no way affected prices as cutting does not seem to increase the demand for tidewater coal, especially on export business.

During the month of February just ended a total of 880,073 tons of coal was dumped over the Hampton Roads piers. While these figures show a decrease of 5460 tons below those of January, it is really an increase over January shipments as the former month had 31 days while February had but 28 days. During February the Norfolk & Western dumped 383,672 tons from Lamberts Point, the Chesapeake & Ohio 260,472 tons from Newport News and the Virginian Ry. 235,929 tons from Sewalls Point.

A total of 141 vessels, foreign and American, cleared for foreign ports and 14 of the American vessels were schooners.

The following cargoes cleared from Norfolk and Newport News, between Feb. 27 and Mar. 5, inclusive:

Norfolk			Newport News		
Vessel	Tons	Destination	Vessel	Tons	Destination
Copenhagen	2203	Salaverry	**Neugus**	3887	Port au Spain
Chiswick	4500	Canal Zone	**Anna**	1643	Santiago
Franklyn	7400	Genoa, Italy	Chas. Whittmore	1109	Cienfuegos
Margaret Haskell	3260	Montevideo	Edith	1791	Cienfuegos
Berwindvale	7901	Havana, Cuba	Margaret	1993	Cienfuegos
Singleton Palmer	4072	Rio	Matanzas	1525	Cadiz, Spain
Marcus L. Uran	2720	Rio			
Mary E. Palmer	1895	Rio			
Naugarland	6550	Genoa, Italy			
Addison E. Bullard	2500	Montevideo			
Hermod	4500	Curacao			
Beckenham	6100	Canal Zone			
Nellie W. Craig	709	Bermuda			

Note—Steamers are indicated by **bold face type**, all others being schooners.

BALTIMORE

Snow and sleet storm impedes traffic and movement was light. Outlook on contracts not favorable.

Export fuel and sample lots for contract tests have been delayed by the recent storms but not seriously as there was enough coal at Tide to meet the requirements generally. Contracting absorbs the attention of the bituminous trade. It seems likely from present outlook that the business closed by the middle of April will be less than last year. Prices remain about the same. West Virginia gas three-quarter is selling around 85 to 90c., with steam coal of low grade around 80 to 85c. and best fuels at $1.25. Pennsylvania lower grade coals sell at from 90c. to $1, and best fuels at from $1.25 to $1.35.

OCEAN FREIGHTS

Market continues to advance. Sugar freights to West Indies steady up.

There was a further advance in the freight market last week, owing to the continued demand for steamers for grain cargoes. Prompt boats are practically unobtainable. The British St. "Nora," about 5000 tons cargo, was chartered in London to load coal from Range to Montevideo at $9.60. A number of sailing vessels were chartered last week to Rio at $6 and $6.50; and also a vessel to the River Plate at about $7.25, free discharge. On above charters all foreign port charges are for the account of the charterers. There is a lull in sugar freights, and should same continue, it might be possible to shade the rates to West Indies quoted below:

To	Rate	To	Rate
Havana	**$3 00**	Guantanamo	**$3.75**
Cardenas or Sagua	**3 75**	Demerara	5.50@ 6.00
Cienfuegos	**3 50**	Bermuda	3.75@ 4.25
Port of Spain, Trinidad	**3 50**	Vera Cruz	**3 50**
St. Lucia	**3 50**	Tampico	**3 50**
St. Thomas	**3 50**	Rio	**10 20**
Barbados	**3 50**	Montevideo, Buenos Aires or La Plata	**9 60**
Kingston	3.50@4.00	Mediterranean	9.60@12.00
Curacao	**3 25**	Valparaiso	**8 40**

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
(2 foreign steamers)		Atlantic range	Italy		$9.60
Baker Palmer		Baltimore	Boston	2240	
Helen W. Martin		Baltimore	Galveston	2029	
Sif	Norwegian	Norfolk	Martinique	1959	
The Josephine		Norfolk	Savannah	563	
Nora	British	Atlantic range	Montevideo	2537	9.60
Myrtle Leaf	British	Port Johnston	St. John, N. B.	336	1.35
Progress III	Norwegian	Baltimore	Mediterranean	2224	
Stella (ship)	Norwegian	Baltimore	Rosario	1818	8.00
Dorothy Palmer		Norfolk	Rio Janeiro	2315	6.00
Chas. A. Campbell		Norfolk	Rio Janeiro	1493	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Market has lost strength and is quotable 5c. lower. Contract demand light. Mines operating at 50 to 60% capacity and producing too much coal.

The Pittsburgh district coal market has lost in strength rather than gained in the past week or two. The domestic demand has been altogether unsatisfactory, on account of relatively warm weather and the extreme conservatism of retail dealers, while the demand from other quarters has experienced no further increase, and this has been a direct disappointment to coal operators, whose expectations were based upon a continuance of the improvement in manufacturers' demand that began two months or more ago. The market is more glutted with coal than at any time for many weeks, and prices are softer than ever.

Contract buyers and Lake shippers are showing no interest whatever. Normally there should be a large volume of contract business under negotiation now, for the twelvemonth beginning Apr. 1, but the activity is far below normal for the time of year, and this despite the fact that such contracts would run through the period just before the biennial wage adjustment, when if ever the market should be strong. It looks as though twelvemonth contracts would be made at close to present prices, with no stiffening due to that influence. There has been hardly any coal bought for the Lake trade and predictions of an improvement now have reference to late in the season. The Pittsburgh district is operating at between 50 and 60% of nominal capacity, and is evidently producing too much coal at that.

Prices quoted in recent reports as being practically nominal are now so generally departed from that we quote about 5c. per ton lower, and even these new prices are very frequently shaded: Slack, 90c.; nut and slack, $1; nut, $1.05; mine-run, $1.10; ¾-in., $1.20; 1¼-in., $1.30, per net ton at mine, Pittsburgh district.

COLUMBUS

Dulness characterizes the local coal industry. Domestic trade is dead and the same is true of steam business. Lake trade prospects not bright.

The coal trade has been quiet to the extreme. There has been little demand for domestic sizes, which coupled with weak steam business makes the tone of the market decidedly bad. There are no immediate hopes for the future until the arrival of the stocking season.

Dealers' stocks are sufficient for present needs and they are not inclined to order additional supplies at present. They are devoting their attention to "cleaning up" in order to avoid being caught with large stocks. The weather has been unfavorable and dealers are no longer looking for any cold spell which might stimulate trade.

Little is doing in steam sizes. Manufacturing is not increasing and as a result fuel requirements are light. Railroad fuel business shows a small increase but not sufficient to stimulate trade. Sales managers have considerable difficulty in renewing steam contracts, and many of them are being closed at low figures. Many steam users are content to buy in the open market. There is no disposition on the part of steam users to accumulate stocks at this time.

Retailers have not been having much business and their trade has been extremely spotty. Retail prices have been shaded to a certain extent and there has been cutting in order to get business. This is especially true of Hocking Valley and West Virginia grades. Pocahontas prices are still fairly well maintained.

Indications are not very bright for the Lake trade. Reports from the docks of the Northwest show that a considerable tonnage will be carried over unless severe weather appears. Since manufacturing is quiet, the usual consumption of coal in the Northwest has not been maintained and it is believed the Lake season will be slow in opening. Chartering of boats is not active. Some Lake coal has been loaded but not as much as usual at this time of the year.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.60	0.65	0.55
Coarse slack	0.50	0.55	0.45

TOLEDO

Upper docks to be cleaned up before fresh supplies are purchased. Opening business will be slow.

Warm weather has deadened the demand in both the domestic and steam trades. Jobbers are booking some orders but practically everything is for immediate delivery. There is a difference of opinion among local dealers as to the beginning of a real trade in Lake coal. It is generally conceded that navigation will open earlier than usual but it is believed that trade will not open up with any briskness until after June. According to late reports there are now about four and one-half millions of tons of coal on the upper docks which is a million more than was left over last season. There seems to be a disposition on the part of those in charge of the docks to clean up what coal there is on hand before stocking up extensively. The bulk of the shipments will not begin until about the first of July, and may not be very active then.

TORONTO, CAN.

Prices unsettled and demand falling off all along the line on domestic grades.

Trade is fair with a decreasing call for coal for domestic uses. The yards are well stocked in all lines and but little coal is coming forward. Prices for bituminous are rather unsettled, some dealers having made small advances on account of the increased duty while others have made no change. Some lower grade anthracite is retailing at 50c. per ton less than prices quoted which are as follows: Retail anthracite egg, stove, and nut $8; grate $7.75; pea $6.75; bituminous steam $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars three-quarter lump, $3.80; screenings, $2.96.

CLEVELAND

Slack has advanced 10c. due to the light receipts. Retail trade not taking much coal and domestic sizes are off.

Monday night of this week there were not to exceed thirty cars of fine coal on track as compared with a normal supply of 150 cars. The trade took all the available fine coal at an advance of 10c., making the spot price $1.70 to $1.80. On the other hand there was no demand for coarse coal. Many of the mines in Pennsylvania, West Virginia and Ohio only worked from one to three days the week before.

Lake coal will begin to arrive at Lake Erie ports the latter part of this month or early next, but this will not materially increase the amount of slack, as the Lake shipping season does not look very bright and operators do not expect to load much coal early. The Upper Lake stocks continue to drag and shipments are far from normal.

There has been no inquiry recently for Lake vessels and a number of the larger shippers do not expect to close for their Lake business until April.

The retail trade is taking so little coal that prices on domestic sizes are low. Pocahontas lump and egg prices for shipment are less than two dollars at the mines.

Anthracite—Hard-coal shipping at Buffalo has started and has increased the demand for boats. The Lackawanna has loaded all but one of the ships it will cargo before the opening of navigation. The Erie has two boats ready for loading within the next few days and the Reading is expected to take some tonnage the next few weeks. The curtailment of Canadian business has proved rather embarrassing to the anthracite shippers and caused a larger inquiry for boats to load coal.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.05	......	......	......	......
Lump, 6 in.	......	......	$2.30	......	......
Lump, 1¼ in.	......	$2.35	2.10	......	......
Lump, ¾ in.	......	2.20	2.00	$1.90	$1.90@2.00
Egg	3.15@3.20	......	......	......	......
Egg, 6 in.	......	......	1.95	......	......
Mine run	2.45@2.50	2.10	1.90	1.80	1.75@1.90
Slack	......	1.90	1.80	1.90	......

CINCINNATI

Contracting is proceeding slowly, consumers demanding lower prices than the trade will give. Prompt business somewhat improved.

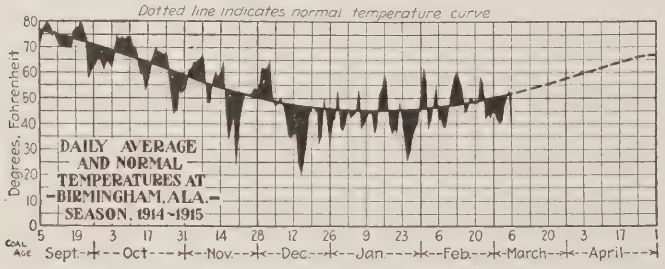
Spring contracting business and the approach of the Lake trade have steadied up the market slightly. Very little actual business is being done just now, however, as buying is naturally on an extremely light basis. Prices on the larger contracts are rather unsettled, and the tendency on the part of consumers is to hold off in view of the present slow state of business and the uncertainty of the future. It is reported that a number of the smaller industrial concerns in this vicinity have closed contracts on the usual basis.

Although a week of generally cold and disagreeable weather has helped the domestic trade, the retailer has not been forced into the market to any extent.

LOUISVILLE

Domestic market slightly improved by the colder weather, but the general outlook continues uniformly discouraging.

Though reports from the eastern part of Kentucky are to the effect that mining operations are being resumed on a more or less general scale, market conditions are not of a character to substantiate this. The domestic market has shown improvement, due to the return of colder weather, but the benefit is confined principally to the retailers. Industrial requirements are said to be somewhat better though prices are unchanged from a week ago. Prices, on block coal are ranging from $1.25 to $1.50, nut and slack, 55 to 70c. and are being maintained with some success, the stiffness of the steam grades being still due to the reduced output, rather than to any increased demand.



BIRMINGHAM, ALA.

Coal market very quiet. Demand light and operations much restricted.

The market on both lump and steam coal continues very quiet, with practically no improvement on either grade. The demand is small, and the mines in this district are running only about two or three days per week, while some are closed down entirely. The spring movement on lump coal has not yet started, but operators are not looking for very heavy bookings for spring and summer shipments, as nearly all of the retail yards are carrying over some stock.

COKE

CONNELLSVILLE

One merchant furnace inquires for coke; otherwise market stagnant. Increased production and shipments on part of steel interests.

The only new demand for merchant coke is an inquiry from the Perry Iron Co., Erie, for 10,000 to 12,000 tons a month over the second quarter or the balance of the year. The company has been quietly sounding the market for some time and is now out with a definite inquiry, expecting to put the furnace in blast about Apr. 1. The market for spot furnace coke is not well defined as there has been scarcely any buying. While there has been a very considerable increase in coke production in the past two months the increase is practically confined to the steel interests, the demand for merchant coke having experienced scarcely any improvement at all. We quote: Prompt furnace, $1.50@1.55; contract furnace, second quarter, $1.60; to Dec. 1 (nominal), $1.75; prompt foundry, $2@2.50; contract foundry, nominal, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 27 at 274,935 tons, an increase of 3845 tons, and shipments at 278,461 tons, an increase of 8573 tons.

Buffalo—There is no one as yet prepared to champion the coke trade or even predict that it will soon come up to a greater activity. There is a steady sale as a fair number of the local furnaces are running and the demand for their output keeps up about as usual. Prices remain steady on the former basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Birmingham—With several of the furnaces out of blast, many of the coke ovens in the district are idle, and will not be put back into blast until the furnaces resume operations.

Chicago—Prices in the coke market show some change. Competition has caused April prices to become general for domestic sizes, and there has been increased absorption at these reduced figures. Furnace and foundry coke remain practically unchanged from last week. Prices are as follows: Byproduct, $4.75@4.95; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4@4.25; furnace, $4.50@4.65.

THE STEEL INDUSTRY

Steel Corporation working 67% capacity. Satisfactory increase in tonnage of unfilled orders. Purchases by consuming interests light.

Negotiations closed in the past week bring the Illinois Central's purchase of open-hearth rails from the Algoma Steel Co.'s mill in Ontario up to 35,000 tons. There are sidelights on this transaction which will not be publicly discussed, but it may yet have its value as an object lesson in the effects of free access to this market for Canadian rails, wire and other products, while on many American steel products going to Canada the duties, already high, have just been increased 7½%. The Algoma rail mill has now booked 60,000 tons of rails on this side and 80,000 tons from the Canadian Pacific. Chicago rail sales of the week include 11,000 tons for the Lake Shore and 9000 tons for a line the Keystone Construction Co. is building in Kansas. The B. & O. placed 7000 tons at Pittsburgh; the Terminal Railway of St. Louis bought 3000 tons and the United Railways of St. Louis 1400 tons. An export order from Colombia calls for 1200 tons.

While buying by manufacturing consumers of iron and steel has been light this month, the expectation is that the present rate of operations will hold through March and there is the hope that spring demand will be a factor by April. The Steel Corporation's steel works are running this week at 67% of ingot capacity. The Homestead plant is not supplied with orders insuring full output for several months, as widely published. Just now 85% of its steel capacity is active, but this is due to special plate orders for pipe work. The Steel Corporation's statement of Mar. 10 showing 96,803 tons gain in unfilled orders last month, against 412,000 tons in January, is favorable in the light of the large inroads made in February by the heaviest mill shipments in months.—"The Iron Age."

MIDDLE WESTERN

CHICAGO

Domestic coals still weak. Screenings buoyant at higher prices. Smokeless coals lifeless. Anthracite soft.

Screenings have sold as high as $1 per ton this week, showing an average gain of 25c. to 30c. over last week. Otherwise the market is spiritless. The domestic situation is a weather proposition entirely, and there is no encouragement in the outlook. Prices are about as low as could be expected, and operators have been obliged to make unheard of concessions to move coal. The limited lump production has been an important factor in maintaining the screenings market. Contracts are coming to the front, but most buyers are withholding definite action to ascertain if concessions on last year's prices can be obtained.

The Gary steel mills are operating on a minimum scale, and railroad buying continues at the minimum quantities specified in the contracts. Unbilled domestic coal on hand at some mines is so great that shippers find it difficult to meet the demand for the small sizes. The consignment coal on tracks in Chicago is excessive and too much for the market to absorb. As a result, all kinds of coal and grades are being sold at unheard of prices.

Mine run from the Indiana district has been selling below $1 per ton in a number of instances; it is reported that some of the Indiana operators show a disposition to move coal at any price in order to secure funds to meet their payrolls, the mines not even averaging half time. Screenings and steam sizes have been short of the demand, and as a consequence prices have moved up.

Franklin and Williamson County screenings have been much stronger, and the smaller sizes of washed coal have shown betterment. The domestic grades made some improvement earlier in the week, but have again slumped.

Screenings have also been very strong in the Springfield district but the domestic demand is not improved.

There has been some Kentucky consignment coal, particularly egg size, moved at sacrifice prices, and on the whole the demand is of a negligible quantity.

On Hocking the situation is improved, the operators having evidently made up their minds to keep free coal off the market but it may be said that there is no betterment in the situation.

There is still gloom and general demoralization in smokeless sizes. Coal is selling at 30c. to 40c. under list and few contracts, if any, have been let.

Anthracite is very quiet, and some shipments have already been made at April list while there are reports of concessions under the April list in order to secure a tonnage.

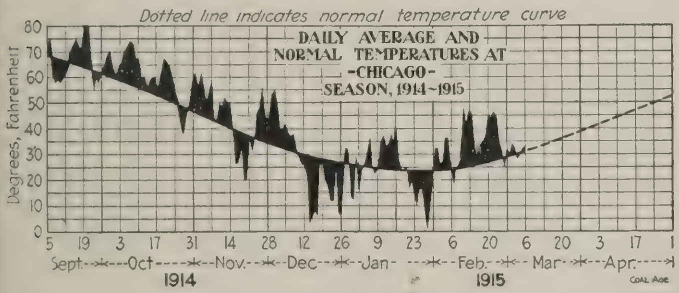
Splint coals are in bad shape, and it is reported there is considerable quantities on track and en route which will have to be sold at ridiculous figures.

Prevailing prices are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.50	$1.25@1.40	$1.35@1.60	$1.35@1.60	$1.35@1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	....	....	1.10@1.20	....
2½-in. lump.	....	....	1.25@1.35	....	....
1¼-in. lump.	....	....	1.15@1.25	....	....
Mine-run...	1.15@1.25	1.00@1.05	1.00@1.10	0.95@1.10	....
Egg........	1.25@1.50	1.15@1.35	1.15@1.35	1.10@1.30	....
No.1washed	1.25@1.50	....	....	....	1.25@1.50
No.2washed	1.15@1.40	....	....	....	1.25@1.40
6x3-in. egg.	....	....	....	....	1.30@1.65
Nut........	....	1.15@1.25	1.05@1.20	1.05@1.20	....
No. 1 nut..	1.35@1.50	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	0.85@0.90	0.75@0.85	0.75@0.80	0.75@0.80	0.85@0.90

	Saline Co. & Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.50	$1.25@1.40	$1.50@1.75	$1.50@1.90	....
1¼-in. lump.	1.15@1.30	1.00@1.35	....	....	$1.10@1.50
Mine-run...	1.00@1.10	....	1.05@1.40	1.00@1.10	1.00@1.25
Egg........	1.25@1.40	1.00@1.25	1.50@1.75	1.40@1.90	....
No. 1 nut..	1.35@1.50	....	....	....	....
No. 2 nut..	1.30@1.35	....	....	....	....
Screenings..	0.75@0.90	....	....	....	....

Knox and Green County 5-in. lump, $1.35@1.50; 3-in. lump, $1.25@1.35; 5-in. egg, $1.15@1.20; 3-in. egg, $1.15@1.20; mine-run, $1@1.10; screenings, 80@85c.



ST. LOUIS

Summer conditions prevail and there are no indications of any improvement in sight. Scarcely any demand at all.

In the Williamson-Franklin County field lump and egg has been quoted as low as $1.10, and nut at 95c. Inability to move these sizes has curtailed the tonnage in the district, and screenings are coming into their own; the latter part of the past week screenings were quoted at 85c., but it was impossible to buy any at that figure. No. 5 washed was quoted at 75 to 80c., though no one has any to sell. There is no indication that conditions will change, unless it might be that the prices on steam coal will advance. The washed market on Nos. 1, 2 and 3 is weak, but on Nos. 4 and 5 it is strong and will continue so.

In the Standard district lump has sold as low as 82½c. and 85c., with a maximum of $1 for 2-in. lump. Screenings have gone to 75c., and indications are that they will continue to advance. There is no domestic demand at all to speak of, and very little steam. No inquiries are received from the country, excepting on the cheapest grades of coal, and this tonnage is remarkably light for this season of the year.

No anthracite is reported moving in, but there is a heavy tonnage of smokeless egg coal at East St. Louis, rejected on account of weather conditions.

INDIANAPOLIS

Some slight improvement due to short spell of old-fashioned March weather. Mines making better time. Prices generally unchanged. Domestic coal season about ended.

There is some improvement in operations at the Indiana mines, due to the colder weather; it appeared as if for a time domestic sales were about over for the season but the mines are now experiencing another little spurt. Operators, however, are not counting on much further business in this direction, as their customers will buy only for current needs from now to the end of the season.

Prices remain generally unchanged, though mine-run ranges from $1 to $1.20; sales are reported even less than $1 but the coal thus offered either comes from some new development, or is of relatively poor quality. Slack prices are stiff, owing to the curtailment in production, due to the restricted call for domestic grades. Mines of the state are probably making a little better than half time. The industrial demand continues to increase slowly and the railroad consumption is not larger than usual.

KANSAS CITY

Colder weather stimulates market. Steam grades also active.

March has begun with a week of cold weather and the retail business holds up well. The wholesale trade has settled down to a summer basis, the steam-coal movement being close to the normal summer consumption just at present. A reduction of domestic tonnage has stimulated the steam-coal market somewhat and steadier prices, ranging about 10c. higher than ten days ago, are the rule. The production in the southern Kansas fields has been about three to four thousand tons in the last fortnight, and has done much toward overcoming the shaky condition of both domestic and steam markets, but especially the steam grades.

Prices are as follows:

	At Mines	Freight		At Mines	Freight
Cherokee lump .	$1.85@2.00	$0.80	Waverly nut......	$1.75	$0.40
Cherokee mine-run..........	1.40@1.60	0.80	Novinger No. 1 lump..........	2.00	0.60
Cherokee nut...	1.85@2.00	0.70	Novinger coarse...	2.00	0.60
Cherokee mill...	1.40@1.50	0.70	Novinger nut.....	1.85	0.60
Cherokee slack..	1.25@1.35	0.70	Arkansas semi-anthracite......	2.50	2.00
Lexington block.	1.90@2.00	0.40	Arkansas sizes....	4.10	2.10
Parlor block....	2.10	0.40	Arkansas lump....	3.85	2.10
Farmers........	2.00	0.40	Penn. chestnut....	7.10	2.50*
Richmond......	1.90@2.00	0.40	Penn. egg........	6.85	2.50*
Waverly lump..	1.85	0.40	Penn. grades......	6.60	2.50*

*To Chicago.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for February and the first two months of 1914-15 were as follows:

	February		2 Months	
	1915	1914	1915	1914
Phila. & Reading........	693,743	746,793	1,454,500	1,761,919
Lehigh Valley..........	887,267	681,844	1,841,339	1,492,432
Cent. R.R. N.J.	473,928	563,650	1,082,224	1,268,141
Del. Lack. & West.......	630,246	573,553	1,205,784	1,192,491
Del. & Hudson..........	544,325	442,378	1,168,272	1,029,271
Pennsylvania	372,374	426,100	823,574	962,218
Erie..................	535,883	533,307	1,112,890	1,239,610
Ont. & Western.........	137,341	153,826	321,059	351,101
Total.............	4,275,107	4,121,451	9,009,642	9,297,183

Stocks at Tidewater Jan. 31 were 798,125 tons as compared with 782,581 tons, Feb. 28.

FOREIGN MARKETS

The British reports usually printed under this heading have failed to arrive this week, due to the strike of the Liverpool dockmen.

Financial Department

Philadelphia & Reading Coal & Iron Co.

President W. J. Richards of this company reported for the fiscal year ended June 30, 1914, as follows:

The total production of anthracite coal from the lands owned, leased and controlled by The Philadelphia & Reading Coal & Iron Co. for the year ended June 30, 1914, was 10,271,669.04 tons, as compared with 12,807,996.06 tons mined during the previous year, a decrease of 2,536,327.02 tons, or 19.8%.

During the year the company mined 8,992,494.04 tons, a decrease of 2,097,248.12 tons, or 18.91%; purchased 218,957.08 tons and sold 8,747,643.19 tons, a decrease of 2,000,959.01 tons, or 18.62%, as compared with the previous year.

The percentage of sizes above pea produced from the mining operations was 59.35% as compared with 59.92% the previous year.

The decrease of receipts from the sale of anthracite as compared with last year was $8,131,818.30, this decrease resulting almost entirely from the fact that we sold 2,000-959.01 tons less in 1914; the decrease in receipts from sale of bituminous and from other sources was $147,262.66, the bituminous sales falling off 31,991.05 tons and $70,915.96, and other sources $76,346.70, making a total decrease in gross receipts of $8,279,080.96 as compared with previous year.

The decrease in expenses, excluding the amount expended for improvements was $5,292,844.31, resulting from the decreased production of 2,097,248.12 tons.

Cost of transportation of coal by rail and water during the year was $7,768,236.60, as compared with $10,093,802.65 for the previous year, owing to the falling off in our sales of 2,000,959.01 tons.

The cost of maintenance and repairs decreased $370,098.95 and the cost of mining decreased $2,049,042.30 as compared with the previous year.

The total sum expended for improvements during the year and charged to expenses was $1,193,385.43, as against $1,241,070.64 the previous year.

Thirty-one collieries were operated a total of 7313 days during the year ended June 30, 1914, as compared with a total of 8770 days during the previous year. None of the washeries was in operation during the year. The collieries have a capacity in excess of the maximum amount that they may be called on to produce.

The funded indebtedness of the Coal & Iron Co. has been reduced by the following payment: Philadelphia & Reading Collateral Sinking Fund Loan, $30,000. This company has been reimbursed by Reading company for the payment of these bonds; the amount of this loan now outstanding is $1,050,000.

On June 27, 1913, the Commonwealth of Pennsylvania passed an act laying a tax on anthracite coal of 2½% of the value thereof when prepared for market, the law taking effect on June 28, 1913. The tax due by this company for the period from June 28 to Dec. 31, 1913, amounted to about $320,000.

It is with feelings of profound regret that the board records the sudden death on Apr. 26, 1914, of George F. Baer, president of the company.

At a special meeting of the board of directors, held on May 8, 1914, the office of chairman of the board was created, and Edward T. Stotesbury, a member of board, was elected to fill that position.

W. J. Richards, vice-president and general manager, was elected president of the company to fill the vacancy caused by Mr. Baer's death.

INCOME ACCOUNT FOR THE YEAR ENDED JUNE 30, 1914, COMPARED WITH THE YEAR 1913

Receipts	1914-1913 Amount	1913-1912 Amount
Coal sales (anthracite)	$30,946,264.63	$39,078,082.93
Coal sales (bituminous)	1,206,691.66	1,277,607.62
Coal rents	276,157.24	302,713.60
House and land rents	138,975.50	135,339.44
Interest and dividends	108,037.96	109,377.15
Miscellaneous	27,855.08	79.942.29
Total receipts	$32,703,982.07	$40,983,063.03
Expenses		
Mining coal and repairs	$20,627,192.70	$23,046,333.95
Improvements at collieries, etc	1,193,385.43	1,241,070.64
Coal purchased (anthracite)	372,467.41	1,308,665.45
Coal purchased (bituminous)	1,118,875.32	1,136,729.46
Royalty of leased collieries	485,614.01	601,325.76
Transportation of coal by rail	6,555,640.50	8,758,817.16
Transportation of coal by water	1,212,596.10	1,334,985.49
Handling coal at depots	406,451.87	458,379.15
Taxes on coal lands and improvements	488,195.49	512,300.00
Improvements and repairs of houses	113,997.89	142,435.68
Damages account coal dirt	655.85	3,769.69
All other expenses	1,120,958.62	1,201,568.49
	$33,606,031.19	$39,746,380.92
Less coal added to stock	1,840,416.02	2,550,236.23
Total expenses	31,855,615.17	37,196,144.69
Profit in operating	848,366.90	3,786,918.34
Fixed charges and taxes	86,248.18	94,649.51
Interest on Reading Company loan		2,269,405.15
Interest on Reading Company commercial loan	46,728.80	
Abandoned storage yard and jig house		176,784.37
Additional wages awarded employees on account of sliding-scale percentage	132,976.98	2,647,325.93
Profit	715,389.92	1,139,592.41
Profit of previous years	2,599,286.55	1,459,694.14
Balance to Credit of Profit and Loss Account	3,314,676.47	2,599,286.55
Tonnage—		
Mined (anthracite)	8,992,494.04	11,089,742.16
Purchased (anthracite)	218,957.08	524,574.05
Sold (anthracite)	8,747,643.19	10,748,603.00
On hand (anthracite)	1,592,421.19	1,120,574.06

BALANCE SHEET, JUNE 30, 1914

Capital Accounts	Amount	Capital Accounts	Amount
Coal lands	$48,368,137.77	P. & R. collateral sink. fund loan	$1,050,000.00
Timber lands	841,690.64	Capital stock	8,000,000.00
New York and Eastern depots	839,539.70	Reading Company	72,472,767.37
Western yards and depots	1,824,284.15	Current Liabilities	
Miners' and other houses	553,137.67	Pay-rolls and vouchers	1,062,744.29
Real estate and improvements	417,939.87	Due for coal purchased	30,622.90
Storage yards and washeries	675,107.78	Due for royalty	114,621.80
Other real estate	403,468.59	Freight and tolls	17,523.12
Improve. and equip. at coll.	12,959,224.33	Cos. and individuals	382,436.59
Stocks, bonds and loans	9,863,914.75	Interest due	120.00
Total	$76,746,445.25	Interest and taxes accr.	497,717.94
Current Assets		Total	$2,105,786.64
Cash on hand	$369,511.18	Miners' beneficial fund	31,851.29
Bills receivable	6,989.69	P. & R. Ry. Co. Acct.	1,166,188.94
Coal accounts	3,098,297.27	Profit and loss to June 30, 1913	2,599,286.55
Rent accounts	51,795.13	Profit and Loss July 1, 1913, to June 30, 1914	715,389.92
Companies and individuals	980,541.56	Total	$3,314,676.47
Coal on hand	5,401,478.91	Total	$88,141,270.71
Supplies and materials on hand	1,433,010.48		
Total	$11,341,624.22		
Stocks, bonds and mortgages	53,201.24		
Total	$88,141,270.71		

Note. For previous annual report of this company see Vol. 4, p. 1002.

⁂

Pittsburgh Coal Co.

The following is a comparative statement of results for the past two years ended Dec. 31:

	1914	1913	Inc.	Dec.
Net earnings	$4,201,070	$6,421,703	......	$2,220,633
Res. for dep., etc.	2,014,316	2,839,295	......	824,979
Interest on bonds	815,695	856,139	......	40,444
Total deductions	2,830,011	3,695,534	......	865,523
Surplus	1,371,058	2,726,269	......	1,355,211
Preferred div.	1,353,590	1,353,590	......	......
Surplus	17,469	1,372,680	......	1,355,211
Previous surplus	10,526,112	9,153,433	$1,372,679	......
P. L. surplus	10,543,581	10,526,112	17,469	......

⁂

The O'Gara Coal Co. has announced that the interest coupons on its bonds, due Mar. 1 of the current year, will be paid on presentation at the office of the company in the Marquette Building, Chicago, Ill.

Coal Contracts Pending

It has been found impossible to eradicate all inaccuracies from this department; since its inception 2.5 per cent, of the items listed have been reported as incorrect, in spite of the fact that we are paying a higher average scale of remuneration for this matter than has ever been paid by this, or any other coal journal. In the collection of this information the customary sources of inquiry, such as clipping bureaus, press reports, etc., were rejected because of their unreliability. Only information obtained directly from the source of the proposed business, or a seemingly reliable connection, is accepted, and much of this is drawn through our affiliations with other leading technical journals. In justice to ourselves and our readers, we believe this brief statement to be warranted. It is only through the close cooperation of all concerned that this department can attain a lasting success and be of real benefit to the coal trade. We will, therefore, appreciate any and all information relative to inaccuracies of contracts listed below.

No. 97—Baltimore, Md.—The following are the bidders on this contract (p. 356), which calls for an annual supply of about 240,000 tons of soft coal: Shaw Bros.; Baker Whitley Co.; Castner, Curran & Bullitt; W. H. Bradford; Coale & Co. Address Pur. Agt. & Gen. Mgr. W. P. Coria, Merchants & Miners' Transportation Co., Baltimore, Md.

No. 131—Rochester, N. Y.—Bids on this contract (p. 357) which involves 6000 tons of anthracite and 6000 tons of semi-bituminous coal will be opened Mar. 19. Address Secy. J. S. Mullen, Municipal Bldg., Rochester, N. Y.

No. 133—St. Louis, Mo.—Bids will be received by the government engineers here until noon, Mar. 15, for furnishing 25,200 tons of coal in barges (p. 357). Address Maj. Clarke S. Smith, Mississippi River Commission, International Life Bldg., St. Louis, Mo.

No. 137—Ellensburg, Wash.—The bids on this contract (p. 398) which provides for furnishing steam coal for Kittitas County were as follows: Roslyn Fuel Co. (special steam coal), $3.40, (washed steam coal) $3.60; Carter Transfer Co. (special steam coal), $3.50. Address County Audr. W. G. Damerow, Ellensburg, Wash.

No. 143—Buffalo, N. Y.—The lowest bids on this contract (p. 398) were: Bituminous, C. A. & M. Kaiser (Buffalo), mine-run, $2.65; screened nut, $2.60; slack, $2.45; screenings, $2.15; smokeless, $2.70. Anthracite, Connell Anthracite Mining Co., grate, $5.10; egg, $5.30; pea, $4.25. Address Col. Francis G. Ward, Dept. of Public Works, Buffalo, N. Y.

No. 144—Oswego, N. Y.—The Board of Education will be in the market during the latter part of March for about 600 tons of anthracite coal in egg, stove, nut and pea sizes (p. 358). Address Chief Clerk, Dept. of Education, City Hall, Oswego, New York.

No. 183—Shawano, Wis.—This contract (p. 399) calls for 1500 tons instead of 2000 tons of bituminous coal as previously stated. This business is usually done on a competitive basis, and is awarded on an evaporative test of the coal. Address Paul E. Caprano, City Water & Light Plant, Shawano, Wis.

No. 192—Rockville Center, N. Y.—The local city government will be in the market for about 2500 tons of bituminous coal during the latter part of March (p. 399). This business is customarily done at $3.53 per ton. Address Village Clk. George S. Utter, Rockville Center, N. Y.

No. 211—St. Albans, Vt.—We are advised by the Central Vermont Co. that they are not at the present time in the market for 190,000 tons of anthracite and bituminous coal, as stated in a previous issue (p. 400). Address Pur. Agt. J. W. Wardlaw, Central Vermont Ry. Co., St. Albans, Vt.

No. 222—Bayonne, N. J.—Sealed proposals will be received by the Board of Education until 8 p.m., Mar. 18, for furnishing about 2500 tons of coal, the amount to be made up of 1500 tons, more or less, of egg, stove, or nut coal, and 1000 tons, more or less, of pea coal (p. 446). Address Secy. W. J. Tomlin, Board of Education, Ave. C and 26th St., Bayonne, N. J.

No. 241—Fall River, Mass.—The Stafford Mills advises that they are not in the market for coal as noted in a previous issue (p. 447). Address Treas. Charles B. Luther, Stafford Mills, Fall River, Mass.

No. 255—Taunton, Mass.—Concerning this contract (p. 447), we have been advised by Reed & Barton that Pur. Agt. L. A. Hodges is no longer connected with this firm. Address E. R. Mitchell, Reed & Barton, Taunton, Mass.

No. 268—Buffalo, N. Y.—Sealed proposals will be received until 2 p.m., Mar. 15, for furnishing anthracite and bituminous coal as required by the Police Department and Patrol Boat for the year beginning Apr. 10. Bids are to be accompanied by a certified check for $500 and a bond of not less than $5000 is required (p. 448). Address Board of Police Comrs., Headquarters Bldg., Franklin and Seneca St., Buffalo, New York.

No. 276—Bennington, Vt.—The Twin State Gas & Electric Co. advise that they purchase their coal in the local market (p. 448). Address Mgr. E. E. Larabee, Bennington Division-Twin State Gas & Electric Co., Bennington, Vt.

No. 279—Windsor Locks, Conn.—The Northern Connecticut Light & Power Co. report that they are not in the market for coal at the present time (p. 448). Address Northern Connecticut Light & Power Co., Windsor Locks, Conn.

No. 285—Lynchburg, Va.—The Board of Education will soon be in the market for approximately 800 tons of mine-run coal, the present contract being closed at $3.45 per ton. Address City Clk. J. M. Otey, Board of Education, Lynchburg, Virginia.

No. 286—Boston, Mass.—Proposals may be submitted until Mar. 15 for furnishing the New York, New Haven & Hartford R.R. with approximately 15,500 tons of anthracite coal, divided as follows: 9800 tons of stove, 5000 tons of egg, 300 tons of chestnut, 400 tons of broken. Prices should be per gross ton f.o.b. cars at the mine. For further information on this contract refer to Inquiry No. 6044. Address Manager of Purchases and Supplies, N. Y., N. H. & Hartford R.R., Boston, Mass.

No. 287—Chambersburg, Penn.—Chambersburg Electric Light Department will be in the market during April for approximately 2000 tons of bituminous "Jerome" coal. The present contract was closed at $2.90 per ton f.o.b., and was awarded on a test basis. Address Supt. J. H. Mowrey, Chambersburg Electric Light Dept., Chambersburg, Penn.

No. 288—Troy, N. Y.—The Board of Public Works will contract during April or May for about 1200 tons of egg and stove coal, to be used by the city schools. The present contract was closed at about $6.47 per ton. Address Commissioner of Public Works, Troy, N. Y.

No. 289—Chicopee, Mass.—The Board of Education at this place usually contracts in April for about 1000 tons of Lackawanna egg coal, the present contract price being from $6.80 to $7 per ton. Address Committee on Supplies, Chicopee, Mass.

No. 290—East Orange, N. J.—The Board of Education will be in the market during April or May for about 1800 gross tons of anthracite coal. Address Secy. Warren A. Clapp, Board of Education, East Orange, N. J.

No. 291—Guantanamo Bay, Cuba—Telegraphic bids were received up to noon, Mar. 11, for either transportation of coal or coal and transportation, for delivery at the Naval Station, Guantanamo Bay, Cuba. The quantity required is about 10,000 tons, and delivery is to be made by Apr. 30. A daily discharge rate of 300 tons is guaranteed at Guantanamo Bay. Address Paymaster Gen. of the Navy Samuel McGowan, Bureau of Supplies & Accounts, Navy Department, Washington, D. C.

No. 292—West Point, N. Y.—Sealed proposals in triplicate will be received until noon, Apr. 15, for furnishing and delivering charcoal, smithing and gas coal, as required at this post for the fiscal year 1916. Address Depot Quartermaster Maj. E. J. Timberlake, West Point, N. Y.

No. 293—Boston, Mass.—Proposals will be received by the Union Freight R.R. Co. for furnishing approximately 1800 gross tons of broken anthracite coal, shipments to be made in carload lots to Boston in equal weekly deliveries for a period of one year beginning Apr. 1. In corresponding with this company refer to Inquiry No. 6040. Address Mgr. H. A. Fabian, Department of Purchases and Supplies, Union Freight R.R. Co., Boston, Mass.

No. 294—Meriden, Conn.—Bids were received up to 11 a.m., Mar. 2, for supplying the Connecticut School for Boys with about 1300 tons of coal. Address Supt. Chas. M. Williams, Executive Committee, Connecticut School for Boys, Meriden, Connecticut.

No. 295—Danville, Penn.—Bids will be received until Mar. 20 for furnishing the State Hospital for the Insane with 10,000 tons of No. 1 buckwheat, 500 tons of egg, and 100 tons of chestnut. Deliveries are to be made as ordered at the hospital coal dump, between Apr. 1, 1915 and Mar. 31, 1916, and the coal must be free from slate and dirt, freshly mined and of the best quality. Address Steward H. B. Schultz, State Hospital for the Insane, Danville, Penn.

No. 296—Leavenworth, Kan.—Bids will be received until noon, Mar. 20, for furnishing coal for the county court house, county jail, county hospital, and for the poor of the county. Address County Clk. J. E. Voorhees, County Clerk's Office, Leavenworth, Kan.

No. 297—Northampton, Mass.—The Northampton Gas Light Co. will be in the market about Apr. 1 for 3500 tons of gas coal, delivery via N. Y., N. H. & H. R.R. Address Light, Heat & Power Corporation, Boston, Mass.

No. 298—Clarendon, Ark.—The Clarendon Electric Light & Ice Co. will be in the market during April for about 2400 tons of pea and slack coal. The approximate cost per ton is $3.50. Address Cont. Agt. J. T. Bateman, Clarendon Electric Light & Ice Co., Clarendon, Ark.

No. 299—Hartford, Conn.—The Hartford Machine Screw Co. will be in the market about Apr. 1 for 2500 tons of anthracite and bituminous coal, deliveries via N. Y., N. H. & H. R.R. and C. N. E. R.R. and teams. Address Pur. Agt. H. R. Grant, Hartford Machine Screw Co., Hartford, Conn.

No. 300—Stoughton, Wis.—The contract with the Moline Plow Co. for furnishing various sizes of coal for steam purposes will expire on Apr. 1. Address Mandt Wagon Branch of the Moline Plow Co., Stoughton, Wis.

No. 301—Housatonic, Mass.—The Monument Mills will be in the market for 2000 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address H. C. Church, Great Barrington, Mass.

No. 302—East Moline, Ill.—The contract with the Union Malleable Iron Co. for from four to eight cars of lump and egg coal per week expires on Apr. 1. Address Purchasing Agent, Union Malleable Iron Co., East Moline, Ill.

No. 303—New York, N. Y.—The following are the bids opened on Mar. 5 for furnishing 350 tons of No. 1 buckwheat coal for Bellevue Hospital: Robert Gordon & Son, $3.35; John S. Conabeer, $3.35; M. L. Bird, $3.41; Burns Bros., $3.39; Meyer-Denker-Sinram Co., $3.72; Chas. D. Norton Co., $3.34; S. Trimmer & Son, $3.75; John W. Peale, $3.11; Gavin Rowe, $3.29; Meeker & Co., $3.07. Address Contract Clk. Geo. D. White, Bellevue Hospital, 400 East 29th St., New York, N. Y.

No. 304—Wilmington, Del.—Bids were received up to 10:30 a.m., Mar. 1, for supplying the Water Department with approximately 3700 tons of bituminous coal for a period of one year beginning Apr. 1. Address Ch. Engr. Edgar M. Hoopes, Jr., Board of Water Commissioners, Wilmington, Del.

No. 305—Atlantic, Iowa—The Municipal Electric Light Works will contract in April for about 4300 tons of Iowa steam coal, the present contract being closed at $2.10 delivered in bin. Address Mgr. T. E. Nichols, Municipal Electric Light Works, Atlantic, Iowa.

No. 306—Algoma, Wis.—The City Water & Light plant will be in the market in April for a supply of mine-run Youghiogheny coal. This company consumes approximately 900 tons per year, the present contract price being $3.70 per ton, delivered in bin. Address Supt. J. O. Posson, City Water & Light Plant, Algoma, Wis.

No. 307—Logansport, Ind.—The Logansport Electric Light Co. will soon be in the market for about 14,000 tons of 1¼-in. screenings. This plant is located alongside the Vandalia R.R. Address Purchasing Agent, Logansport Electric Light Co., Logansport, Ind.

No. 308—Waterbury, Conn.—The Benedict & Burnham Co. will be in the market about Apr. 1 for 22,000 tons of anthracite and bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Benedict & Burnham Co., Waterbury, Conn.

No. 309—Kalamazoo, Mich.—The Kalamazoo Corset Co. at this place will be in the market about Apr. 1 for a supply of lump coal for steam purposes. Address Purchasing Agent, Kalamazoo Corset Co., Kalamazoo, Mich.

No. 310—Griswoldville, Mass.—The Griswoldville Mfg. Co. will be in the market about Apr. 1 for 3500 to 4000 tons of anthracite and bituminous coal. Address Pur. Agt. J. W. Ballard, Griswoldville Mfg. Co., Griswoldville, Mass.

No. 311—Chaska, Minn.—The Municipal Electric Light & Power Plant of this place will be in the market during April for approximately 800 tons of coal. The present contract was closed at $3.35 per ton. Address Mgr. & Supt. E. F. Strong, Municipal Electric Light & Power Plant, Chaska, Minn.

No. 312—Chicago, Ill.—Sealed proposals will be received until 11 a.m., Mar. 15, for furnishing and delivering coal for the following departments in various sections of the city. Each division, as listed in the following, is a separate contract, and the deposit required to accompany each bid is given:

	Department			
	Fire	Health	Street	Police
District No. 1	$500	$100	$100	$100
District No. 2	500	100	100	100
District No. 3	600	200	100	100
District No. 4	800	100	100	100
District No. 5	500		100	100

PUMPING STATIONS

Central Park Ave.	$2200	Chicago Ave.	$2000
Sewage pumping stations	100	Twenty-second St.	1900
Harrison St.	700	Sixty-eighth St.	2200
Springfield Ave.	2000	Rogers Park	200
Lake View	2200	Roseland	1200
Fourteenth St.	2200		

MISCELLANEOUS

City Hall Building	900
Bureau of Engineering	100
Bridges and Harbors	200

Address Comr. of Pub. Wks. L. E. McGann, Room 406, City Hall, Chicago, Ill.

No. 313—Providence, R. I.—Sealed proposals will be received until Apr. 1 for furnishing anthracite coal required by the Federal Departments of the State of Rhode Island. Deliveries are to be made as specified, and each bid must be accompanied by a certified check for 5% of the bid. Address Chn. William A. Schofield, Board of Control and Supply, Room 18, State House, Providence, R. I.

No. 314—South Bend, Ind.—Bids will be received for furnishing the Singer Mfg. Co., Factory No. 3, 10,000 to 15,000 tons of screenings, deliveries to be made in equal amounts throughout the year. Shipments are to be at the rate of 10 to 18 cars per week during the winter and five to six cars during the summer, the contract to go into effect Apr. 1. The coal from the mines in Pike and Sullivan Counties, Ind., or Franklin and Williamson Counties, Ill., is preferred. Address Purchasing Agent, Singer Mfg. Co., South Bend, Ind.

No. 315—Arlington, Mass.—The Arlington Gas Light Co. will be in the market about Apr. 1 for about 1500 tons of anthracite and bituminous coal, delivery via water and B. & M. R.R. Address H. L. Ogden, 131 State St., Boston, Mass.

No. 316—Wyandotte, Mich.—The Municipal Light & Water Plant will be in the market during April for 5000 tons of West Virginia mine-run coal. Address Supt. A. S. McClenehan, Municipal Light & Water Plant, Wyandotte, Mich.

No. 317—Putnam, Conn.—The Morse, Powhattan & Nightingale Mills will be in the market about Apr. 1 for 2000 tons of bituminous coal, delivery all rail via N. Y., N. H. & H. R.R. Address Pur. Agt. Augustus Morse, Morse, Powhattan & Nightingale Mills, Putnam, Conn.

No. 318—Sullivan, Ind.—The present contract with the Sullivan Electric Co. for two or three cars of screenings per week will expire on Apr. 1. Address Purchasing Agent, Sullivan Electric Co., Sullivan, Ind.

CONTRACTS AWARDED

No. 93—Jersey City, N. J.—This contract (pp. 356 and 436) has been awarded to Behrens Bros., Paterson Plank Road, Secaucus, N. J., at $4.19 per ton; contract provides for 2500 gross tons of best quality pea coal. Address Clk. of the Bd. John T. Sweeney, Boulevard Commissioners, County Court House, Jersey City, N. J.

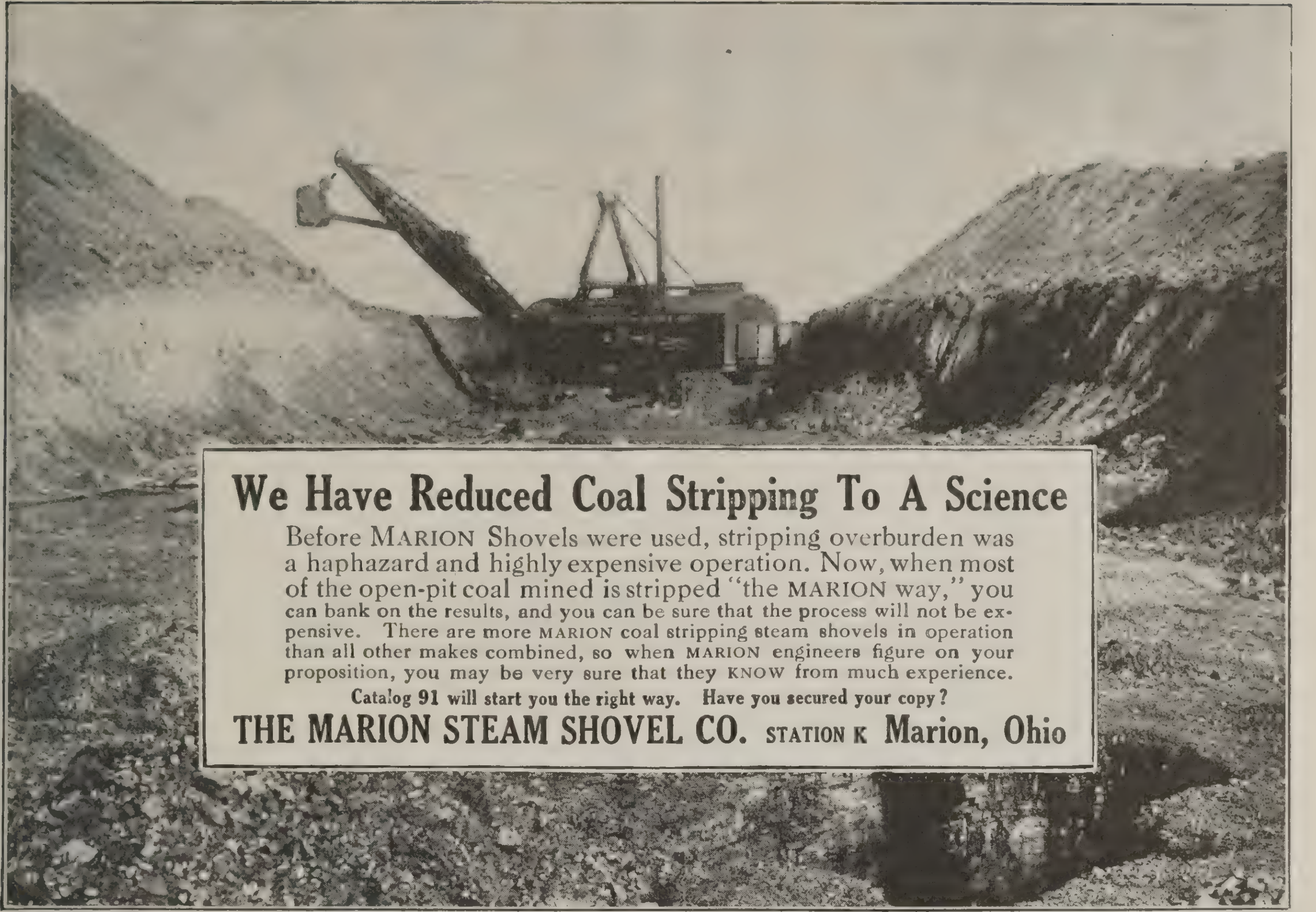
No. 119—New York, N. Y.—Bids on this contract (p. 357), which provides for furnishing and delivering about 4,000,000 lb. of No. 2 buckwheat coal alongside of dock at the asphalt plant, 90th and 91st St., East River, were as follows: Gavin Rowe, $4080 (awarded contract); William Farrell & Son, $4320; Pattison & Bowns, $4232.14; Chas. D. Norton Co., $4280; John W. Peale, $4380. Address Pres. Marcus M. Marks, 21st floor, Municipal Bldg., New York.

No. 166—Concord, N. H.—The Board of Education has awarded this contract for about 1000 tons of anthracite coal (p. 399) to the E. S. Tenney Coal Co. The contract price is $6.80 per ton of small broken coal. Address Secy. Board of Education, Concord, N. H.

No. 247—Montpelier, Vt.—This contract (p. 447) which provides for furnishing 2000 tons of gas coal has been awarded to the Pittsburgh Coal Co. Address Capital City Gas Co., Montpelier, Vt.

No. 256, Ludlow, Vt.—This contract (p. 447) which provides for furnishing 1000 to 1500 tons of bituminous coal to the Black River Woolen Co. has been closed. No details are available. Address Pur. Agt. George P. Levey, Black River Woolen Co., Ludlow, Vt.

For the official advertisements of bids wanted see the Contracts to Be Let section on the second page following.



We Have Reduced Coal Stripping To A Science

Before MARION Shovels were used, stripping overburden was a haphazard and highly expensive operation. Now, when most of the open-pit coal mined is stripped "the MARION way," you can bank on the results, and you can be sure that the process will not be expensive. There are more MARION coal stripping steam shovels in operation than all other makes combined, so when MARION engineers figure on your proposition, you may be very sure that they KNOW from much experience.

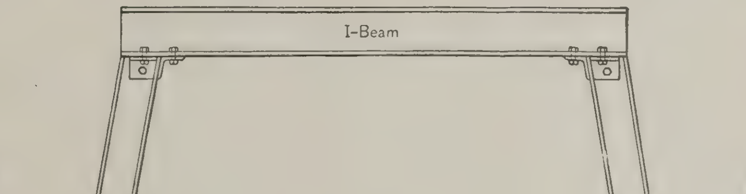
Catalog 91 will start you the right way. Have you secured your copy?

THE MARION STEAM SHOVEL CO. STATION K **Marion, Ohio**

STEEL GANGWAY SUPPORTS

No Cutting
No Fitting
No Waste

Have You Our Mine Timber Pamphlet?



Note the Simplicity

Steel Gangway Support, Style F

Easy to Erect

Only 8 Bolts to Tighten Up

CARNEGIE STEEL COMPANY

GENERAL OFFICE: PITTSBURGH, PA.

577

Classified Ads

Positions Wanted, 3 cents a word, minimum charge 50c. an insertion in advance.

Positions Open, (Civil Service Examinations), **Employment Agencies** (Labor Bureaus), **Business Opportunities, Wanted** (Agents and Salesmen—Contract Work), **Miscellaneous** (Educational—Books), **For Sale,** 5 cents a word, minimum charge, $1.00 an insertion.

POSITIONS OPEN

AN EXPERIENCED MINING ENGINEER for large West Virginia coal operation. In reply state age, whether married or single and salary expected. Also experience you have had, and give reference from former employees. P. 375, Coal Age.

Employment Agencies

The Employment Agencies advertising in this paper agree to refund any registration fee on demand any time within the first six months when no position is secured.

EFFICIENCY SOCIETY OF AMERICA, Pittsburgh, Penn.—Solicits the confidential patronage of interested employers in behalf of our available list of technical and commercial members.

POSITIONS WANTED

AS MINING ENGINEER or draftsman; references. P. W. 378, Coal Age.

MINE ELECTRICIAN open for engagement, wide experience in A. C. & D. C. mine equipments. P. W. 374, Coal Age.

MINING ENGINEER and superintendent, 21 years' experience with coal companies having large coal and coke operations. P. W. 376, Coal Age.

A COAL MINE ELECTRICIAN of wide experience as chief electrician and master mechanic, desires position; good reference. P. W. 379, Coal Age.

BY A SOBER, STEADY ENGINEER-MACHINIST; understand use of steam, air, electricity and general machine repair; A-1 recommendations. P. W. 381, Coal Age, Chicago.

AS OUTSIDE FOREMAN at coal mines, West or South preferred; am practical in every detail and can give the very best of reference from present employer and others. P. W. 380, Coal Age.

MINING ENGINEER, technical graduate, six years' practical experience in field and office, including preparation of plant plans, field construction and inspection; excellent references; in charge of plant construction at present. P. W. 348, Coal Age.

ASSISTANT MINE FOREMAN—Expert mine surveyor would like a position as straw boss or assistant mine foreman; will do surveying on idle days; three years' experience as mining engineer for large Illinois concern. P. W. 377, Coal Age, Chicago.

FOR SALE

COMPLETE SET, 12 volumes, good as new, International Correspondence School Mining Engineering Course; price $21. Box 73, Roslyn, Wash.

CONTRACTS TO BE LET

Bids received until Mar. 24, 1915.

Proposals for Furnishing Anthracite and Bituminous Coal

State of New York.

Sealed separate proposals will be received until 12 o'clock Noon, March 24th, 1915, and opened at that hour at each of the institutions named, for supplying such institutions with Coal for a period of one year from April 1, 1915. Proposals should be addressed to the following officers at the institutions named: Thomas Mott Osborne, Agent and Warden, Sing Sing Prison, Ossining, N. Y.; Charles F. Rattigan, Agent and Warden, Auburn Prison, Auburn, N. Y.; William J. Homer, Agent and Warden, Great Meadow Prison, Comstock, N. Y.; John B. Twombly, Agent and Warden, Clinton Prison, Dannemora, N. Y.; R. F. C. Kieb, Medical Superintendent, Matteawan State Hospital, Beacon, N. Y.; Charles H. North, Medical Superintendent, Dannemora State Hospital, Dannemora, N. Y. Specifications and Proposal Forms may be had by addressing the Agent and Warden, or Medical Superintendent of the institution for which it is desired to submit proposal.

Dated Albany, N. Y., February 27, 1915.

Mine Contract Work
of all kinds, including Shaft Sinking, Steel, Wood and Concrete Construction and Machinery Erection. Reasonable terms. Full details on request. **Write me today.**
F. D. Buffum
Jenkins Arcade, Pittsburgh, Pa.

Classified List

Second Hand Equipment

For Sale—Exchange—Rent—Wanted

Items not otherwise marked list equipment for sale.

Rates: Less than 4 insertions 55 cents per line—4 to 11 insertions 50 cents per line—12 or more insertions 45 cents per line. C A

NOTE—Most items are signed with only part of the advertiser's name. Complete names and addresses in alphabetical order will be found under the heading "Addresses."

ADDRESSES

NEW RIVER Co., The, Macdonald, W. Va.

AIR COMPRESSORS

Steam driven, 3 Laidlaw-Dunn-Gordon duplex 2 stage and 5 Norwalk tandem 2 stage.—NEW RIVER.

CRUSHERS

1—18x18" Single Roll crusher made by The Jeffrey Mfg. Co., Columbus, Ohio. Cheap if sold quickly.—AMERICAN CHEMICAL CO., East Liverpool, Ohio.

ELECTRIC LIGHTS

For sale at less than half cost. Sixty 300 C.P. D.C. 220 V. Nernst arc lamps, moon globes. In perfect running condition. Can be seen in use in our offices; $4 each. (Regular price, $9.50). Price includes drop lighting switch. Must sell, as our voltage is 110 in new office. HILL PUBLISHING CO., 10th Ave. at 36th St., New York.

FANS

Ventilating from 18x7 down to 10x4, d.c. to steam engines Clifford, Capell, Robinson and Bullock.—NEW RIVER.

GENERATING UNITS

Generator sets direct current, 250 volt and 550 volt, direct connected and belted, capacities up to 250 kw.—NEW RIVER.

HAULAGE ENGINES

Tail rope and endless rope haulage engines.—NEW RIVER.

MINE HOISTS

12 hoists from 14x20 to 24x48 in excellent condition and practically as good as new; makers, Vulcan, Lane & Bodley and Robinson.—NEW RIVER.

MINING MACHINES

Sullivan longwall, equipped with two 7x7 air engines, gage 40", feed chain ⅝x65'. In first-class condition and as good as new. Immediate delivery.—NEW RIVER.

PUMPS

High head. General service and boiler feed.—NEW RIVER.

HANS OLSON, Pres. JNO. A. FISHER, Sec'y.
Punxsutawney Drilling and Contracting Company
DIAMOND DRILL CONTRACTORS
Testing Bituminous Coal Lands a Specialty.
Weber Bldg. PUNXSUTAWNEY, PA.

When It's
Diamond Core Drilling
you want, write or wire us.
Birdsboro Steel Foundry & Machine Co.
Birdsboro, Pa.

Make Your Pick Bits at Less Cost
Make and sharpen your own pick bits on the
Little Giant Power Hammer
Gives position and accurate control of the blow and produces clean, sharp bits. An unskilled man can operate it with perfectly satisfactory results. Saves labor, time and material. No modern coal mine should be without the "Little Giant." Sold by all jobbers. **Write for Bulletin.**
MAYER BROS. CO. **Mankato, Minn.**

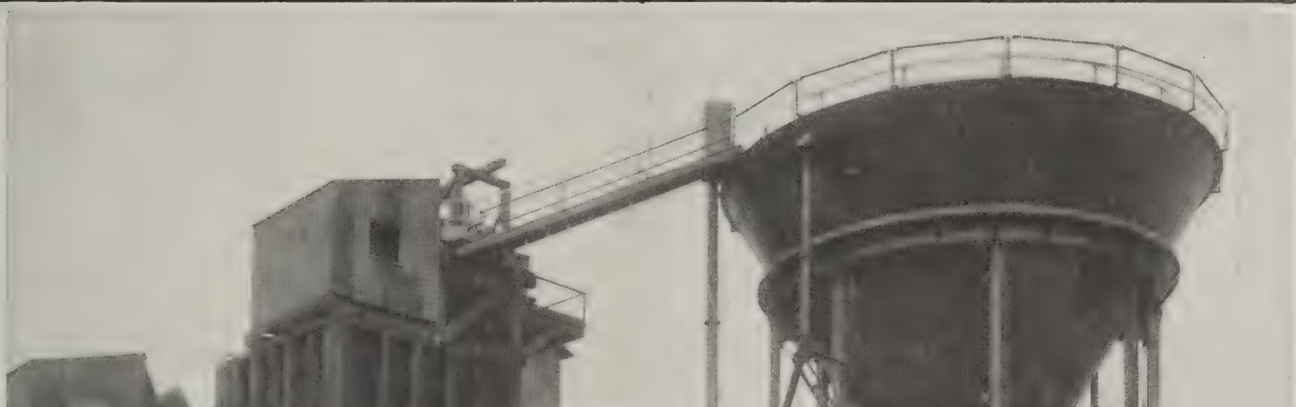
COAL AGE

Volume 7, No. 12
Issued Every Saturday
Hill Publishing Company

NEW YORK, MARCH 20, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

Coal Washing Plant at No. 8 Mine of the Tennessee Coal, Iron and Railroad Company, near Birmingham, Ala.



Barsteel Locomotive Insurance

Means Hauling Coal "All Day Every Day"—

accomplished by the following features:

Barsteel Frame—Never been broken in service.
Commutating Pole Motors—Sparkless over wide range of loads and overloads.
Bronze Bearings with oil and waste lubrication. Last for years—and do not need an expert to replace.
Only mine locomotive on market with **Vauclain removable gib**—simplest device for Journal Box.
Hexagon Brass on main Journals.
Brake rigging supported at three points—two points close to Brake Shoes. Strongest and safest on market.
MCB Brake Shoe—recognized standard by all large railroads—strongest and simplest scheme on market.
Motor's spring suspended.
Separate axle caps—Oil and waste lubrication of axle bearings.
Separate Oil Channel for filling axle bearings.
Diagonally split Motor Field Frame.
Heavy Controllers with large copper contacts.
Only locomotive with **nickel alloy grid**-resistance.
D-21 Trolley—Combines simplicity with strength.

Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Barsteel Users are Boosters—Ask Them

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

VOLUME 7 MARCH 20, 1915 NUMBER 12

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Poem by Michael Bernard.

*DETERMINATION OF THE EQUIPMENT FOR MINE LOCOMOTIVES: *Pages* 490-494

After the weight of a locomotive has been determined, the motors, control equipment, resistance and brake mechanism require careful attention. Motors should be so chosen that dangerous heating will not develop under normal conditions. Graham Bright. COAL AGE, Vol. 7.

*COAL WASHER FOR NO. 8 MINE, TENNESSEE COAL, IRON & RAILROAD CO.: *Pages* 495-496

Some of the details of the crushing, screening, picking and washing machinery are here described. This plant is peculiar in that a reversible picking table is employed. O. H. Bohm. COAL AGE, Vol. 7.

LABOR SITUATION: *Page* 497

The eastern Ohio miners exhibit the firmest determination not to arbitrate or concede anything to the operators. A strike in eastern Kentucky is threatening, a cut of 20 per cent. having been made by the Middle Creek Coal Co. COAL AGE, Vol. 7.

THE ROCKY MOUNTAIN COAL MINING INSTITUTE WILL HOLD SUMMER MEETING: *Page* 497

RECENT LEGAL DECISIONS: *Page* 497

A STATEMENT OF FACTS FROM THE OPERATORS OF THE MIDDLE WEST: *Pages* 498-501

The operators of Indiana and Illinois state that the present competitive system produces a series of public and private ills, and they advocate some manner of regulation, the nature of which, however, is not specified. COAL AGE, Vol. 7.

*COMBINED PITOT TUBE AND MULTIPLYING MANOMETER: *Pages* 502-503

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EFFECTS OF THE EUROPEAN WAR ON OUR EXPORT TRADE—II: *Pages* 502-507

The second installment of this article makes a critical analysis of conditions in Great Britain as regards production, consumption and exports. As the predominating figure in the world's coal markets, the situation in that country will be a controlling factor in the future trade. J. S. Burrows. COAL AGE, Vol. 7.

EXTRACTS FROM A SUPERINTENDENT'S DIARY: *Page* 507

RESCUE WORK AT LAYLAND EXPLOSION: *Pages* 508-509

Seven men were saved in the preliminary rescue work at the Layland mine. Five men walked out after four days' entombment, and then the rescuers succeeded in reaching 42 other men, who had barricaded themselves in under the direction of a veteran of 72 years of age. George S. Rice. COAL AGE, Vol. 7.

EDITORIALS: *Pages* 510-512

The Unforeseen in Mining Legislation—The Gas in Anthracite—The Outlook on Apr. 1 Contracts.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

I HAVE on my desk three letters which give a little example in cause and effect that will interest both readers and advertisers.

First I'm going to quote from a letter from H. C. Cooney, Manager of the Bell-Union Coal and Mining Company, of Curlew, Ky.:

"We read the advertisements very carefully, as we find many new ideas advanced and many new machines advertised therein, and are thoroughly enabled to keep up with the latest developments of the market. We have made various purchases through advertisements in Coal Age and are so well satisfied with it that we are today subscribing for it for our foreman."

* * *

NEXT a letter from G. E. Lyman, Mining Engineer of the Madison Coal Corporation, at Glen Carbon, Ill.:

"I find the advertising pages of Coal Age as interesting as the editorials and constantly refer to them to keep posted on the advance in coal mining and mechanical equipment, and to keep our catalog file up to date. We have purchased a very large amount of material and equipment advertised in your paper."

NOW with the readers talking like that about the advertising pages, surely the advertisers should have something to say.

Surely the *effect* of the readers reading the ads should be felt by the advertisers—so now I'll quote from the third letter, from H. H. Hirsch, President of the Hirsch Electric Mine Lamp Co., of Philadelphia, Pa.:

"You will be interested to know that the results obtained from advertising in Coal Age have far exceeded any other journal in which we have advertised. Our records show 6 inquiries from Coal Age to 1 inquiry from any other paper. Such results have clearly demonstrated to us that Coal Age reaches the coal mine officials better than any other medium we know of."

* * *

COULD there be any stronger proof of the value of your paper as a connecting link between the mine and the manufacturer?

It is this sort of service—this making the technical paper the forum or meeting place for all who are interested in and dependent on coal mining—that makes us *all* winners.

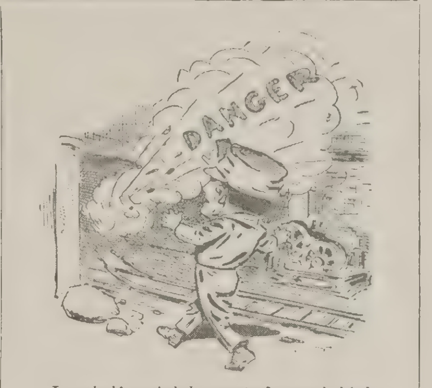
For it's highly profitable to all three sides of that modern triangle — reader, advertiser and publisher.

COAL AGE

Vol. 7 NEW YORK, MARCH 20, 1915 No. 12

The Peril

IT'S a hazardous undertaking,
  This probing the depths for coal,
And the risks that lurk in the inky murk
  Strike fear to the bravest soul;
For a miner may guide his actions
  By the strictest of safety's creeds,
Yet be stricken low by a luckless blow
  Through another man's misdeeds.



In a half a wink he must plan and think

WHEN a danger leaps out upon him
  As swift as a flash of light,
In a half a wink he must plan and think,
  And he's got to do it right;
Then his muscles must do his bidding
  And his mind must be clear to choose;
But he's sure to fail if they've both gone stale
  In the deadening grip of booze.

IT'S a murderous combination,
  Is the mixing of booze and brain,
Which, as sure as fate, either soon or late,
  Brings calamities in its train;
For a miner who grows so groggy
  That he doesn't know up from down
Can raise more hell than a lyddite shell
  Dropped into a busy town.

Puts a stringent ban on booze

IN the running of railway systems
  Old Alcohol stands accursed,
And he has no place in this year of grace,
  When the slogan is "Safety First!"
So the chances are all for gaining,
  And there's nothing at all to lose,
If the mining clan puts a stringent ban
  On the fellow who clings to booze.

Written Especially for COAL AGE *by Michael Bernard*

Determination of the Equipment for Mine Locomotives

By Graham Bright*

SYNOPSIS—After the weight of a locomotive has been determined, the motors, control equipment, resistance and brake mechanism require careful attention. Motors should be so chosen that dangerous heating will not develop under normal conditions.

In order to determine the proper equipment for a mine locomotive it is necessary to have the following information:

Plan and profile of the road.
Number of cars to be handled per trip.
Number of cars to be handled per hour.
Weight of empty cars.
Length of cars.
Weight of load.
Frictional resistance of cars.
Time of layover, including switching and making up trip.
Voltage of circuit.
Gage of track.
Weight of rail.
Radius and length of minimum curve.
Spread of track on minimum curve.
Limiting dimensions which locomotive can have.
Position and range of trolley wire.

It is seldom that all of the above information can be obtained, and in many cases it is necessary to make certain assumptions to supply the missing data. This can only be done by one having considerable experience in working out mining problems.

Motors for mine locomotives are rated on the one-hour basis with a 75-deg. C. rise in temperature. This rating does not indicate the capacity of the motor for all-day service, and is not used in determining its ability to meet with a certain set of conditions.

The capacity of a motor for all-day service depends upon the temperature which the windings will attain. This in turn depends upon the average heating value of the current. Since the heat generated by an electric current is proportional to the square of the current value, the average heating for all-day service must depend upon the square root of the mean square of the current.

Two motors may have the same one-hour rating, but one may have a much larger continuous capacity than the other, due to better design and the proper distribution of the losses. A poorly ventilated motor will in some cases have "hot spots," and since "a chain is no stronger than its weakest link," these hot spots will lower the capacity of the machine. This is due to the fact that, in order to keep these spots within a safe temperature rise, the average temperature of the windings must be kept much lower than would be necessary if such spots were eliminated by proper design.

That the real capacity of a motor is its continuous capacity for all-day service and not the rating for one hour is apparently not generally appreciated among mine operators. The one-hour rating depends largely upon the thermal capacity of the motor, while the continuous rating depends on the ventilation, distribution of the losses and the capacity of the machine to radiate heat.

The one-hour capacity is not a fair rating of a motor for the foregoing reason and also because the speed of the motor is not taken into account. A fairer way would be to rate the machine on the pounds tractive effort at the wheels, irrespective of the speed, provided it is not considered essential for commercial reasons to capitalize the increased horsepower ratings due to increase in speed.

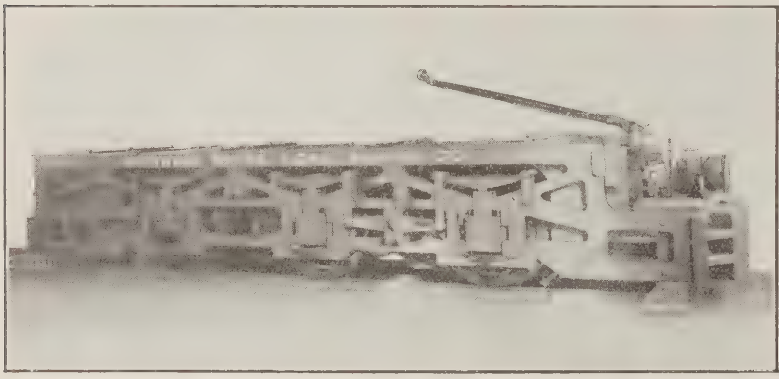


Fig. 1. A Heavy Mine Locomotive with Three Motors and Three Sets of Drivers

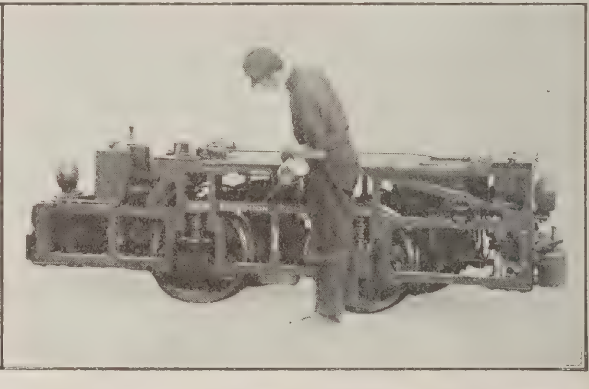


Fig. 2. A Locomotive with Bar-Steel Frame Facilitating Ventilation

If the length of haul, the grade, curve, running time and time of layover are known, the current for each part of the run can be computed. In most main-haulage cases the locomotive will have a definite cycle to go through, this cycle being repeated throughout the working day. If the square root of the mean square current for one cycle can be found, this will, of course, determine the suitability of the motor selected for the all-day service as regards heating capacity.

Motors Are Selected To Suit the Weight of the Locomotive

After the locomotive weight is determined, the motor equipment is selected. By means of the motor curve the current and speed can be obtained for each part of the cycle. Each current value is then squared and multiplied by the time that it lasts. By adding these time-current-squared values and dividing by the total time, including layover, the average squared value of the current is obtained. The square root of this quantity will give the root mean squared value of the current for a complete cycle. If the continuous capacity of the motor is above the root mean squared value the machine is of sufficient capacity; if below, it is not large enough and a larger motor should be selected.

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The continuous-current capacity of mine motors is generally given at two voltages. If the service is main haulage and the distances traversed are fairly long with good line voltage, the value at the higher potential should be used. If the service is gathering and switching or if the line voltage is poor, the value at the lower pressure should be employed. The increased iron loss of the motor at the higher voltage is responsible for the lower current capacity.

When the locomotive is accelerating, the current is considerably greater than when running at constant speed. This, together with the switching and making up of trips at the ends of the run, produces extra heating, and actual calculations show that this can be allowed for by adding 10 per cent. to the sum of the time-current-squared values for fairly long runs and 15 per cent. for short runs. The exact heating value of the accelerating currents can be calculated closely, but as a rule this is not necessary and can be taken care of by the above method of adding from 10 to 15 per cent. to the time-current-squared values.

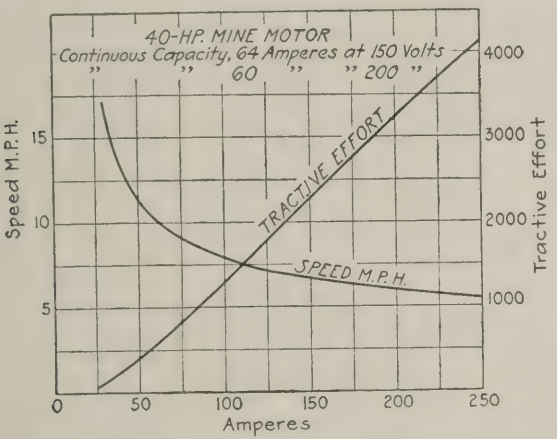

FIG. 3. CHARACTERISTIC CURVES OF A 40-HP. MINE LOCOMOTIVE MOTOR

Since the actual all-day capacity of a mine motor is determined by its ability to get rid of heat by radiation and convection, any construction that will facilitate the ventilation of the machine will add to the all-day capacity. In the past, nine locomotives have as a rule been built with box-type frames of cast iron, rolled steel or structural steel. In all cases the frame was really an inverted box closed at the top and sides and nearly closed at the ends.

As considerable heat is generated by the motors, resistance grids and brake shoes, the temperature of the air around the motor will become considerably higher than the outside atmosphere. Where much sand is used the air inside of the frame will be constantly full of grit which will work its way into the bearings.

One of the recent improvements in locomotives is the "bar-steel" type of frame, which is an open frame made of steel casting. This frame being open on the sides permits of free circulation of air across the motors and resistance. This will increase the capacity of the equipment, since the rise in temperature will be much lessened by this ventilation.

There are a number of other features about the "bar-steel" frame that make it desirable. The amount of inspection and attention a locomotive receives depends largely upon the accessibility of its parts. This type of frame lends itself admirably to this feature by providing ample openings through which inspection and repairs can be made. This frame can be made amply strong to meet the severe conditions that exist in mines, and in event of a collision it may be bent; it has never been broken. A bent frame can be easily straightened by a blacksmith.

AN ASSUMED CASE

To illustrate the working out of the above principles. the following conditions may be assumed to exist at a mine which desires to install electric haulage:

Locomotive required	1
Profile as follows:	
1300 ft. 2 per cent. grade against load.	
1400 ft. 1 per cent. grade against load.	
2200 ft. level.	
Number of cars to be handled per trip	20
Number of cars to be handled per hour	50
Weight of empty car	2000 lb.
Weight of load	4500 lb.
Total weight of loaded car	6500 lb.
Frictional resistance of cars	30 lb. per ton
Time of layover, including switching and making up trip	5 min. each end
Voltage of circuit	250
Gage of track	36 in.
Weight of rail	30 lb. per yd.
Radius of minimum curve	25 ft.
Length of minimum curve	20 ft.
Spread of gage on curve	¼ in.

Limiting dimensions of locomotive, 5 ft. wide, 4 ft. high.

Trolley wire 6 in. outside of rail; height above rail, 4 ft. 6 in. to 6 ft.

The total weight of the trip will be 65 tons.

The limiting condition in regard to weight is, of course, on the 2 per cent. grade. The weight of the locomotive will be found as follows, applying the formula given in COAL AGE of Mar. 6, 1915:

$$30 \times 65 + 20 \times 2 \times 65 + 20 \times 2 \times W = 400\,W$$

$W = 12.6$ tons if cast-iron wheels are used;

$W = 9.88$ tons if steel wheels are used.

It would, therefore, be necessary to use a 13-ton locomotive with cast-iron wheels or a 10-ton locomotive with steel wheels. Steel wheels should be used unless the customer specifies cast iron. A locomotive to negotiate a 25-ft. curve should have a wheel base not more than 55 in. with 33-in. wheels or 65 in. with 30-in. wheels. With motors tandem hung no trouble will be experienced in keeping below 55 in. or 65 in. for a 10-ton locomotive.

The number of cars to be handled per hour being 50, the trips per hour will be $50 \div 20 = 2\frac{1}{2}$. The total time per trip, including layover at each end, will therefore be $60 \div 2\frac{1}{2} = 24$ min. Allowing 5 min. layover at each end will make the actual running time 14 min.

For a locomotive of a given weight there are, as a rule, two or more motors to choose from. For a 10-ton machine these motors range from 40 to 50 hp. in capacity, although larger ones are sometimes required for special cases. A 40-hp. motor is selected for the first trial. The locomotive will have 30-in. wheels with a gear ratio of 4.78 to 1. The highest gear reduction is always selected unless a greater speed is required and can be obtained without overloading the motors. The characteristics of this motor are shown by the curves in Fig. 3.

This curve is made from an actual test, and the tractive effort given includes gear losses, so that to obtain the draw-bar pull only the locomotive friction should be deducted. A table of data covering the case, such as shown in Table 1 or 2, should be prepared, the values inserted being calculated from the motor curves and weights to be handled. Since the curves give values for one motor, the locomotive and trailing weight should be divided by two to give the weight each motor will be required to handle.

TABLE I

Speed Miles per Hr.	Amp.	Total Tr. Eff.	Loco. Res.	Train Res.	Grade Res.	Distance, Ft.	Time, Sec.	Amp.^{2}	Amp.^{2} × Time
8.5	87	1050	75	975	0	2200	177	7,569	1,340,000
6.5	165	2550	75	975	1500	1300	136	27,225	3,700,000
7.2	125	1800	75	975	750	1400	133	15,625	2,080,000
Returning with Empty Trip									
10	25	75	75	300	—300	1400	96	625	60,000
10	0	—225	75	300	—600	1300	89		
10	45	375	75	300	0	2200	150	2,025	303,000

Amp.^{2} × time = 7,483,000
Plus 10% for accelerating, switching, etc 748,300

Total amp.^{2} × time 8,231,300
Total running time, sec. 781
Total time at both ends, sec. 659

Total time including layover, sec. 1440
8,231,300 ÷ 1440 = 5700 = mean squared current.
The square root of 5700 = 75.5 = square root of mean square current.
Capacity of 40-hp. motor is 60 amp.

THE WEIGHTS PER MOTOR ARE FOUND

For the above project the weight of locomotive is five tons per motor; the loaded trailing weight, 32½ tons per motor, and the light trailing weight, 10 tons per motor. Assume that the locomotive starts with a load on a level track and runs 2200 ft., when it encounters a 2 per cent. grade. After ascending this grade for 1300 ft. the grade changes to 1 per cent. for 1400 ft. The return trip will be with empty cars.

Starting with the loaded trip on the level, the locomotive resistance per motor will be 5 × 15 = 75 lb. This value is placed under "locomotive resistance" in the table. The train resistance will be 32.5 × 30 = 975 lb. The grade resistance will be zero. The total tractive effort will be 1050 lb.

Consulting the motor curves of Fig. 3 the current for a tractive effort of 1050 lb. is 87 amp. and the speed 8.5 miles per hour. The time to cover 2200 ft. at 8.5 miles per hour will be 177 sec. The amperes squared will be 7569 and the amperes squared multiplied by time will be 1,340,000. These values should be recorded in their proper place in the table.

When the 2 per cent. grade is reached, the train and locomotive resistance will remain the same, while the grade resistance will be 40 × (32.5 + 5) = 1500 lb. The total tractive effort will be 2550 lb., which corresponds to a motor current of 165 amp. and a speed of 6.5 miles per hour. At this speed it will require 143 sec. to travel 1300 ft. By the same process the values for the 1 per cent. grade are calculated and filled in the table.

On the return trip with the empty cars the locomotive resistance will be the same, the train resistance 300 lb. for 10 tons, and the down-grade resistance —300 lb. for the 1 per cent. and —600 lb. for the 2 per cent. grade. It will be noted that, running down the 2 per cent. grade, the net tractive effort is —225 lb., which means that the brakes must be applied in descending this grade.

TEN MILES PER HOUR WILL PROBABLY NOT BE EXCEEDED

On the 1 per cent. grade and on the level the speeds shown on the curve of Fig. 3 are too high for most mines unless the track is in good shape. It is likely that the operator will not care to run faster than 10 miles per hour, which he can do by operating the motors in series on low notches, or by cutting off the power and coasting before the speed becomes too high.

The total running time is 781 sec., or 13 min. 1 sec. The actual running time will be close to 14 min., due to time taken to start and stop the trip and for possible slowing down at cross-overs. As the total time for a round trip is 24 min., a layover of five minutes is obtained at each end.

The product of the total current squared by the time is 7,483,000. To this, 10 per cent. should be added to allow for acceleration and switching when making up trips, making a total of 8,231,300. The total time for making a round trip, including layover, is 1440 sec. Dividing 8,231,300 by 1440 = 5700 as the mean square of the current. The square root of 5700 is 75.5 amp., which is the square root of the mean square current for one trip or cycle.

The continuous capacity of the motor is 68 amp. at 150 volts and 64 amp. at 200 volts. The class of service is such that the average voltage applied to the motor will be near 200, so that the rating of the motor is about 65 amp., which shows that it is not of sufficient capacity for the service.

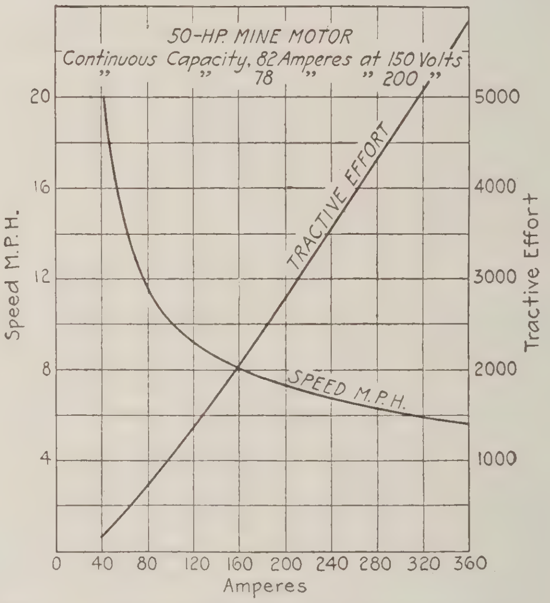

FIG. 4. CHARACTERISTIC CURVES OF A 50-HP. LOCOMOTIVE MOTOR

TABLE II

Speed Miles per Hr.	Amp.	Total Tr. Eff.	Loco. Res.	Train Res.	Grade Res.	Distance, Ft.	Time, Sec.	Amp.^{2}	Amp.^{2} × Time
10.1	100	1050	75	975	0	2200	149	10,000	1,490,000
7.6	187	2550	75	975	1500	1300	117	34,970	4,090,000
8.5	146	1800	75	975	750	1400	113	21,316	2,410,000
Returning with Empty Trip									
10	35	75	75	300	—300	1400	96	1,225	117,500
10	0	—225	75	300	—600	1300	89		
10	56	375	75	300	0	2200	150	3,136	470,400

Amp.^{2} × time = 8,577,900
Plus 10% for accelerating, switching, etc 857,790

Total amp.^{2} × time 9,435,690
Total running time, sec. 714
Total time at both ends, sec. 726

Total time including layover, sec. 1440
9,435,690 ÷ 1440 = 6550 = mean squared current.
The square root of 6550 = 81 = square root of mean square current.
Capacity of 50 hp. motor is 80 amp. at 150 v.

Care should be taken that a motor is not selected in which the commutating limit is exceeded when the wheels are slipped while using sand. The motor curves are generally stopped at the commutating limit, although with the modern commutating-pole motor it is rather difficult to find the commutating limit.

A larger motor should be selected, and Table II shows the results of the calculation using two 50-hp. motors. The curves of Fig. 4 show the characteristics of this motor. The total calculated running time is 714 sec., or 11 min. 54 sec. The square root of the mean square current is found to be 80 amp. The capacity of the motor at 200 volts is 78 amp. and 82 amp. at 150 volts, so that this motor will be of just about the proper capacity to meet the conditions. The actual running time will be about 12 to 14 min., allowing 5 to 6 min. at each end for switching and making-up trips. The higher root mean square current obtained for the 50-hp. motor is due to the fact that it is a higher-speed machine than the 40-hp. This shows the importance of having a low-speed motor.

It is not safe to figure on a short layover, as in many cases the average line voltage is much less than 500 or 250 volts, which means that the speed will be less than is figured on. A low line voltage signifies that a given current will be required for a much longer time than with the normal voltage, which in turn means additional heating. Where the voltage is likely to be poor, a margin should be allowed in the motor capacity, since the value of the square root of mean square current will be greater than that calculated.

IN SOME MINES THE GRADES FAVOR THE LOADS

The conditions outlined above in regard to profile are typical of what may be expected in mines. Sometimes it is possible to lay out a mine so that all of the main haulage will be with the grades; other mines will have mixed grades—that is, some inclinations in favor of the load and some against it; while too often a mine will be found with little or no level track and all grades against the load. If the profile instead of that given above were 2 per cent. against load 300 ft., level track 2300 ft., 1 per cent. in favor of load 2300 ft., the same weight of locomotive would be required, but the heating would be much less. Table III shows that the root mean square current is only 51.7 amp., which gives a large margin of safety when using the 40-hp. motor.

TABLE III

Speed Miles per Hr.	Amp.	Total Tr. Eff.	Loco. Res.	Train Res.	Grade Res.	Distance, Ft.	Time, Sec.	Amp.²	Amp.² × Time
6.5	165	2550	75	975	1500	300	31.5	27,225	870,000
10	40	300	75	975	—750	2300	157	1,600	251,200
8.5	87	1050	75	975	0	2300	184.5	7,569	1,395,000
Returning with Empty Trip									
10	45	375	75	300	0	2300	157	2,025	318,000
10	65	675	75	300	300	2300	157	4,225	664,000
10	0	—225	75	300	—600	300	20		
Amp.² × time =									3,498,200
Plus 10% for accelerating, switching, etc.									349,820
Total amp.² × time									3,848,020
Total running time, sec.								707	
Total time at both ends, sec.								733	
Total time including layover, sec.								1440	

3,848,020 ÷ 1440 = 2670 = mean squared current.
The square root of 2670 = 51.7 amp. = square root of mean square current.

On the other hand, the grade may be 2 per cent. for the entire distance against the load. In this case the root mean square current would be about 105 amp., corresponding to a motor having an hour rating of 75 to 80 hp. As it would not be practical to put two such large motors on a well designed 10-ton locomotive, it would be necessary to go to a 12- or 13-ton machine.

When a locomotive is to be used for gathering it is difficult to determine the proper capacity by the above method, since the service consists largely of starting and stopping with varying loads. From experience it has been found that if the horsepower per ton of weight of locomotive ranges from 6 to 10, the motors will have ample capacity.

This scheme is much of a makeshift and has little real reason behind its use. Locomotives have been in successful operation for years with but 6 hp. per ton and the motors were not overloaded. On the other hand, cases sometimes arise where 12 to 14 hp. per ton would be entirely inadequate. A high horsepower per ton is often obtained by using a high-speed motor and either allowing the locomotive to run fast or to use a pinion which is entirely too small for safe operation.

The placing of too large an equipment on a locomotive is a detriment instead of an advantage. It is somewhat similar to hitching a heavy dray horse to a light express wagon. The horse cannot work up to anything like his capacity and is likely to injure the wagon in attempting to perform his normal work.

Where the motor is too large the speeds will be high and the motor-man is often tempted to use an excess of sand and to hold the brakes on during acceleration to prevent slipping. This kind of operation results not only in a rise in power consumption but also a large increase in mechanical wear. The saving in electrical repairs may be more than balanced by the increase in mechanical repairs.

When reels are desired they can be furnished either of the traction or electrical type. The traction reel is used where steep grades are encountered and it is not desirable to have the locomotive enter the rooms. The capacity of the motor for a traction reel should be from 4 to 8 hp., depending upon the conditions. A small resistance type of controller should be used.

Of electrical reels two general types are used—the mechanically and the electrically driven. The mechanically driven reel is geared to one of the axles or to one of the main gears. This reel has the disadvantage that if the wheels are locked by the brake when coming out of a room the cable will be run over and cut in two.

The electrically driven reel consists of a horizontal or vertical axle reel equipped with a small motor, which acts as an electrical spring, always keeping tension on the cable. The motor is generally less than 1 hp. in capacity and is so wound that it can remain connected across the line continuously without danger of being burned out. The horizontal reel has the advantage that it does not interfere with access to the main motor and can be mounted low down in front without increasing the height of the locomotive.

SELECTING THE CONTROL APPARATUS

The resistance type of controller is generally employed for mine locomotives. This controller contains a combination series-parallel and reversing switch so that the motors can be operated either in series or parallel. This controller has two advantages over the standard series-parallel type used for railway service in which the motors are always started in series—first, it is much shorter, which permits it to be used in an upright position on locomotives which must be built to a minimum height; second, it is often necessary to start in parallel, since a greater and more even draw-bar pull is thus obtained.

The reason for this is that when the motors are in series and one pair of wheels starts to slip, the counter electromotive force of the slipping motor rises and cuts down the current so that the other motor is robbed of a large portion of its torque. When in parallel each motor receives its current independent of the other and the slipping of one pair of wheels does not reduce the torque of the motor driving the other pair.

Controllers for mine locomotives are designed for 500-volt service, so that any given controller has twice the capacity in horsepower on 500 volts that it has on 250. Mine-locomotive equipment, like railway equipment, is becoming heavier each year and considerable difficulty is sometimes experienced in providing a controller to handle the heavy currents. Most of the controller trouble occurs when throwing the controller "off" while pulling heavy loads.

In railway practice this trouble has been taken care of by supplying an auxiliary switch, operated by compressed air or magnetically, to open the trolley circuit when the control hand starts to move to the "off" position. It would be necessary to use a magnetic contactor with a mine locomotive, since, with a few exceptions, mine locomotives are not equipped with compressed air.

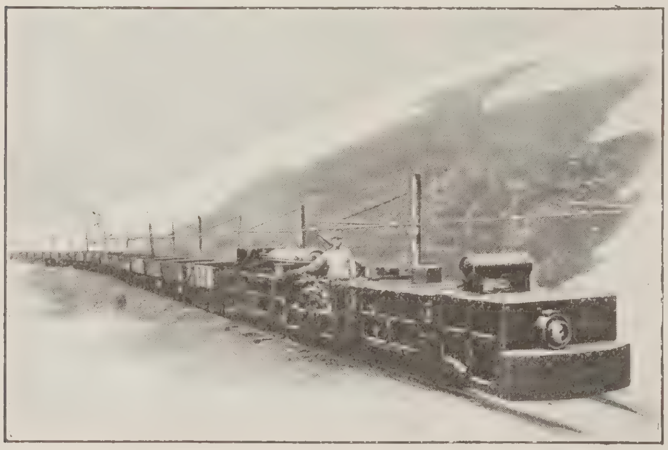

Fig. 5. Two Locomotives Arranged in Tandem for Heavy Hauls

With a locomotive built for minimum height and width, some difficulty would be experienced in finding a suitable location for the contactor. This scheme will no doubt be tried out in the near future. At present, when the motorman thinks he may blow up his controller by throwing it off, he pulls down his trolley and breaks the arc on the trolley wheel.

Care should be taken in selecting the resistance that ample capacity is provided for the type of service to be met. An alloy grid has been found to be the most satisfactory, since straight cast iron is too brittle to stand the constant jarring and vibration incident to mine operation.

Sometimes continuous running on notches is specified. This will greatly increase the number of grids required, and where continuous operation is necessary on every notch the number of grids will be about doubled. In most cases it would be difficult to find room for so much resistance on a locomotive.

Gathering locomotives will require more capacity in resistance than main haulage units, since the number of starts in a given time is greater. It is, therefore, important to supply ample current-carrying capacity as well as the correct ohmic value in the resistance.

Circuit-Breakers Are Seldom Used Except on Large Machines

Circuit-breakers are, as a rule, used only on locomotives of 10 tons and over. Many large machines of 20 to 30 tons are, however, equipped with fuses, and in some cases no protection at all is provided. If a circuit-breaker is of ample capacity and is properly maintained it should give excellent service. Such a device should be set a little above the slipping point of the wheels so that it is not likely to open during the starting of a heavy trip. This setting should correspond to the current in both motors that will produce a tractive effort of about 40 per cent. of the weight on the drivers.

A fuse should be selected in the same way. The railway type of fuse box using an aluminum or copper wire or ribbon is preferable, since a motorman can always find a piece of wire of somewhere near the right size, while the likelihood of his having extra fuses of the inclosed type is not great.

Sometimes a locomotive is desired of such a capacity and weight that the rails will not safely carry it. In this case a tandem unit may be resorted to. This combination generally consists of a leading unit equipped with a four-motor controller and a trailing unit equipped with a two-motor controller. The locomotives are electrically connected by jumpers and mechanically through the draw bars and brake system.

This combination is arranged so that it can be separated and each unit operated independently of the other. The braking becomes a serious consideration when the units are large, and in some cases air brakes are resorted to. Fig. 5 illustrates two 15-ton units operating in tandem and using an air-brake equipment.

Another method of reducing the weight and horsepower per axle is to supply a three-motor locomotive. This renders possible a locomotive one-third larger without increasing the wheel load. The series position on the controller gives rather slow speed with all three motors in series, but heavy pulls can be obtained with a small expenditure of power. Fig. 1 illustrates a 24-ton locomotive equipped with three 85-hp. motors. Particular attention is called to the equalization scheme used on these locomotives. Two pairs of drivers are equalized on the sides, while the third pair is cross-equalized. This insures good tracking, especially at high speeds.

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Success

Articles of all descriptions and kinds are coming in for our April 3 SUCCESS number. Our readers located at different mines in various fields are picking up ideas covering practical installations and systems already being successfully used. In some cases large plants are described, while in other instances practical wrinkles of a saving nature are written about. It is this kind of coöperation that has made Coal Age so very interesting, and we much appreciate such support on the part of our friends. It is not yet too late to send in your SUCCESS story; however, the time is growing short, and all those who have an article under way for this special number are urged to hurry along its completion.

Coal Washer for No. 8 Mine, Tennessee Coal, Iron & Railroad Co.

By O. H. Bohm*

SYNOPSIS—Some of the details of the crushing screening, picking and washing machinery are here described. This plant is peculiar in that a reversible picking table is employed.

The article by Mr. Butcher in Coal Age under date of Feb. 20 prompts a few additional remarks regarding the installation mentioned. Too much praise can not be given Robert Hamilton, consulting engineer for the Tennessee Coal, Iron & R.R. Co., for the careful study which he made of general conditions surrounding the plant.

The coal is brought to the tipple and dumped onto shaking screens set lengthwise over the slack track. The undersize from the shaker may be dropped into a car beneath or spouted to the crushing plant. The oversize or lump coal is fed onto a reversible pan conveyor discharging to a railroad car on the lump track, the speed of the conveyor being such that hand picking is resorted to for the removal of occasional pieces of slate. Running in the opposite direction this conveyor discharges to the crushing plant.

To facilitate the handling of coal from other mines of the company, a foreign-coal track hopper and conveyor were installed at a point up the track from the tipple. This was for the purpose of utilizing the screening, crushing and washing facilities which were to be provided at the mine, either at night or in case an unforseen accident at No. 8 mine might hamper operations at that point during the day. The coal from other points is delivered and stored on the tracks in large hopper-bottom cars. During operation this foreign-coal conveyor discharges onto the shaking screens, the coal being treated the same as the run-of-mine coal from No. 8.

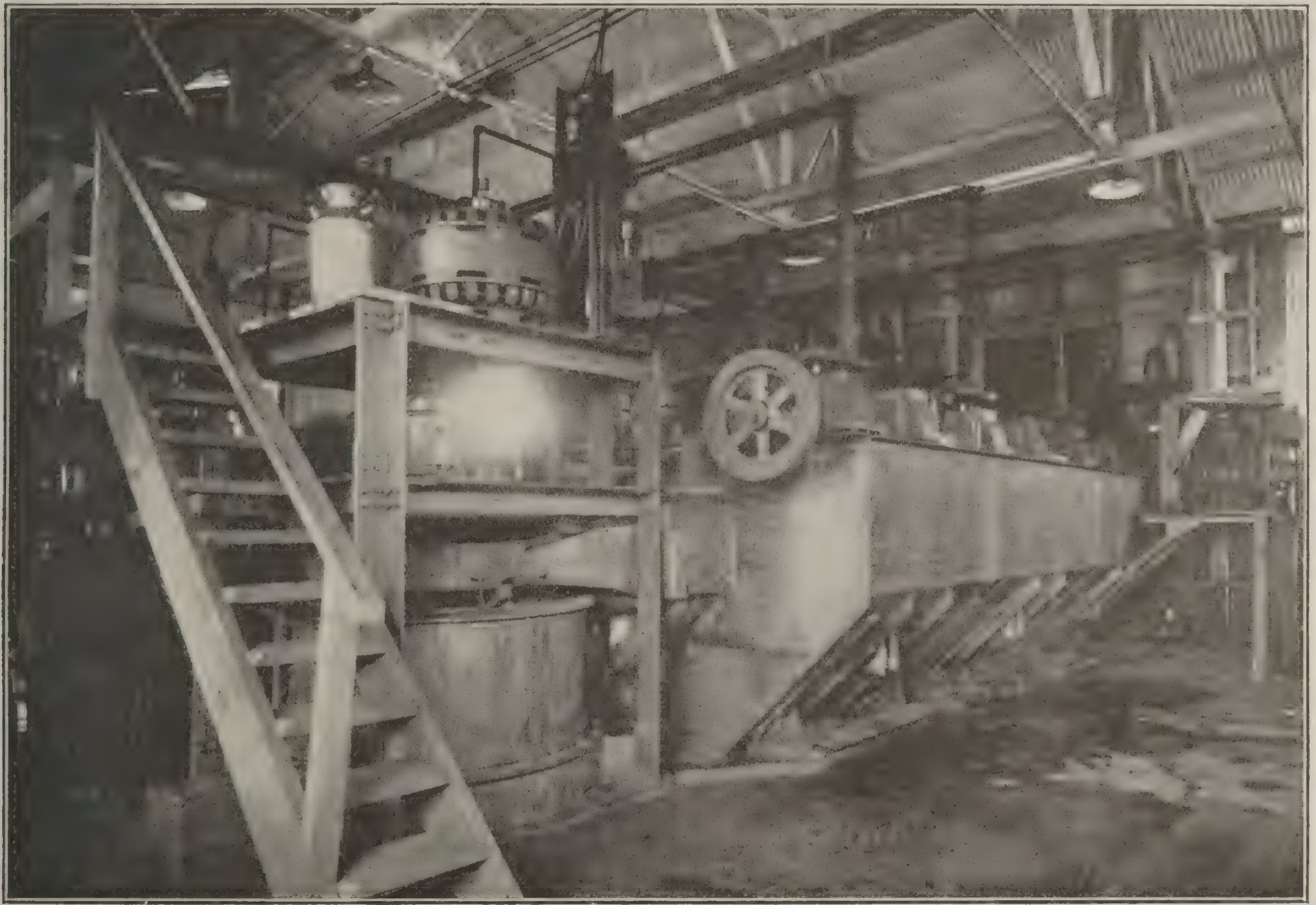

Fig. 1. Interior of Washery, Showing Jigs and Dryers

The crushing plant was installed immediately under the tipple. It consists of one set of toothed rolls for primary reduction of the lump coal and feeding directly to a set of corrugated rolls for the final reduction of the slack product from the shakers, as well as that coming from the primary lump breaker. Both sets of crushers are of heavy design, with parts as nearly interchangeable as possible, and are supported on steel frames carried on walls surrounding the crushers.

To obviate crowding as well as wear and tear incident to an elevator of great height and also to secure capacity sufficient to be able to keep the washing plant in better condition and independent from the tipple operations a belt conveyor was installed to carry the reduced product of the crushing plant to the raw-coal storage bin of 200 tons' capacity, which is located about 200 ft. from the tipple. This bin is placed at a sufficient elevation to feed direct to the jigs through special revolving feeders of wide face, it having been determined that an opening narrow vertically and wide horizontally would permit a more uniform flow of the fine coal than was otherwise possible. As two jigs of approximately 50 tons' hourly capacity each were intended, only two feeders were required, these being driven by chains from the jig shafts.

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*Mining engineer, Canton, Ohio.

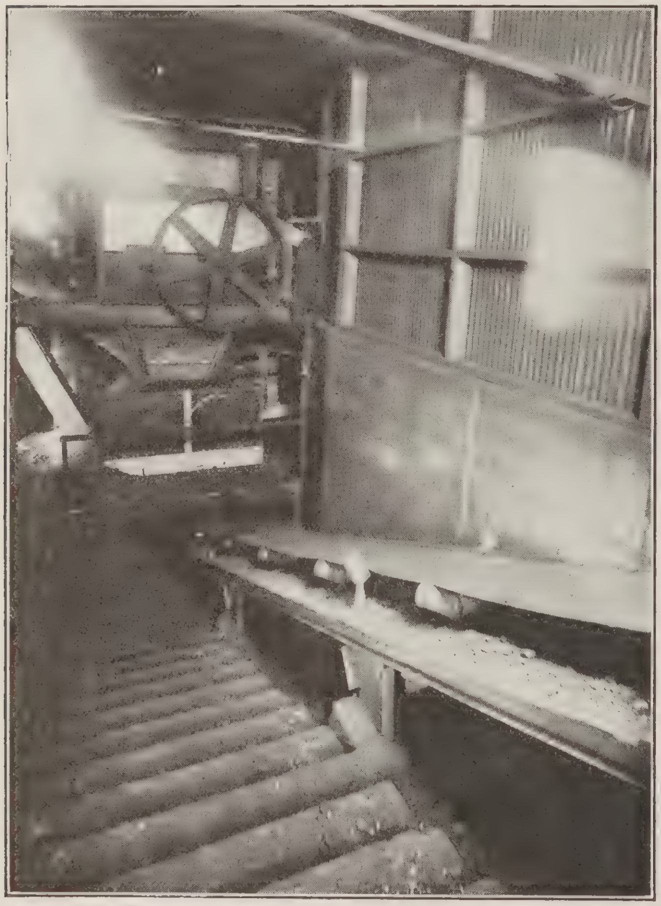

FIG. 2. CRUSHER AND INCLINED CONVEYOR BELT

It was decided that the jigs for the plant would consist of two direct-connected units, each consisting of three tandem sieves 6 ft. wide and 6 ft. long, with plungers on each side thereof. Each sieve was provided with rotary valves of special construction for the removal of slate, bone and boiler coal. The equipment operating these valves is of such design that great variations in speed and capacity are possible, while uniform products can be obtained from the bed of the jigs by their operation. The jig tanks are of steel, double hoppered, and provided with manholes in the bottom for the sake of accessibility, as well as gates for drawing off the product coming through the sieves.

To insure neatness and economy in the matter of lubrication and to reduce power consumption, ring oiling bearings with large oil reservoirs are used on the jig shafts throughout.

The plungers are approximately 3 ft. wide and 3 ft. long, two being used on either side of each sieve. They are of steel construction, equipped with rubber flap valves, and each is actuated by its own eccentric. The reduction of the size of the plungers assures greater ease in handling as well as allowing a variation in stroke at the feed end of each compartment from what might be found necessary at the discharge end of the same.

The eccentrics of the jigs are of special design, adjustable from zero to 2-in. stroke and equipped with automatic oilers and traveling oil reservoirs. The yokes are of cast steel, bushed with brass at the connecting pin. No water or grit can enter the housings or come in contact with the eccentrics. This obviates much wear and tear and the incidental cost of frequent renewals.

The coal passes from the jigs to the driers direct, the water being removed for the purpose of settling out the slimes which are returned to the driers and entrained with the coal as described in Mr. Butcher's article mentioned above. The dried coal is collected on a conveyor underneath the driers and then elevated to a shipping bin of 300 tons' capacity. The refuse and boiler coal are handled in dewatering elevator pits and discharged to bins of 50 tons' capacity each.

The raw-coal, refuse and boiler-coal elevators are of heavy design to insure durability and are double strand throughout. The entire mechanical equipment was designed with high safety factors and with the idea of ample capacity in case a rush had to be handled, as well as economy in operation. Many of the devices used throughout the plant are of special design and protected by patents.

A few words regarding the materials entering into the buildings comprising the completed plant should be permissible here. The crushing plant is of concrete and steel, covered with corrugated iron. The conveyor gallery for the raw coal is also of steel with concrete floors. As the inclination of this gallery is 21 deg. the floors are provided with safety treads.

The washer building proper is concrete up to the washer floor, the superstructure being of steel covered with corrugated iron. The large settling cone mentioned in Mr. Butcher's article is also of steel. The raw-coal bin, as well as the washed-coal, boiler-coal, and refuse bins, are of timber construction throughout, lined with steel and provided with suitable gates for the discharge of materials. The washer building is amply provided with windows and is well ventilated, insuring good working conditions.

The performance of the plant from the standpoint of efficiency and economy has been previously mentioned. Its simplicity is one of its great redeeming features. The writer was identified in an engineering capacity with the design, construction and starting of the plant.

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A Recognition of Deserving Service

No industry can boast bigger and better men than coal mining. There are a number among us who have labored faithfully and efficiently in the mining business, without any recognition other than that of a purely local nature. Pick out a man of this type and send us immediately a short story about him, including if possible a photo of the person himself. The man, his friends and family will much appreciate such a tribute to high character and superior ability. The article will go in our SUCCESS number and must be sent to us within three or four days.

The Labor Situation

SYNOPSIS—The eastern Ohio miners exhibit the firmest determination not to arbitrate or concede anything to the operators. A strike in eastern Kentucky is threatening, a cut of 20 per cent. having been made by the Middle Creek Coal Co.

The storm center is still Ohio. The union reluctantly finds that it cannot finance more than one such center; in fact the Ohio difficulty is a terrible strain on a limited purse. The union has already paid over $1,380,000 in Ohio to the strikers, and the payments still being made amount to $40,000 a week. In addition to these union contributions, 75 carloads of clothing, food and other supplies have been shipped in from the cities in which these goods were solicited.

Carried Almost Unanimously

But what can be done to end a strike where the men are such a unit in their determination! At the recent referendum 118 voted for arbitration and 14,280 against such action. Three small locals at Flushing, a large one at Crescent and a small one at Warnock, all in Belmont County favored arbitration by a small majority. But out of 79 locals, only the 5 mentioned voted for arbitration, 10 (which were working) did not vote, and 62 stood out for the 47c. basis. From two others the returns have not yet been received.

The operators declare that those men who were opposed to arbitration were the only persons notified of the proposed vote, but the number of votes cast, which is not far from 100 per cent. of the possible ballot, makes this complaint feeble. The sentiment is, of course, not so strong as the vote. Majorities tend always to unanimities. Few men wish to oppose their convictions to a strong body of contrary opinion.

The Operators Who Have Received Concessions Favor the Green Act

The Gallagher amendment to the Green anti-screen bill has been certified to the state house of representatives. It is now in the committee on mines and mining, and sentiment seems to favor its passage. The miners' leaders are starting a vigorous campaign through the state for the defeat of the amendment.

In order to prevent the miners from permitting any amendment to the Green Antiscreen Act, J. S. Jones, president of the Sunday Creek Co., which is one of the largest producers in the state of Ohio and has no mines in the eastern Ohio district has notified Percy Tetlow, the miners' legislative agent, that in case the house adopts the Gallagher amendment and it becomes law with the emergency clause attached, he will close down his mines unless his men will accept a reduction of 2.39c. on the wage scale adopted last August.

It is evident that the Sunday Creek Co. recognizes that the 47c. rate in the eastern Ohio field would be an increase of 2.39c. over the old screen rate. It realizes that such an increase gives the companies in other parts of the state an advantage, which it regards as already secured and which it desires not to lose by the repeal of legislation.

Rumored Defections of Operators

There appears to be considerable doubt as to the intentions of Arthur T. Morgan at the Edgehill mine. It is stated that no contract has been signed and that all the operations of the 15 men at this mine constitute merely cleaning work, such as was commenced some time ago at the Big Run and the Fort Pitt mines and was stopped later by the union.

Now the Blyth Coal Co., at Salt Run, is similarly reported to be about to sign a contract on the 47c. basis. It employs about 100 employees. C. J. Albasin, the president of the subdistrict, says that yet another coal company has asked for a form of contract.

To prove that the miners are supporting their leaders, the vote for president, vice-president and secretary-treasurer of the subdistrict in which the strike is centered may be quoted. C. J. Albasin, William Roy and William Applegarth who respectively filled the positions mentioned for the past term have been reëlected, meeting absolutely no opposition, though the vote was not large, being only 6059 out of a membership of about 17,000.

The Eastern Kentucky Strife

The Middle Creek Coal Co., the largest concern in Floyd County, eastern Kentucky, has decided on a 20 per cent. reduction in wages. The Colonial Coal & Coke Co., the next largest operator in that county, has made the same reduction and a strike has resulted. The men in that district are mostly American and non-union. If, as has been expected, other companies make an equal reduction in wages, a widespread strike may result.

An Agreement Sought in New River District

The directors of the New River Co., and the New River & Pocahontas Consolidated Coal Co. desired Thomas Haggerty and Joseph Vasey, members of the international executive board of the United Mine Workers to come to New York City for the purpose of discussing the terms of an agreement. The meetings at Cincinnati, Ohio, and Charleston, W. Va., had been a failure. The two labor leaders left Charleston on Mar. 9. The result of their deliberations has not been announced.

Convention in Arkansas

A convention is proposed in District 21, comprising Arkansas, Oklahoma and Texas. This convention is to consider the purchase of the Bache-Denman property. Five locals near Hartford have voted in favor of the purchase, and others are expected to do so shortly.

Several unions are voting to assess their members from 25 to 50c. per month for the benefit of the families of the men who were sent to jail in the government's conspiracy cases. The sentences imposed on these men were for violence and contempt of court arising out of the attempt of the Bache-Denman Coal Co. to run an open-shop mine.

An agreement has to be signed with the Blue Ridge Coal Co., which intends operating the mines of the old San Bois Coal Co., which had, as our readers will remember, a terrible explosion at its Chant mine, which appears to have been the cause of its troubles. This agreement will probably be elaborated at the convention proposed.

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The Rocky Mountain Coal Mining Institute Will Hold Summer Meeting

The Rocky Mountain Coal Mining Institute will resume its meetings, holding the next one in Trinidad, Colo., June 8, 9 and 10, 1915. The following committees have been appointed: Program and entertainment—W. F. Murray, J. P. Thomas and M. O. Danford, all of Trinidad, Colo. Transportation—Wyoming, Frank Manley and P. J. Quealy; Utah, W. C. Ferguson and A. C. Watts; New Mexico, G. A. Kaseman and T. H. O'Brien; Colorado, W. J. Murray and C. W. Babcock. F. W. Whiteside, Denver, Colo., is secretary-treasurer.

Recent Legal Decisions

Scope of Mine Safety Law—A law, such as is in force in Missouri, making coal operators liable for injuries to employees, caused by negligence of coemployees, does not extend to men engaged in sinking prospect holes. (Kansas City Court of Appeals, Allen vs. Leach, 171 "Southwestern Reporter," 9.)

Personal Injury Verdict Not Excessive—Seven thousand three hundred and thirty-four dollars cannot be deemed excessive recovery for injury to a miner caused by a fall of slate, if he was thereby incapacitated for work through hardening of the muscles of his back, partial paralysis of his legs and disarrangement of his internal organs, he having previously earned $4 or $5 a day. (Kentucky Court of Appeals; New Bell Jellico Coal Co. vs. Sowders, 172 Southwestern Reporter, 914.)

Misunderstanding as to Price of Coal—When the parties to a contract for a sale of coal or other commodity really misunderstand the price at which the sale is made, the same not being expressed in writing, and the buyer receives and uses the property, after ascertaining from invoices that the seller claims a larger price than the buyer understood was fixed, he becomes liable for the invoice price, according to the decision of the Kentucky Court of Appeals, announced in the case of Caldwell & Drake vs. Cunningham, 172 "Southwestern Reporter," 498. But where it appears that a certain price was mutually agreed upon, the buyer's acceptance of shipments under invoices calling for a higher price does not render the buyer liable for more than the contract price.

"A Statement of Facts" from the Operators of the Middle West

SYNOPSIS—The operators of Indiana and Illinois state that the present competitive system produces a series of public and private ills, and they advocate some manner of regulation, the nature of which, however, is not specified.

The coal operators of the States of Indiana and Illinois present herewith to the American nation some facts about the condition of their business. The normal state of the coal industry for some years has been such as to endanger the lives of the miners, to waste the coal reserve which now insures the continued prosperity of the eastern part of the country and to deprive these operators of any hope of profit. The recent general business depression has intensified this dangerous condition. The near future contains nothing but disaster unless some relief is extended. What follows summarizes the facts.

The coal produced in Illinois and Indiana sells in an interstate market embracing 18 states. For that reason, the operators who produce it are amenable to the antitrust laws which, they believe, forbid any coöperation among them. Because they cannot coöperate, they cannot simplify their selling methods or reduce their selling and operating costs.

Their mines are within the two states mentioned and cannot be removed therefrom. These states will continue therefore to regulate their operating methods.

COST INCREASES WHILE PRICE DECLINES

The effect of the nation's anti-trust laws is to cause the operators to compete without restraint. This unrestricted competition has resulted in a decreasing selling price. On the other hand, the states' laws, which were enacted to assure the safety and the social welfare of the miners, have resulted in a rising production cost and in increased expenditures for equipment. In obedience to the states' laws, the mines have been fireproofed and expensive safety appliances have been added. These things have enlarged the requisite investment in plant and equipment by 1000 per cent. in the last 20 years.

The effects of these two sets of laws have moved in opposite directions. The rising cost of production and the falling selling price have long since made profit impossible and now threaten the integrity of the whole business structure as well as the safety of the miners and the welfare of the public.

One of the refinements of competition in which these operators have indulged has been the erection of elaborate plants with which to prepare and clean carefully nine standard sizes of coal.

Another effect of enforced competition has been intense individualism. In consequence, three mines have been opened where only two were needed, and three men have been employed where only two were necessary. These mines and men can find productive work only during 175 instead of a possible 300 days in a year.

THE MARGIN BETWEEN SELLING AND LABOR COSTS

Because the operators can give their miners work only a part of the time, these operators must pay higher daily wages than are warranted by the current selling prices. Their labor cost is 92.44c. per ton, whereas the selling price is but $1.14 and $1.11 respectively for the States of Illinois and Indiana.

From the resulting narrow margin these operators must pay administrative salaries and expenses, selling cost, royalty or land-depletion charge, depreciation on plant and equipment, the cost of all materials used in the mines and some eight or ten other major items of expense. The margin is clearly wiped out by these expenditures, and thus the business is left with no possible net revenue.

Still, these operators are morally or legally obligated to pay the cost of any great or dire emergencies, to educate their miners in ways which will assure greater safety, to educate the users in methods by which coal can be burned with greater efficiency, to expand their sales into the foreign markets, to experiment with and undertake the manufacture of byproducts and to do those hundreds of little things which make for greater safety and for true conservation.

WASTE OF COAL

One obligation resting upon these operators is to recover the pillar and top coal that the loss to the country may be lessened. Because this involves an additional expense, it cannot be undertaken. Still, for every two acres of coal land which the operations exhaust they leave one acre of coal unrecovered and unrecoverable in the ground. This means that in Illinois each year 12,000 acres of coal land are exhausted, whereas the exhaustion should be but 8000 acres. In Indiana the depletion is 3000 acres, whereas it should not be more than 2000. In the whole country 100,000 acres are exhausted, whereas not more than 65,000 or 70,000 acres should have been thus made of no mineral value.

The operators of Illinois and Indiana, caught between the conflicting regulations of the states and the nation, yet under compulsion to obey both, are powerless to prevent this waste. Only the nation can reverse this tendency and provide against it. This statement is made in the hope that some suggestion will be made which will bring the relief needed.

PROSPERITY OF FARMERS AND MANUFACTURERS

It has been said that the normal condition of the coal-mining industry is one of dangerous financial exhaustion. Since the end of the depression in 1897 the farms and factories have enjoyed increasing prosperity. This has not been shared at any time or in any degree by the coal industry. Regardless of the regular and substantial annual increase in tonnage produced, the returns from investments in the coal trade have been steadily diminishing. Coal has supplied the power which made every business rich, yet the author of all this wealth remains poor.

In fact, in the last dozen years there have been but a few brief periods in which the coal trade has enjoyed any prosperity. These prevailed in each instance for not to exceed two or three months. They were due to wholly unnatural causes and in no manner indicated that the business had, at last, become master in its own house.

For example, the operators of Illinois and Indiana received remunerative prices during the anthracite strike of 1902 when they profited by the misfortunes of others. For short periods during car shortage in the winters of 1903 and 1904, this experience was duplicated. Once or twice since that time, strikes or other temporary labor difficulties in one state gave the other states business to which they had no natural right. Except in such times, the trade has been unprofitable or actually showed a loss.

Why Costs of Production Have Risen

Meanwhile there has been a steady increase in operating and administrative expense due to repeated advances in labor cost; to the increased cost of material, such as rails, timber, cement and machinery; to the passage of laws in behalf of the workers such as the safety measures and the Workmen's Compensation Act in Illinois, and to the increased cost of making sales, arising from unrestricted competition.

The Cost of Production

According to the figures compiled by the Bureau of the Census, the amount paid in wages was, in 1909, above 80 per cent. of the total selling value of coal at the mine mouth. Since 1909 there have been granted two wage increases—one in 1910 of 5.55 per cent. and another in 1912 of 5.26 per cent. These increases have brought the wage cost per ton of coal produced to 92.44c. in 1913.

DISTRIBUTED COST AND SELLING PRICE OF COAL WITH OTHER DETAILS, UNITED STATES CENSUS OF ILLINOIS AND INDIANA 1909

State	Number of Operators		Gross Capital and Capital per Ton of Product	Expenses						Number of Wage Earners	Coal Produced, Including Coal Coked at Mines	
				Total	Salaries	Wages	Supplies	Royalties	Miscellaneous Expenses		Value Including Minor Products	Tons (2,000 lb.)
Illinois......	470		$75,257,667	$51,697,504	$2,083,668	$41,991,246	$4,944,371	$744,860	$1,933,359	74,445	$53,030,545	50,570,503
		per ton	$1.488	$1.024	$0.041	$0.832	$0.0977	$0.014	$0.038		$1.05	
Indiana......	223		35,937,961	14,906,831	604,111	12,273,544	1,198,974	240,494	589,708	22,357	15,018,123	14,723,231
		per ton	$2.441	$1.012	$0.041	$0.834	$0.0815	$0.0163	$0.040		$1.02	

COMPARATIVE DISTRIBUTED COST AND SELLING PRICE OF COAL IN 1889 AND 1909 IN ILLINOIS AND INDIANA

State	Census		Gross Capital and Capital per Ton of Product	Expenses				Value at Mines	Tons (2,000 lb.)	Wage Ratio to Value
				Total	Wages	Supplies	Contract Work			
Illinois......	1909		$75,257,667	$51,697,504	$41,991,246	$4,944,371	$51,480	$52,999,918	50,570,503	79%
		per ton	$1.488	$1.024	$0.832	$0.0977	$0.0001	$1.048		
	1889		17,630,351	10,366,069	8,111,253	966,927	26,662	11,755,203	12,104,272	69%
		per ton	$1.457	$0.856	$0.670	$0.0799	$0.002	$0.097		
Indiana......	1909		35,937,961	14,906,831	12,273,544	1,198,974	10,674	14,984,616	14,723,231	81%
		per ton	$2.441	$1.012	$0.834	$0.0815	$0.0007	$1.018		
	1889		3,435,703	2,581,669	2,045,641	241,094	5,807	2,887,852	2,845,057	70%
		per ton	$1.207	$0.906	$0.718	$0.0847	$0.0002	$1.015		

In 1913 the average selling price of coal at the mines in Illinois was $1.14 and in Indiana $1.11 per ton. This leaves a margin of only 21.6c. in Illinois and 18.6c. in Indiana. Out of this must be paid the cost of material used at the mines; the cost of making sales; all officers' salaries; general expenses; insurance (liability, fire, storm, etc.): taxes (including tax on plant and mineral rights); interest on the investment; depreciation of plant; royalties or charges for the exhaustion of coal.

Three Cents or Less for Interest and Amortization

The last report of the Bureau of the Census (1909) showed that, without allowing for any interest charge on the investment or for amortization of property, the so called net returns in Illinois and Indiana were only 3c. per ton in Illinois and less than 1c. per ton in Indiana.

The average royalty paid, however, in these two states on coal recovered under lease is 5c. per ton, and the average present valuation of coal land is such as to require a minimum amortization charge of 3c. per ton to recover such land value within the period of the mine's life. It will therefore be seen that in even so good a year as 1913 an actual profit return was impossible. As existing facts show, the industry sustained a substantial deficit in these two states.

A considerable addition to the cost of production is caused by the idle time of the mines, during which all overhead and some labor costs must be paid. The average number of productive days worked per annum in these two states is only about 175 out of a possible 300 or more. This idle time of the miners is not confined to one season or period during which they can find employment elsewhere. The men are always subject to call, for which reason they urge a greater daily wage so that their annual income may be sufficient for their needs. This causes these operators to grant abnormal wage advances, which are directly reflected in coal cost.

A Mining Year Has Only 1400 Hours

Many industrial plants which produce standard or basic commodities find it possible to operate 24 hr. per day by using different shifts of men. They work also for 310 or more days a year, or a total of 7440 hr. per annum. Still other industries, on two 8- or 10-hr. shifts per 24 hr. work 300 to 310 days per year, thus operating 5000 to 6000 hr. every 12 months.

Even one 8-hr. shift in each 24-hr. period with 310 days per year gives 2480 working hours in every 12 months. Because of the unrestricted competition the mine operators of Illinois and Indiana have built more plants than are needed and can only operate for 8 hr. out of every 24, and for 175 days per year, or 1400 hours.

It will be seen, therefore, that as against 100-per cent. plant utilization (24 hr. for 310 days or 7440 hr. per annum) possible in some industries, and as against an average by all industries of 33 per cent. to 45 per cent. (one 8- or 10-hr. shift per 24-hr. period for 310 days), a coal plant is in actual productive use only about 18 per cent. of the time. This makes plant, interest and depreciation charges six times as heavy as for some other industries.

Miners Lose $371 per Year

In addition to ruining the operators, this distresses the miners. For example, the 97,000 miners of Illinois and Indiana who are prevented from working 125 days per year might at the present wage have earned an additional $36,400,000, or $371 per man per year, had their employers been able to give them work or had their efforts been expended in other directions.

The present markets for Illinois and Indiana coal can be supplied by 60 per cent. of the mines now being operated. The interest on the surplus capital invested in these unnecessary mines adds to the cost of production in each.

That labor concurs in this point of view is shown by testimony given by Duncan McDonald, secretary-treasurer of the United Mine Workers of America, in Illinois at a hearing held in Chicago in the latter part of July, 1914, before the U. S. Commission on Industrial Relations.

The Consequences of This Waste

Having shown the cost of mining coal and having compared it with the revenue from its sale, it remains to measure the consequences of the present low prices.

In Bulletin 47 of the United States Bureau of Mines, Dr. J. A. Holmes, Director of the Bureau, states:

> During the past year (1911) in producing 500,000,000 tons of coal we wasted or left underground in such a condition that it will probably not be recovered in the future 250,000,000 tons of coal. In a higher way, our mineral resources should be regarded as property to be held in trust with regard to both the present and future needs of the country. Neither human labor nor human agency has contributed to their intrinsic value and whatever rights the individual may possess have been derived from the general government. The government does not surrender its right, and should not neglect its duty to safeguard the welfare of its future citizens by preventing the waste of these resources.

It is customary to say that the mining of coal is an extractive industry. The phraseology is too weak; it must be considered as a destructive industry. That is to say, each ton of coal removed destroys by just that much the value of the plant engaged in producing it. Also, it destroys by that much the country's coal reserve. Coal once mined or lost can never be replaced. With the life of several of the large coal deposits well defined and with the end not extremely remote, the deliberate waste of coal by the mining methods now in use constitutes an immediate menace. When these operators have under the best market conditions no margin above cost they can work only the choicest areas, and the removal of thinner or inferior parts which must be effected at a much higher cost per ton is out of question. This will be explained briefly.

Why Coal Is Lost

The major portion of the thick-seam coal in Illinois and Indiana is recovered by the so called room-and-pillar method, the work advancing toward the boundaries of the controlled area from the shaft bottom. By such method pillars of coal of sufficient size to sustain the overlying weight are left standing 25 to 40 ft. apart. Also all coal above certain well-defined lines of parting in the seam is left up to protect the roof until the boundaries of the acreage have been reached.

These pillars and the so called top coal are supposed to be recovered as the work is carried back to the bottom of the shaft. In actual practice, however, this is seldom or never done. Thus the actual coal recovery from any given acreage seldom exceeds 50 per cent. of the total amount in the seam out of a possible 90 to 95 per cent. available by proper mining practice, and for this reason: As the distance from the shaft increases, the expense of haulage and road maintenance becomes also greater. Also the hazard from gas and the loss from mine falls increase. Likewise, in working backward to the shaft the quality of the coal secured is impaired by reason of its becoming mixed with the accumulated refuse of earlier work. Therefore, all these valuable areas are simply abandoned, because the operator cannot afford to pay the extra cost of reclaiming this coal.

It also occurs at various places that substantial bodies of coal lie between the boundary lines of two approximately adjoining mines. The extra haulage cost to either shaft, for the removal of this intermediate coal (although only a few cents), cannot be borne without operating loss. Such areas are therefore entirely neglected and cannot later be recovered because the amount of coal available would not justify the development of a new mine to reach them.

Taxation as Another Cause of Loss

Although not strictly germane to the subject in hand, mineral-land taxation is an indirect cause of waste. Many operating companies hesitate to secure as large areas as might be economically available to their shafts because they wish to avoid unwarranted tax payments through a long period of years. They prefer to let title to such additional acreage rest with the farmer or other owner who uses only the surface and who, while so using it, does not pay any tax on the underlying coal. Later, it frequently occurs that such an original owner, with an unreasonable notion of the value of his coal rights, makes purchase impossible through his demands for an excessive price. This coal also is abandoned along with the adjoining worked-out area.

This waste of coal should concern the Eastern and Central States sufficiently to cause some relief to be extended to these operators. It is to the country's interest to see that they get enough money to make recovery reasonably complete.

Social Consequences of Loss

Aside from the economic waste mentioned herein, the loss of revenue has serious social consequences. The continuous and prolonged lack of any profit in the coal industry makes it impossible for these operators to furnish, in all instances, the necessary safeguards to make mining even a relatively safe occupation.

It has also occasioned the rejection by many of the provisions of the Illinois Workmen's Compensation Act. That is to say, coal companies without current net earnings or any sort of reserve resources are not willing to assume such additional definite obligations as the law proposes, to make provision for the injured workman and his family or even to obligate themselves to make incidental payments of any kind.

Necessity compels them to rest their hope on the throw of chance in a judicial hearing. They rely on a court's decree to leave them something of their capital, whereas if they worked under this law they might as well have no capital for all the return they can hope to get upon it.

For this reason, the anticipated value and beneficent purpose of such legislation are clearly nullified. And until, by common consent, the conditions detailed in this statement of fact have been ameliorated, further effort taking the form of additional legislation, however worthy, rational or desirable, will prove similarly abortive and futile.

Coal and Regulation of Business

For a part of the present disastrous condition of their industry the coal operators are, perhaps, themselves responsible. They have not organized their business as many other industries have done. However, with the stringent anti-trust laws of the states and the Sherman Act confronting them, much uncertainty has existed and still exists as to what the various laws permit. Because of this doubt no concerted action has been taken. During the period of waiting for some new light on the laws, many operators have hoped that some solution would come and that they might survive until the dawn, while competitors would fail.

They have been discouraged by the severity of judicial rebuke which has, throughout the last several years, followed many community efforts in other industries. These operators have, therefore, done nothing, but are now prepared to defend their claim to just consideration and a fair return. They do this not alone for selfish reasons but because they want to make appropriate provisions for conserving natural resources and to grant their workers physical and social comforts beyond those now possible.

The recent passage of certain acts, which may with propriety be called enabling laws, encourages these operators to believe that public sentiment has so changed that a possible opportunity to secure relief presents itself. They therefore submit this statement.

Hope in the Trades Commission

Their hope is that the Trades Commission may be the governmental means through which the nation will ultimately be thoroughly enlightened regarding the absolute equities of their industry. They further believe that, on account of its extent and importance, they are warranted in urging as a first consideration that one of the members of this Trades Commission shall be a capable, experienced man, who is familiar with mining conditions and requirements, is acceptable to the coal industry and who can bring to the commission sound judgment on all matters affecting these interests.

They also hope that through this commission, or upon the sanctioned initiative of the operators themselves, the remedy for present conditions which is evidently necessary may be immediately applied. The propriety of such a remedial plan should be determined later by an appropriate agency of the Federal Government.

Two Kinds of Collective Bargaining

There is no desire now or hereafter to establish a coal monopoly. Much less is there a desire among these operators to extort unreasonable profits. But they consider it vitally essential to stabilize the industry for the benefit alike of the workmen, the consumers and investors. It is, they believe, reasonable to assume that as long as the Government sustains and encourages the principle of collective action—as evidenced by the exemption of labor unions from anti-trust measures—it would also sanction a plan enabling coal operators to coöperate in a similarly legitimate way. Particularly do they hope this might be permitted if appropriate and definite governmental control were included to the extent, at least, of permitting all such activities to be known to the public and provided that sufficient and ample penalties be imposed for the violation of all such rules, agreements or laws as may be devised to regulate such collective actions.

Coal operators would not object to, but on the contrary would invite, such publicity and supervision.

The Purchasers Combine and the Sellers Must

This suggestion is particularly pertinent for this reason. On every hand these coal operators are confronted by combined purchasing agencies to which they sell their coal and by unionized workmen from whom they buy their labor. Thus situated, these operators are obviously at a disadvantage, for while they are disorganized as herein stated, both their buying and their selling are done with collective or coöperating units.

Other industries enjoy a degree of encouragement and protection by the Government which is denied the coal-mining industry. In volume of business, mining is approximately one-half that of agriculture; these major industries are alike in that both work the land in recovering vital necessities for the public use. Yet, regardless of the fact that the exhaustion of the mineral deposits is irremediable, while the loss of soil fertility and productiveness can be overcome, the United States spends only one twenty-fourth as much to promote the mining industry as to help agriculture. Intimately affecting, as it does, the lives and welfare of all our citizens, the coal industry deserves and should receive at the hands of our lawmakers attention proportionate to its importance.

Farmers Are Aided and Coal Men Restrained

The publications of the United States Geological Survey and the Bureau of Mines, while helpful in the physical operation of properties, do not contain statistics such as are furnished by the Agricultural Department dealing with costs, values and distribution. The appropriations are entirely too small.

When the Southern cotton growers suddenly found their market demoralized by the European war, prompt investigations were made and assistance rendered. Whatever the major sentiment or opinion may be with reference to the propriety and warrant of such help so extended, the fact remains that, however bad and unfortunate this situation may be, it is still not so serious, except perhaps as to the number of persons immediately involved, as the present coal-producing situation. Nor is it as threatening to the general welfare. For even though all the present cotton crop be lost and return no value whatever, the land remains and later crops are possible. With coal removal or waste, the land is exhausted of such value permanently, and the serviceability and use of a coal-mining plant is not, as with the land, perennial.

Coöperation would not only greatly benefit the workmen and investors in the coal business, but would encourage the establishment of other industries now sorely needed in this country.

Without Capital Industry Cannot Progress

For example, the necessity for the establishment of byproduct and coking plants is evident. The utilization of sulphate of ammonia for fertilizer, creosote oil for timber treatment and the products of coal tar for industrial and pharmaceutical purposes is too well known to require further reference. Over $12,000,000 was paid last year for coal-tar products imported from abroad. Of the 95,000,000 gal. of creosote oil consumed in the treatment of ties and timber, 60,000,000 gal. were imported. Of the 44,000,000 tons of coke manufactured in the United States in 1912, 33,000,000 tons were made in beehive ovens and the waste in smoke was over $50,000,000.

It is only through coöperation that the coal operators can get together the money needed to establish the coking and byproduct industry on a proper basis in this country. That is to say, the coal man is the proper producer of these byproducts, but he cannot make them because he has not the capital and cannot get it because his business is so disorganized that he has no longer any credit.

Combined Pitot Tube and Multiplying Manometer

Much interest has recently attached to the measurement of the velocities and pressures of air currents circulating in airways and conduits; and in this connection the following brief description of a combined Pitot tube of improved pattern and a multiplying manometer having a direct-reading dial will be of interest to both mining and mechanical engineers who have occasion to take such measurements.

The original form of this instrument, which was designed by the engineers of the Davis Instrument Manufacturing Co., Inc., of Baltimore, Md., is shown in Fig. 1, together with the bracket attachment that can be made in any desired form and of any required dimensions and which enables the observer to make any desired adjustment of the tube in the airway, conduit or draft pipe. The dial shown in Fig. 1, requiring the gage reading to be multiplied a specified number of times, according to the inclination of the gage, will soon be replaced by a direct-reading dial, the design of J. T. Beard, Jr., a mechanical engineer.

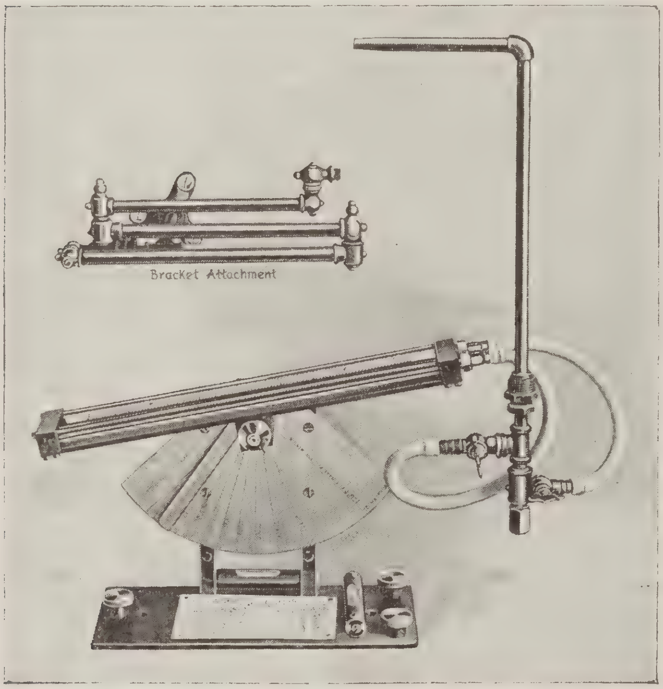
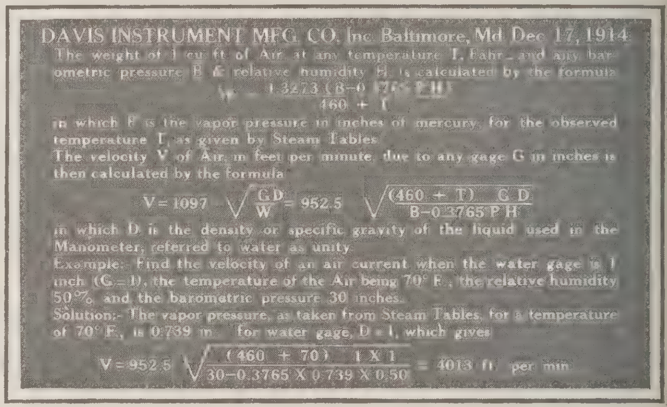


Fig. 1. The Davis Combined Pitot Tube and Multiplying Manometer

After a careful study of the different forms of the well known Pitot tube, the manufacturers of this instrument selected that form of tube which yielded, by experiment, the most uniform and reliable results in the measurement of both pressure and velocity of circulating air currents. Neither time nor money has been spared in the endeavor to produce an instrument that would give accurate and reliable readings and preserve the most serviceable and compact form of the instrument. For this purpose, the form of gage adopted was that known as the multiplying draft gage, in which the reading scale is multiplied any number of times according to the inclination of the gage. By the use of liquids of different densities, also, it is possible to still further increase the accuracy of the gage reading.

To enable the ready calculation of the velocity of the air current from the observed gage reading, a brass plate, Fig. 2, was especially prepared and attached to each instrument, giving the formulas for the calculation of the weight in pounds per cubic foot, for different barometric pressures, temperatures and degrees of humidity of the air, and the corresponding velocity of the air current for different gage readings and liquids of different densities used in the gage. By the use of these formulas, the calculation of the velocity of the current for varying conditions is made quite simple.



DAVIS INSTRUMENT MFG. CO. Inc. Baltimore, Md. Dec. 17, 1914

The weight of 1 cu. ft. of Air at any temperature T, Fahr., and any barometric pressure B & relative humidity H, is calculated by the formula

$$W = \frac{1.3273\,(B - 0.3765\,P\,H)}{460 + T}$$

in which P is the vapor pressure in inches of mercury, for the observed temperature T, as given by Steam Tables.

The velocity V of Air in feet per minute, due to any gage G in inches is then calculated by the formula

$$V = 1097\sqrt{\frac{G\,D}{W}} = 952.5\sqrt{\frac{(460 + T)\quad G\,D}{B - 0.3765\,P\,H}}$$

in which D is the density or specific gravity of the liquid used in the Manometer, referred to water as unity.

Example: Find the velocity of an air current when the water gage is 1 inch (G = 1), the temperature of the Air being 70° F., the relative humidity 50%, and the barometric pressure 30 inches.

Solution:- The vapor pressure, as taken from Steam Tables, for a temperature of 70° F., is 0.739 in. For water gage, D = 1, which gives

$$V = 952.5\sqrt{\frac{(460 + 70)\quad 1 \times 1}{30 - 0.3765 \times 0.739 \times 0.50}} = 4013 \text{ ft. per min.}$$

Fig. 2. Plate Attached to the Instrument for Calculating the Velocity of the Current

The direct-reading dial designed by J. T. Beard, Jr., is shown in Fig. 3, and will need but a brief explanation. Referring to the diagram shown on the left of the figure, the line *Aa* indicates the position of the vertical gage, which may here be supposed to be calibrated for a length of 10 in. and pivoted at its center, corresponding to *O* in the diagram. It is evident that if the gage now be inclined to the position indicated by the line *Bb,* the 10 in. of the inclined-gage scale would correspond to a head of 8 in., indicated by the vertical line *Bx.* In other words, for this inclination, the true gage is 8/10 of the reading on the gage scale.

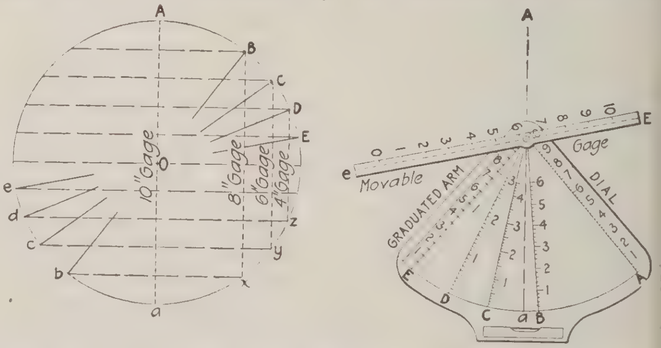


Fig. 3. Diagram Explaining the Direct-Reading Dial

In like manner, when the gage is inclined to the position indicated by the line *Cc,* the true gage is 6/10 of the reading of the gage scale; and, for the position indicated by the line *Dd,* the true gage is 4/10 of the reading of the gage scale. To illustrate, suppose that the gage is inclined to the position indicated by the line *Cc,* and the reading on the gage scale is 5 in. In this case, the true head or gage is only 0.6 × 5 = 3 in.

Now, utilizing this principle, it is possible to construct a dial, as shown on the right in Fig. 3, such that the graduated arm attached to the gage and moving with it can be read on different scales marked on the dial and graduated to correspond to the different inclinations of the gage. The letters in the right-hand figure correspond to those in the left-hand diagram. It is important to notice, however, that the gage on the right of the figure, which is shown in the position *Ee*, is not necessarily pivoted at its center but can be swung at any convenient point of its length. Also, the length of the graduated arm fixed to the gage and the radial length of the dial can be anything desired, provided the graduations correspond in number to those on the gage scale. While the gage scale is made to read exact inches of gage, it is only necessary that the graduations of the fixed arm and those of the dial should be proportional.

In the figure, the dial is shown as having five graduated scales, *A*, *B*, *C*, *D* and *E*. When the gage is in a vertical position corresponding to the line *Aa*, the graduated arm will correspond to the dial scale *A*, the graduations of which are equal to those on the arm. The graduations of the dial scale *B* are 8/10 in number of those on the arm; those on the scale *C*, 6/10 of those on the arm; those on the scale *D*, 4/10; and those on the scale *E*, 2/10 in number of the graduations on the arm.

It will be observed from this that an actual gage reading of 5 in. on the gage scale when the gage is in the position *Ee* reads, on the dial scale *E*, simply 1 in., which is therefore the true gage. In like manner, the true gage for any observed gage reading and any inclination of the gage marked on the dial can be read directly from the corresponding dial scale. This makes the most convenient direct-reading, multiplying manometer that has yet been designed.

The instrument must be seen and used to be fully appreciated, as its fine workmanship and delicate adjustments recommend it to the engineer engaged in making accurate fan tests or running boiler tests requiring the careful determination of the velocity of flue gases, and in all determinations of the velocity of air or gas in conduits or airways. The manufacturers are working to produce a dial that will read at once the velocity of the current in feet per second and the pressure in pounds per square foot or ounces per square inch, for all probable atmospheric conditions of temperature, pressure and humidity and for a liquid of any specific gravity.

Effects of the European War on Our Export Trade--II

By J. S. Burrows[*]

SYNOPSIS—The second installment of this article makes a critical analysis of conditions in Great Britain as regards production, consumption and exports. As the predominating figure in the world's coal markets, the situation in that country will be a controlling factor in the future trade. The author points out the fact that even should we obtain the entire South American business the tonnage involved is not great enough to influence our markets as a whole.

It is quite generally known that England, the second largest coal producer in the world, is the principal coal-exporting country, about 50 per cent. of the world's export coal coming from her mines. Naturally, therefore, she is the pacemaker in international competition, and to a large extent the export trade of other countries depends upon what England is or is not able to do. Through her virtual control of merchant shipping, ownership of extensive and varied industrial enterprises all over the world, and her dominance of international finance and banking she holds her trade by more than one means.

Some Problems of the British Coal Industry

Those who write or talk on the export question needs must look to English experience and statistics for their data, and the subject of the English export trade has been of late thoroughly covered in the press. Occasionally a writer appears who tells us that the British coal production has reached its maximum and must now decline, giving America the long-looked-for opportunity to take her rightful place as the dominant coal exporter of the world. Such a view only amuses the Englishman who, with his more intimate knowledge of the subject, sees other sides to the question than the mere matter of output curves. It should be evident that the English coal fields are nearer exhaustion than those of the United States, but to advance this fact as an argument for increased coal exports from this country is to deal in distant futures that do not affect the current situation in any way.

The real problem in British coal mining is the increasing cost of labor, which, after all, is only one of the items that combine to make up the selling price of coal. We have ample evidence at home, as well as elsewhere, that in considering export prices, the burden of an extra expense can be taken off the product and placed elsewhere to gain a needed advantage.

Great Britain's normal coal production is indicated by the following outputs for the four years preceding 1914:

TABLE 6—ANNUAL PRODUCTION OF COAL IN GREAT BRITAIN

Year	Gross Tons	Year	Gross Tons
1910	264,433,000	1912	260,398,000
1911	271,892,000	1913	287,412,000

In the general table of the world's coal production, her annual output is given as 287 million tons. It is now of interest to estimate to what extent this production is likely to be affected by the war, in which we are fortunate in having some figures already made by Messrs. Davies & Hailey, of Cardiff.

These statisticians estimate that about one million men are engaged in coal mining in the United Kingdom, and that they represent 9 per cent. of all the industrial workers. They further estimate that fully one and one-half million laborers have answered the call to the colors.

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[*] Fuel expert, Castner, Curran & Bullitt, Norfolk, Va.

and that the proportion of these men already taken from the mines, as well as those who will enlist during the year, will result in a reduction of 20 per cent. of the total mine labor. It is estimated that this will decrease the British production about 53 million tons, making the available supply 214 million tons per annum instead of the normal 267 tons.*

British Exports and Consumption

About one-fourth of the total British coal production is shipped to foreign markets; the actual exports for the past two years and for the first six months of 1914 were as follows:

TABLE 7—TOTAL EXPORTS OF COAL FROM GREAT BRITAIN

Year	Gross Tons	Year	Gross Tons
1912	64,445,000	1913*	35,526,000
1913	73,400,000	1914*	34,586,000

*Six months to June 30.

Great Britain, it will be seen, requires normally about 75 per cent. of her total production for home consumption, leaving a surplus for export of 25 per cent. The extent to which this surplus will be affected by her reduced output will, of course, depend on the home demand during the war. To again quote Messrs. Davies & Hailey, they estimate the home requirements and the reduction in the same as follows, in gross tons:

TABLE 8—CONSUMPTION OF COAL IN GREAT BRITAIN

Industry	Normal Consumption	%	Consumption for War Period	Reduction, %
Iron, steel, etc.	55,000,000	29	44,000,000	20
Manufacturing	55,000,000	29	44,000,000	20
Railways	13,000,000	7	11,700,000	10
Gas making	16,000,000	9	16,000,000	nil
Domestic	30,000,000	15	30,000,000	nil
Bunkers	21,000,000	11	17,500,000	16
Total	190,000,000	100	163,200,000	..

According to these figures, the reduction in home needs will be something in the neighborhood of 27 million tons. If we deduct the estimated war consumption from the reduced war production of coal (214 million) we have a surplus of 51 million tons, which is about two-thirds of the normal supply of British export coal. The possible disposition of this surplus will be taken up under heading, "The World Demand for Coal."

Chart No. 2 summarizes graphically the exports of British coal, showing the first months of the war compared with two normal years and 1912, the year of the last British strike.

The chart showing monthly exports of British coal from 1911 to 1914 is constructed on a base line which represents the normal average monthly shipments, allowing for the natural increase in tonnage as indicated during the past five years. The black areas above and below this base line represent the tonnage shipped each month above or below normal. The total shipments for any month may be ascertained by reading up from the bottom of the chart, and the excesses or shortages noted, by reading up or down from the normal base line.

The years 1911 and 1913 represent normal conditions, while 1912 is a wonderful illustration of the recuperation of the industry following the miners' strike in March of that year, which is seen in the excess tonnages handled the last half. The year 1914 started out below normal as will be seen from the black areas below the base line, and was just beginning the corresponding excess area above normal in July when interrupted by the war, the full effect of which may be seen in the large black area from August to November, 1914. This shortage represents a falling off in shipments of nearly 50 per cent. and a total of about 11 million tons. We know, however, that the falling off in shipments during the first months of the war was not occasioned by any lack of coal, but was due to an embargo established by the government on certain varieties of coal, which, however, was soon lifted. Later, the shortage is attributable to financial conditions and a decreased demand from all quarters. British exports to various countries are shown herewith in tabular form.

Summary of Conditions in Great Britain

To summarize the supply for the war period, it would appear that while Great Britain will suffer a curtailment in production of about 20 per cent., due to the enlistment of the miners, her decreased consumption will leave available for export purposes at least two-thirds of her normal supply, or about 51 million tons. Out of this surplus, however, must be taken the extra coal, above normal requirements, needed by the allies' fleets. Admiralty shipments in the early stages of the war would indicate that about 10 million tons will be required for this purpose, according to Messrs. Davies & Hailey. In this connection it is well to remember that this tonnage affects only certain mines and will probably take out of the market altogether a large amount of the very best grades of Admiralty Welsh coal.

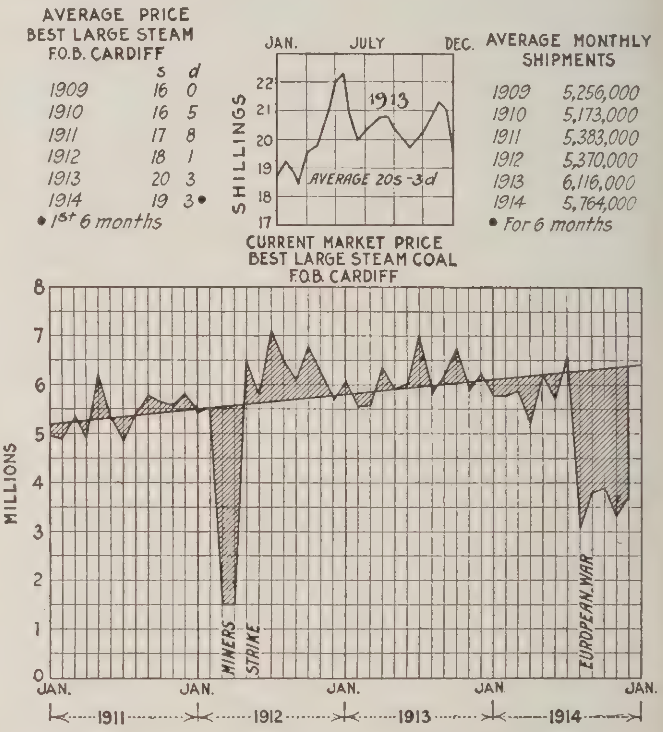

Chart II. British Exports by Months and Market Price of Best Large Coal

Less naval requirements, the surplus of coal available for export purposes appears to be 41 million tons. Thus, so far as Great Britain is concerned, the problem is one of demand and to what extent she will have to care for her allies before having coal available for shipment to neutral markets.

The World Demand for Coal

As before stated, the world's normal coal consumption is about one and one-third billion tons per annum, of

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*After deducting coal used at mines.

TABLE 9. COAL EXPORT MARKETS OF THE WORLD

(Geographical Groups)

According to Usual British Classification

Trade Group	Normal Demand Foreign Coal Estimated	Loss during War Period	Foreign Suppliers under Normal Conditions	Source of Supply for War Period
North Atlantic:				
Canada, etc., Bermudas, West Indies, Mexico, Central America, Colombia and Venezuela.	20,000,000	20%	Naturally the principal export market of the United States, in which foreign competition is rapidly vanishing.	No interruption to normal source of supply.
South Atlantic Coast: South America, Brazil, Uruguay, Argentine.	6,500,000	25%	Practically a British market which has been repeatedly assailed by American shippers with some success.	A shortage of British coal and, or, interruptions and war risks to British shipping would turn this market entirely to U. S.
Pacific Coast:				
South America, Peru, Ecuador, Chile, Bolivia, North America.	1,250,000	25%	Australian and British coals compete. Some progress made with American coal.	Australian and American coals will compete.
Mexico, U. S. A., Br. Columbia, Alaska.	1,000,000	20%	Australian, British Columbia, Japanese and some English coal compete. A small tonnage of American coal also taken.	No change in source of supply. Probably increase in American shipments due to opening of Panama Canal.
European:				
Russia, Sweden, Iceland, Whale Fisheries, Norway, Denmark, Germany, Holland, Belgium.	55,000,000	50%	British coal competes with German, the latter having lately made great progress against the superior English tonnage at seaboard.	England and Germany will make every effort to supply their allies and neutral countries may have to depend on U. S.
Mediterranean:				
France, Portugal and Azores, Madeira, Spain and Canaries, Gibraltar, Italy, Switzerland, Malta, Egypt, Austria, Hungary, Greece, Bulgaria, Roumania, Turkey, Tripoli, Tunis, Algeria, Morocco, etc.	42,000,000	50%	British coal has virtually held a monopoly on seaboard, although meeting with increasing German competition within recent years. It has been open to American coals at various times and each year sees an increase in shipments from this country.	England and Germany will make every effort to supply their allies and neutral countries on seaboard will have to depend on the U, S.
Africa:				
West Coast, Ascension and St. Helena.	1,000,000	20%	British market opened lately to American coal.	Probable curtailment of British shipments will increase American tonnage.
South Africa:				
East Coast.	250,000	20%	British coal competes under favorable conditions with Natal coal.	Little or no interruption to normal source of supply.
Mauritius, etc., Bourbon, Arabia, Persia, Aden, etc.	250,000	nil	So. Africa and Indian coals compete with comparatively small tonnage British coal.	Little or no interruption to normal source of supply.
Indian Continent	250,000	nil	Australian and Japanese coals compete with Indian coal.	India and Australia can meet all demands.
Far East:				
Ceylon, Straits Settlements, Java, etc., Philippines, Siam, Hong Kong, China, Japan, Australasia, Pacific Islands.	6,000,000	20%	British, Japanese, Australian, and Indian coals compete.	Japan can amply supply and will probably dominate this market.

which about 140 million, or a little more than 10 per cent., is export coal. We have already reviewed the origin of this export coal and we will now examine the markets to which it is shipped and see how they are affected by the war. To do so intelligently necessitates an investigation of both normal times and the extraordinary conditions which obtain during the present abnormal situation.

TABLE 10. COMBINED EXPORTS OF GREAT BRITAIN AND GERMANY

To Neutral Countries

	From Great Britain, Gross Tons	Germany All Fuel, Gross Tons	Total, Tons
Sweden	4,563,000	177,000	4,740,000
Norway	2,298,000	19,000	2,317,000
Denmark	3,034,000	370,000	3,404,000
Netherlands	2,018,000	7,650,000	9,668,000
Portugal (Azores, Madeira)	1,356,000		1,356,000
Spain and Canaries	3,648,000	279,000	3,927,000
Italy	9,647,000	1,197,000	10,844,000
Greece	727,000		727,000
Egypt	3,162,000	90,000	3,252,000
Algeria	1,281,000		1,281,000
Gibraltar	354,000		354,000
Malta	700,000		700,000
South Africa	65,000		65,000
India	179,000		179,000
Straits Settlements	31,000		31,000
Ceylon	239,000		239,000
Chili	588,000	46,000	6,936,000
Brazil	1,886,000		
Uruguay	723,000		
Argentine	3,693,000	2,501,000	2,501,000
Switzerland			
Other countries	2,008,000		
	42,219,000	12,632,000	54,851,000
To English Allies			
Russia	5,998,000	2,103,000	8,101,000
Japan	small		
France	12,775,000	3,626,000	16,401,000
Total	18,773,000	5,729,000	24,502,000
To German Allies			
Germany	8,952,000		8,952,000
Austro-Hungary	1,056,000	12,308,000	13,364,000
Turkey	369,000		369,000
Belgium (a)	2,031,000	7,174,000	9,205,000
Total	12,408,000	19,482,000	31,890,000
RECAPITULATION			
English Allies	18,773,000	5,729,000	24,502,000
German Allies	12,408,000	19,482,000	31,890,000
Total Belligerents	31,181,000	25,211,000	56,392,000
Total Neutrals	42,219,000	12,632,000	54,851,000
Grand total	73,400,000	37,843,000	111,243,000

(a) Now German territory.

Table 9 has been compiled to show the principal coal-importing markets of the world. Both the normal demand and the estimated reduction in percentages are shown, also the usual source of supply, together with the probable source for the war period. A careful reading of the table will make further comment unnecessary.

Table 10 embraces the detailed and combined shipments of coal from the two leading international traders, Great Britain and Germany. This table is based on the returns for 1913. A careful study of this table will also prove valuable.

Under existing conditions it is reasonable to assume that Great Britain and Germany will first of all look out for the requirements of their respective allies. Whatever the demand may be from these quarters, we may as well eliminate from our calculations the fuel requirements of the belligerents. Their combined needs represent a normal demand for 56 million tons, or more than half of the total export trade of Great Britain and Germany. The neutral countries represent a normal demand for British and German coal of nearly 55 million tons. With the allies' fleet in command of the high seas the possibility of Germany supplying any oversea markets is very remote; furthermore, it is believed, with her neighboring markets, she will have all of the trade that can be cared for. The problem of demand therefore narrows down to determining, as well as possible, the effect of the war on coal consumption in neutral countries and Great Britain's ability to hold her position in these markets.

The slowing down of trade and manufacturing generally throughout the world has resulted in a decreased demand for coal in neutral countries, as well as those at war. Of the total exports of the world (140 million tons) it is said that 46 million tons finds its way to ships' bunkers at foreign coaling stations, Great Britain's shipments to coaling stations for British ships alone amounting to from 35 to 40 million tons annually. Any reduction in the amount of steamship tonnage engaged has a serious effect on the export demand for coal, so that in the present condition of shipping we are able to account for a large part of the decreased demand. Add to this a decrease in manufacturing and its effect on railway transportation in neutral countries, and we may assume a reduction to the extent of at least 20 per cent. for the neutral countries, which figure is borne out by the export movement of coal in the early stages of the war.

The Position of Great Britain

When considering Great Britain's ability to meet the reduced demand for coal in neutral countries, in our review of her probable supplies for the war period, we estimated her surplus over home and naval needs at 41 million tons. Her first duty is to her allies, of which France will need the most coal, both on account of the condition of her mining industry and the loss of German coal. The normal consumption of coal in France is placed at about 61 million tons, of which the greater part is used in the Paris district. Messrs. Hailey & Davies estimate the war consumption of France at 30 million tons, of which her mines will be able to furnish only six million. The remainder for this country's use, including military purposes will therefore have to be shipped by England. This would take 24 million tons of British coal, leaving 17 million tons with which to supply the comparatively small needs (say five million tons) of her other ally, Russia, and the neutral markets of the world.

TABLE 11. PRICES OF BRITISH COAL*

Description of Fuel	Jan. 1, 1914	July 1, 1914	Jan. 1, 1915
Best Northumbrian steam coals f.o.b. Tyne	$3.36@3.48	$3.24@3.30	$2.94@3.00
Best Northumbrian steam smalls f.o.b. Tyne	1.68@1.80	2.04	1.68@1.74
Best Durham gas coals f.o.b. Tyne	3.60	3.12	3.00
Durham coking coals f.o.b. Tyne	3.12@3.36	2.88	2.40@2.52
Best Durham blast-furnace coke del. Tees-side	4.68	4.68	4.56
Durnham bunkers f.o.b. Tyne	2.94@3.24	2.73@3.00	2.52@2.76
Foundry coke f.o.b. Tyne	5.04@5.52	4.56@5.04	4.56@4.80
Best Lancashire house coals at pit	4.14@4.32	4.14@4.32	4.14@4.32
Best Lancashire slacks at pit	2.40@2.52	2.28@2.40	2.28@2.40
Best Yorkshire silkstone at pit	3.72@3.84	3.72@3.84	3.72@3.84
Barnsley thick-seam house at pit	3.60@3.66	3.60@3.66	3.60
Best Haigh Moor (London) at pit	3.48@3.60	3.36	3.60@3.84
Yorkshire steam coals at pit	2.94	2.70@2.76	2.76@2.84
Best Derbyshire house coals at pit	3.72	3.24	3.24
Large Derbyshire nuts at pit	2.76	2.28	2.52
Best Staffordshire house coals	4.44	4.20	4.44
Best Welsh steam coals f.o.b. Cardiff	4.92@5.04	5.04@5.16	5.04@5.28
Best Welsh small steam coals f.o.b. Cardiff	2.64@2.70	2.64	2.88@3.00
Best Semi-bituminous f.o.b. Cardiff	4.38	4.08@4.14	4.32
No. 3 Rhondda, large f.o.b. Cardiff	4.20@4.32	4.20	4.32
No. 2 Rhondda, large f.o.b. Cardiff	3.72@3.78	3.00@3.18	3.60@3.72
Patent fuel f.o.b. Cardiff	5.40	5.04	4.32
Best Welsh malting anthracite f.o.b. Swansea	5.16@5.76	4.80@5.28	5.40@5.88
Special foundry coke, Cardiff	6.72	6.48@6.96	6.72@7.68
Scotch ell coals f.o.b. Glasgow	3.30@3.36	2.70@2.76	3.30@3.36
Scotch steam coals f.o.b. Glasgow	3.12@3.48	2.52@3.00	2.70@3.18
Scotch splint coals f.o.b. Glasgow	3.30@4.08	2.52@3.36	3.18@3.78
Fife steam coals, f.o.b. Methil	3.12	3.00@3.12	3.00@3.06
Fife treble nuts, f.o.b. Methil	3.12@3.18	2.64@2.76	3.00@3.12
Hetton Wallsend, London	5.16	5.16	

Comparing the normal exports of Great Britain with this war period surplus of 17 million tons, it will be seen that there is a very great difference in the figures. The Hailey & Davies estimates show an actual shortage of British coal to the extent of 27 million tons, which, as the present conditions are unprecedented, can only be confirmed or disproved by actual experience. Making generous allowances for error in the above estimates, however, there would still seem to be room for either a considerable shortage of the British product or extraordinarily high prices, due to a scarcity.

In this connection, Tables 11 and 12 are of interest as showing the prices of British coals and freights to certain selected points as of Jan. 1, 1915, compared with the month before the war and the corresponding time of the previous year. These prices would indicate that there was a strong demand for British coal and that the expected shortage had already set in as might be inferred from what has been said. The answer, however, may be seen in Table 12 giving the freights to various destinations. No one is able to say what the freight market will be, but it is believed that when the South American crops are harvested and the tide of shipping has set in toward Europe, more vessels will be available for return cargoes of British coal, and it is then that the scarcity of the product may become manifest.

TABLE 12—FREIGHTS*

	Jan. 1, 1914	July 1, 1914	Jan. 1, 1915
Tyne to			
Rouen	$1.02	$1.08	$4.08
Marseilles	1.68	1.86	5.04
Genoa	1.71	1.86	5.16
Alexandria	1.80	1.92	5.40
London	0.75@0.78	0.72	2.76
Cardiff to			
Genoa	1.74	1.92	4.24
Bordeaux	1.02	1.26	2.64
Marseilles	1.68	1.80	3.72
Havre	1.02	0.99	2.76
Barcelona	1.92	2.04	3.84
Las Palmas	1.74	1.68	3.12
Alexandria	1.80	1.80	4.68
River Plate	3.12	3.48	3.90

The Prospects of America

It remains for us to examine carefully our own prospects in the present situation and to learn the extent of our own preparedness to meet an extraordinary demand for coal in the foreign markets. We have always shown great interest in the South American and Mediterranean trade. Before the war started we had even made substantial progress in these quarters; for years past we have shipped coal there under favorable conditions, and made additions of new business there as well as in Europe and Africa.

While our exports overseas are hardly to be compared with those of Great Britain and Germany, yet considering our handicap in the lack of shipping and banking facilities, the growth has been very creditable. Certain of our shippers have engaged in this business for twenty years and know the game thoroughly and the limitations imposed by foreign conditions; others are just breaking into the export trade and assume that is is an entirely new line of business. The propaganda for increased export business which we started in this country at the beginning of the war has proved a bitter disappointment to many embryo coal exporters. Independent of financial and other business considerations, which at present and for some time previous to the war have been of critical importance in selling anything in South America, the answer lies in the fact that South America is not a large coal consumer, the total imports for the entire continent being normally about seven million tons. It would not be a difficult matter for four or five of the larger companies already engaged in this trade to take care of the entire South American requirements, even should Australia and Great Britain, which have the lead in these markets, be forced to withdraw.

Under the influence of favorable crop reports, conditions will undoubtedly improve and our exports will increase, but even with a shortage of British coal, Australia, our strongest competitor on the West Coast, will remain with unimpaired supplies and prices.

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*From the "Colliery Guardian," London, England.

Further concerning this export propaganda, the following pertinent editorial from the *Colliery Guardian* of London will be of interest:

> Some indication of the extent of the mineral wealth of the United States is given in a bulletin which has just been published by the U. S. Geological Survey. But this bulletin, which is written by George Otis Smith, the Director of the Survey, and possesses the somewhat grandiose title, "Our Mineral Reserves: How to Make America Industrially Independent," does something to explain the comparative failure of the United States up to now to live up to her predictions of commercial conquest. This may have been due to unreadiness, but there is also a suggestion that the government has no thorough grasp of the problems to be assailed. Taking the section on coal, Mr. Smith says:
>
>> The exportation of coal to South American countries must be of advantage both in establishing trade relations and in insuring a balance of trade in our favor. Already shipments to European and South American ports have begun.
>
> To us it is incomprehensible that the simple postulate expressed in the first sentence should require a war to enforce it; as to the second, the shipment of American coals both to South America and Europe was started over 15 years ago. The whole passage, therefore, is supererogatory.
>
> Apparently this message is intended for the American producer, for there is a little homily on the groundlessness of any fears that exportation on a considerable scale will be dangerous from the standpoint of the country's resources —which, by the way, seems to show an incapacity to appreciate the commercial attributes of the whole question, which demands more than mere academic discussion. But whether intended for the American coal operator or the potential customer abroad, the bulletin contains some statements that are not well calculated to inspire confidence in either. Thus it is stated "until the present war broke out, Great Britain was the only country that exported coal in considerable quantity"—what of Germany?—"but Great Britain is already beginning to feel the pinch of poverty in her coal supplies, and it is probable that when peace is once more established she will place restrictions upon her exports of coal." This is truly a strange observation, unless the author is looking far into the misty future; there is no indication that we have suffered any such poverty of supplies, and we do not know upon what grounds Otis Smith contemplates a reimposition of the coal tax. There is nothing in the industrial or political situation to warrant such an assumption. * * *
>
> Up to the present very little has come of the attack upon our markets in South America; on the other hand, our own shipments to this quarter are steadily recovering lost ground. We cannot say that we are surprised. The United States has got the coal and the energy, and, as we have always predicted in these columns, the day must arrive when it would recognize the value of these markets; at the barest reckoning the opening of the Panama Canal must make a difference. But Rome was not built in a day, and, on taking stock, it has been discovered that the ships and business organization are lacking, the fiscal system is embarrassing and the British export trade is still a factor to be reckoned with.

As we attempt to look forward, we must conclude that for the present at least our prospects are quite problematical, depending purely and simply on the movement of ships. No one has yet had the temerity to predict what the freight market is going to do, but it must be evident that *if* there is an actual shortage of coal and the supply of British coal is going to be inadequate, neutral coal-importing countries will have to depend on the United States regardless of the freight market.

Extracts from a Superintendent's Diary

It is considered quite the thing these days to criticize directors of corporations for trying to direct at too great a distance from the base of operations.

If our directors are typical of all directors, then today's experience leads me to believe that such criticism is not well taken, because directors are not competent to form conclusions even after making personal inspections, and if they did make such inspections they might feel tempted to "butt in" indiscriminately.

For two years now we have been looking forward to a visit from our directors, but only today was the great event consummated.

On several occasions during that two-year period word came down the line that we might expect the inspection party in a few weeks, but always before we completed our house cleaning the rumor would be discredited and our improvised whitewash squad would be dismissed. But about two weeks ago positive instructions were issued from our general manager's office to prepare for today's inspection, and the wording of the order made it clear that this time there would be no change of plans.

As a consequence the past two weeks has been a busy time for the floating gangs. All scrap iron has been gathered up and classified, mud holes in our roadways have been filled in, grease and oil spots on engine-house floors have been sanded and scrubbed, and two crews with whitewash mixtures have transformed trees, fences and outbuildings into veritable snowdrifts.

In the party were six directors, the company's chief engineer and the general manager. They were making the trip in a private car and were accompanied by a chef, a waiter, a porter, choice eatables, etc.

They spent, all told, some three hours with us. Two hours were spent in wandering about the camp and one hour at dinner in their car. They seemed to regret the fact that they could not remain until the men began to come from work, but the train schedule did not permit.

Not one of the directors was familiar with mining, except in a very general way. This was very evident from the questions which they asked and the criticisms that they volunteered.

At each of the points of interest, such as the commissary, the supply house, the timekeeper's office, the blacksmith shop, the carpenter's shop, the powerhouse, the hoisting-engine room and the fanhouse, they felt called upon to ask for information and to relieve themselves of impressions. Each one of them had a different viewpoint, easily accounted for, as each one of them obtained a directorship in the company for a different reason.

In the commissary they were given opportunity to scrutinize at close range a miner's family, as several miners' wives, accompanied by their entire brood, came in to make their daily purchases while the directors were there. Strange to say, all of the comments were concerned with the size of the families and the general appearance of the children; not one took any interest in the articles purchased or the prices paid.

In the office, the emergency cabinet with its helmets and safety lamps entirely overshadowed the payroll files with their valuable testimony on average earnings and idle days.

Often during the day I caught myself wondering as to the kind of working agreement our miners might be able to obtain if the directors should decide to take such matters out of the hands of their managers and decide them as they saw fit. Editorial writers have insisted that such a change is to be desired; I haven't been able to follow their arguments with any degree of conviction.

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Don't forget the SUCCESS number of COAL AGE, *April 3. Have you sent in your story? THIS IS THE LAST CALL.*

Rescue Work at Layland Explosion

By George S. Rice*

SYNOPSIS—At the Layland mine, seven men were saved in the preliminary rescue work. Five men walked out after four days' entombment, and then the rescuers succeeded in reaching 42 other men who had barricaded themselves in under the direction of a veteran of 72 years of age.

Great interest has been manifested in the rescue operations, following the explosion of Mar. 2 at the mine of the New River & Pocahontas Coal Co., near Layland, W. Va. Many inquiries have come to the Director of the Bureau of Mines regarding the rescue of 47 entombed men and the following statement has, therefore, been prepared, based on reports submitted by members of the bureau's rescue corps, and from general information obtained during a visit to the mine.

The recovery of the entombed men furnishes a splendid illustration that it is wise for men who have escaped the direct violence of an explosion to brattice themselves in, when the exits are filled with afterdamp. It also shows the importance of their keeping calm and collected under the trying conditions which prevail after an explosion.

The Layland disaster killed or imprisoned over 160 men, and also one man on the outside of the mine. He was killed while passing the main entrance, when the force of the explosion burst out at the mouth of the mine.

Seven Men Are Saved

Steps for the recovery of those entombed were at once taken by the local management, H. M. Bertolet, general manager, taking charge after his arrival at Layland. The main exit or haulageway was partly blocked, consequently entrance was made through the air course. The fan doors had been blown away, but in less than half an hour emergency repairs had been made, and the fan was forcing air into the outer part of the mine. Most of the ventilation stoppings had been blown down, and in order to advance, brattices had to be placed in the crosscuts, because, at this time, there was no oxygen rescue apparatus at hand.

After these repairs to the fan, ventilation was restored along the outer part of the main air course, and this made it possible for seven miners, with the assistance of the advance rescue party, to escape from an entry which had not been penetrated by the explosion.

State Inspectors L. B. Holliday and J. I. Absalom were soon upon the scene, followed by Chief Inspector E. A. Henry and Inspectors R. B. Cobb, L. Blenkinsopp, I. Murray and E. C. Lambert. They worked untiringly searching for survivors and bodies. The work of recovery was conducted with the utmost system and care by the state inspectors and mine management, and the latter saw to it that nothing in the way of supplies should be lacking.

The Rescue Car Made a Record Trip

Thanks to the officials of the Norfolk & Western and the Chesapeake & Ohio Ry., a record-breaking run to the Layland mine was made by Bureau of Mines Car No. 8. When the notice of the explosion was received by the officials in charge the car was on a branch road three miles from Glenalum, W. Va. The officials of the Norfolk & Western Ry. were at once informed of the need for a speedy transfer of the car to Layland. With remarkable promptness, they arranged to dispatch it to Kenova. It left Glenalum at 12:50 p.m. and reached Kenova, 104 miles away, in three hours. This was only accomplished by side-tracking several trains.

At Kenova, the car was turned over to the Chesapeake & Ohio Ry., which had prepared a clear track for it and hitched on what is said to be the second largest passenger engine in the world. The train fairly flew over the sharp turns in the New River Cañon and reached Quinnimont with only one stop at Thurmond for water. The 133 miles were covered in 3 hr. 16 min., which is said to be record time on this mountain road. The car was then pushed up the steep 6-mile grade to Layland, reaching there at 9:37 p.m., after a journey of only about 8¾ hr. from Glenalum.

Rescue apparatus was hastily flung into waiting cars which took the party up the incline and two miles beyond to the mine mouth. At 10:30 p.m. the crew, consisting of D. J. Parker, mining engineer, Dr. W. A. Lynott, surgeon, H. D. Jones, foreman miner, R. H. Seip, first-aid miner, and Edwin Staley, clerk, was placed under the orders of the state inspectors and entered the mine for exploration work.

The Gary Rescue Crew

The oxygen-apparatus crew of 11 men of the Gary, W. Va., mines gallantly volunteered their assistance when the disaster was announced by General Manager E. O'Toole. They started about the same time as Car 8, but having to come by regular trains they did not reach the Layland mine until the next afternoon. The Gary crew, which did valiant service, was in charge of the chemist, Vitus Klier, and had the following members: Andy Toshie, John Christian, H. K. Payne, Julius Kovacs, Nick Sharkey, Richard Haynes, Mike Skipiczky, James Thirtle, Louis Toth and H. L. Ross. J. W. Paul, the bureau's chief of rescue operations, with his assistant, H. D. Mason, arrived from the Pittsburgh station on the same train with the Gary crew and W. J. German, foreman miner from Car 6 followed on the next train.

The 11 men from Gary and the nine from the Bureau made up three rescue crews thoroughly trained in the use of oxygen-rescue apparatus. Under the direction of the state inspectors and Mr. Paul and the general direction of Mr. Bertolet, they worked in successive 2- to 6-hr. shifts, exploring in advance of the rescue men who, being without apparatus, were engaged in bratticing and the recovery of the bodies. The advance exploration was to insure that there were no smoldering fires which might start up with restored ventilation and thus cause explosions by the ignition of any firedamp which might have collected. The apparatus work also expedited the rescue of the men and the locating of bodies.

The exploration continued from Tuesday till Friday night, by which time Mines 4 and 5, which were turned off Mine 3 and not independently connected to the surface, had been thoroughly explored and most of the bodies taken out.

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*Chief mining engineer of the United States Bureau of Mines, Pittsburgh, Penn.

One of the oxygen-apparatus crews then made an exploration in the main haulage entry of No. 3 mine, as far as the 6th left entry. This proved that the main entry had few falls and little wreckage and led Earl Henry, the chief mine inspector of West Virginia, to plan the reversal of the air current. This change in ventilation would permit the use of the haulage road, since meantime the blockage at the mouth of the mine had been largely cleared away. To reverse the fan involved repairs; so that night all the men were withdrawn in order that the fan might be stopped.

On the following Saturday morning, while these repairs were still being made, Mr. Paul, who happened to be in the mouth of the main entry, was astonished to see five men come out of the mine. They stated that they were from the 9th left entry, in which they had bratticed themselves following the explosion. It appeared that the shutting down of the fan the previous night had caused the atmosphere to clear somewhat in the No. 3 haulage road.

The men were in good condition, having had plenty to drink and enough food to sustain them. They had collected twenty buckets of water before they bratticed themselves in. In the brattice they left a small opening, and kept a guard there to watch for the clearing of the air, and finally when this occurred they came out. As it developed later, however, the air was even then not entirely normal in the 9th left.

Naturally the most intense excitement prevailed, and it at once awakened hope that others might be alive in the mine, although these men stated to Mr. Paul that there were no others alive in the 9th left. It was thought, however, that there might be other men in other cross entries; accordingly the oxygen-rescue apparatus men were called, and one of the crews and part of another were told to go to the 10th left, the other rescue-apparatus men being held in reserve at the entrance of the mine. Meantime inspectors and other rescue men hurried in, but decided to search the 9th left first.

Rescuers Find a Notice on Haulage Road

The oxygen-rescue crews from Gary and the Bureau of Mines, on reaching the mouth of the 10th left, found a written notice, "Mar. 4, 42 live men in 10th left." The rescue men pushed on in the direction indicated and found a strongly built gob stopping of rock, coal and fine dirt, which they immediately attacked and broke through. The canary which was being carried showed no ill effects from the atmosphere, and, accordingly, a messenger was sent out to notify Chief Henry and Mr. Paul that there were live men in the 10th left, that the rescue crew had got through a barricade, that the air was all right and that blankets and stretchers should be brought in.

The party then proceeded and found another barricade 200 ft. beyond the first, which they started to break through. Meantime, Mr. Klier, of Gary, the messenger, found Inspector Holliday and four men at the 9th left, and told Mr. Holliday of the message. On arrival at the inner barricade one of the unhelmeted men was sent to the outside to carry a requisition for blankets and stretchers, and the unhelmeted men finished breaking through the stoppings, disclosing the group of entombed miners who had gathered around the inside of the barricade. Mr. Holliday and the rescue men then entered and helped the men one by one through the hole in the stopping. It was found that all the 42 men who had been inclosed were alive, and in fair shape, considering that they had been confined for four days, with only the food from five dinner pails and a very little bad water. They were then lined up along the entry, the rescue men were placed at intervals, and the procession slowly moved outward.

Mr. Bertolet and Chief Henry, who had entered the mine on receiving the message, had sent for blankets and stretchers, which were hurried in. Some of the rescued men were quite weak, and finally two of them had to be carried out on the stretchers. All the men were carefully wrapped up and taken to a detention station so as to insure them proper medical attention.

The experience of the 42 men was strikingly set forth in a newspaper interview with one of them, Thomas Whalen, when he passed through Charleston a few days later. This appeared in the *Charleston Gazette* of Mar. 9, and the substance of it is worthy of repetition, although I cannot vouch for the accuracy of the detail. The bracketed statements of known facts have been inserted to make the meaning clear. The interview is as follows:

> Thomas Whalen, the oldest survivor, who, with his son, John, worked in Room 24 of the 9th entry, heard a rumbling sound. They ran down to the main entry, but the heat was so great that it took their breath; they made a hasty retreat inby on the main entry, seeing on their way the dead bodies of four men who had worked on the motor. These bodies were stretched face downward with their hands outstretched at their full length. Whalen states that the one thing he can remember best was the awful feeling that the top of his head was being lifted off, a sensation giving him terrible agony. The son was using a carbide lamp, while that which his father carried was fed with oil. The latter was extinguished by the force of the explosion, but the other remained burning.
>
> The Whalens ran back into No. 10 entry, where they found 40 other miners, mostly foreigners, who were crazed almost beyond control. By persistent begging they were made to go back beyond the trap door and to work building good walls (across the 10th left entry and air course) whereby to barricade themselves against the afterdamp.
>
> Some of the foreigners wanted to smoke cigarettes. This would have endangered all the entombed men, and it was necessary to use force to prevent it. The men in the 10th entry suffered greater hardship than the five in the 9th left as nearly all dinner pails were left in the main entry, and the only water available was polluted. Only once did Whalen moisten his lips. So great was the hunger of the entombed men that they dug into the coal dust to get crumbs and eggshells which had been thrown away at some meal probably several days or weeks before.
>
> While they were expecting the rescue men, for whom every man waited with implicit faith, they would take turns at watching. Many broke down entirely, and but for the leadership of young John Whalen they would, doubtless, have broken down the wall. (On Friday it was decided to try to send out a man and a hole was made through the walls for that purpose. He carried out the written notice of the 42 men being in the 10th entry, and left it at the mouth of the heading where it was found by the rescue crew. On his way back he was overcome by the afterdamp, but two others ran out and dragged him in through the barricades, which were again sealed.) The rescue party was not heard until they were half way through the inner wall, and then young Whalen gave the order to start meeting them, and, according to Dad Whalen's testimony, little time was lost in complying with the order, despite the terribly weakened condition of the men. When asked how he felt when reached by the helmet men, Dad replied: "I can hardly remember anything because I was so weak and nervous and the awful sight of my dead friends on every hand completely took my memory away from everything else in the world." Dad Whalen is 72 years old, hale and healthy, and gave his interviewer to understand that it was owing to his weakened condition and not to old age that he was the last to leave the mine. He further stated that he expects to be digging coal again within two weeks.

Editorials

The Unforeseen in Mining Legislation

It is easy to be inept in language, and even well meaning lawyers and legislators are not exempt from failures to express themselves plainly. When the Pennsylvania Mining Laws were passed, it was purposed to require that safety lamps used by the workmen should be supplied and maintained by the coal companies. The idea was that the miner should not be obliged to buy a lamp, nor should its care be left to his tender mercies. If each miner owned his lamp the inspection of the lighting equipment of a mine would be difficult, and as many men in the mines are not competent workmen the upkeep would be, in many cases, defective.

But the intention was surely not to require the operator to buy his lamps outright when he might just as satisfactorily lease them from a manufacturing company which would know far better how to keep them in repair and proper working order. Inspection surely would not be less easy, nor would the burden to the miner be any greater under such an arrangement. Surely it was only an oversight which inserted this clause into the Pennsylvania Mine Anthracite Law of 1907:

> Whenever safety lamps are required in any mine they shall be the property of the owner of said mine. Art. 3, Sec. 15.

And it was probably a similar inadvertance which caused the following unfortunate requirement to slip into the Pennsylvania Bituminous Coal Mine Law:

> All safety lamps for examining mines or for working therein shall be the property of the operator. Art. 4, Sec. 5.

The Virginia Law of 1912 is equally unfortunate:

> Safety lamps used for examining any mine or which may be used therein shall be furnished by, and be the property of, the owner of the mine. Chapter 178, Sec. 12.

In West Virginia under the code of 1914 the wording of the law is indentical. In the Colorado Session Laws of 1913, Sec. 133 reads:

> After the first day of October, only electric lamps shall be used in the coal mines, except in cases generating explosive gas or noxious gases, where an approved safety lamp shall be supplied for each working place for distinct purposes; and all lamps shall be the property of the owner.

Ohio, in its general code of 1910, has a better worded provision. It requires:

> Safety lamps used for examining coal mines or which are used in a coal mine shall be provided by the owner of the mine and be under the charge of the agent thereof.

Amendments are needed permitting the companies to lease lamps. If thought desirable, the coal companies could be made just as responsible for their condition as if they owned them. As it is, however, the manufacturing company which is ready to enter into a leasing contract is estopped from doing so because the contract to participate in an illegal act is null and void.

Even if the company, confident in the support of a department of mines, were to be willing to contract with a leasing company, that lamp corporation would have to refuse because the agreement would not be binding.

It has been repeatedly found that manufacturing concerns can and will keep their own supplies in better service than a purchasing corporation. The Galena Signal Oil Co., for instance, often affords better service to the operator when it contracts to keep bearings in condition than when it supplies the oil and lets the operator figure out as best he may how it should be used.

The Gas in Anthracite

Because anthracite contains only a small amount of volatile matter, it is always a matter of surprise that, at least in the United States, it gives out abnormal quantities of gas. Not only are the emanations of gas large, but such as is formed is mostly methane and consequently highly inflammable.

Bituminous coals produce, not only methane, but large quantities of water and carbon dioxide. It is anthracite coal which specializes so markedly on methane. But here it should be stated that we believe there is no available knowledge of the relative gas emanation of anthracite and of bituminous coal, because Chamberlain and other investigators, so far as we know, in making their records regarding such emission of gas, excluded water, which may be truly as gaseous an emanation as methane, carbon dioxide or carbon monoxide.

The paraffins emitted in vacuum by Mansfield coal from Carnegie, Penn., formed roughly 80 per cent. of the whole gas content *as measured* by Chamberlain. It must be remembered that he has nothing to say about the water product. If he had considered it, the percentage of paraffins would probably have been considerably reduced. This Mansfield coal is still bituminous; and consequently it may be asked how, in face of Chamberlain's testimony, it is deduced that water and carbon dioxide are so important as products of metamorphosis up to and including the bituminous stage. The argument is simple. If the assumption just made were not true, we would not find any coal in nature, for peat would progressively gain in oxygen percentage by the elimination of the other elements, the carbon and hydrogen would pass off as methane, and the outcome would be mainly an unburnable body of carbon, oxygen and ash. Despite the fact that coal seems to have an avidity for oxygen, nevertheless coal continues to lose that element as it rises in the scale of its metamorphosis, and this disposition to diminish the percentage of oxygen does not show an appreciable slackening till the element is nearly all gone.

The substance of lignite, when the moisture and sulphurless ash are excluded, contains from 4 to 5 per cent. of hydrogen. The fuel loses some of this in the long course of centuries, but it parts with so much more of its oxygen that in the extended series of metamorphoses from lignite to sub-bituminous and bituminous coal the percentage of hydrogen increases rather than diminishes.

Though the sub-bituminous coal usually contains about 5 per cent. of hydrogen, one sample from Hanna, Wyo., had 6.18 per cent. In Ohio the bituminous coal appears invariably to have over 5 and may even have over 6 per cent.

The reason for this increased hydrogen percentage, which makes for the betterment of the fuel even more than the increase in the carbon percentage, is that for every pound of hydrogen lost as water, 8 lb. are lost as oxygen. For every 12 parts by weight of carbon passing away as dioxide, 32 of the oxygen disappear. That element is abducted by both hydrogen and carbon and so suffers greatly in percentage; for not only is it lost in greater quantity than the carbon and hydrogen, but also the combined weight of these elements far outbalances the weight of the oxygen and can therefore better sustain the continued drain.

We have seen, therefore, that the hydrogen, having an ally in carbon in all its attacks on the oxygen supply of the coal and losing only one part by weight for every eight of oxygen it carries away, comes out of the earlier centuries of stress in relative triumph. Would it be amiss to add that like many other allies, having subdued and destroyed the common enemy, these allies—carbon and hydrogen—after some irregular skirmishes proceed to destroy each other?

The semibituminous coal—that of Cambria County, Pennsylvania, for instance—contains, despite its losses, between 4.37 and 5.36 per cent. of hydrogen in the coaly matter when freed from moisture and sulphurless ash. The trend is evidently toward a reduction in the amount of hydrogen. The oxygen has dropped to a percentage between 1.72 and 5.50, so that it becomes less possible for the hydrogen or carbon to pass off by self-oxidation.

Perhaps that is the reason why the hydrogen now begins to pass off mostly in combination with carbon, three parts by weight of carbon passing away in the methane for every part by weight of hydrogen. Were the coal to consist of 75 parts by weight of carbon and 25 parts of hydrogen, the loss of methane might go on indefinitely without a change in the percentage composition of the coal, but the carbon is in somewhat larger proportion and the hydrogen is in much less. Still it is really a remarkable change in the weight of the coal which must take place in order that a semibituminous coal like that in Cambria County may be converted into an anthracite such as is mined in the Schuylkill region.

Let us take a coal from Patton, Penn., with carbon 88.12, hydrogen 5.24, oxygen 3.39 and sulphur and nitrogen together 3.25 per cent. We will assume that the hydrogen is reduced to 2 per cent. and the oxygen to 2.2 per cent., which are about the percentages in the Schuylkill anthracite field. Furthermore, we will make the assumption, which may be overbold, that all the oxygen lost passes away as water vapor and all the rest of the hydrogen not thus spirited away is lost as methane. The nitrogen and sulphur are assumed to be unchanged in actual quantity.

An interesting but simple calculation will then show that 100 lb. of the first coal will lose 1.52 lb. of oxygen, 3.54 lb. of hydrogen and no less than 10.05 lb. of carbon, leaving carbon 91.96 per cent., oxygen 2.2, hydrogen 2 and sulphur and nitrogen 3.84 per cent.

So to make the hydrogen lower only 3.24 per cent. and the oxygen 1.19 per cent., 15.11 per cent. of the coal substance must pass away as gas. This is an important consideration and throws light on the extremely gaseous nature of the deeper mines in the anthracite region.

It is interesting to note that as coal is about 812 times as heavy as methane and as it loses in the instance given 13.4 per cent. to form that gas, the amount of methane evolved will occupy about 109 times as large a volume as the coal from which it is derived. This latter figure is extremely rough, being based on the assumption that the coal substance in question has a specific gravity of 1.19—an assumption which is hard to deny or to prove.

N. H. Darton stated on Jan. 16 of last year at a meeting of the American Institute of Mining Engineers that the Dorrance mine in Wilkes-Barre, Penn., produced 3390 cu.ft. of gas per min. and that in that neighborhood, 1500 cu.ft. of gas was liberated per ton of coal mined. Very roughly, then, we deduce from the latter statement that the measures contain only about 7 per cent. of the methane generated between the metamorphosis of the coal from semibituminous as typified at Patton, Penn., and the anthracite stage as exemplified at Wilkes-Barre, in the same state.

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The Outlook on Apr. 1 Contracts

EASTERN

In New England the outlook is anything but encouraging. A large share of what season business has already been entered was undertaken early in the year under the pressure of high coastwise freights, most of it, however, in the same channels as in 1913 and 1914. Buyers who have hitherto bought of agencies that rely on what transportation can be had in the open market have been encouraged all along to wait for the market to "settle down," a process that seems to be well on its way at this writing. There is, therefore, quite a volume of business that is yet to be closed and it will require careful handling to avoid a demoralized market, particularly on Pocahontas and New River coals. While the "asking price" is still $2.85 f.o.b. Hampton Roads everybody knows the spot price is around $2.70 or less, and buyers are likely to postpone purchases just as long as they possibly can.

The business outlook is not improved over last year. In scattered instances factories and mills are working on better time, but on analysis these are found to be in special lines and not indications of any improvement that is general. There is no inducement, therefore, to bring buyers into the market for future supplies under present conditions.

Most of the contracts already closed were subject to correction in case freight or prices f.o.b. declined, and that is a further reason for the West Virginia operators to refrain from mining coal that must ultimately be sold at a loss. If these interests would show less rivalry for tonnage and more disposition to mine coal with some respect for the market that must absorb it, there would be much less anxiety over prices later. The senseless over-production of recent years with "market cargoes" and "distress coals" at New England points has been the bane of the market and is the reason why each year so many buyers withhold placing contracts until late in the season. A large number have now, for the past few years, made their contracts from July 1 rather than from Apr. 1, so pronounced has been their experience in this respect. In August, 1914, "distress coal" sold as low as $3.15 on cars Boston and this for choice grades of Pocahontas and New River.

With such situations in mind, and present tendencies toward weakness in price, it is hard to see how there can be any snap to the spring market. The export trade under present conditions can hardly be better than spasmodic and cannot be relied upon to move coal in any regular volume. The burden, therefore, will fall on the coastwise trade. In that case a better spirit of coöperation is needed among the West Virginia interests before New England buyers can have much faith in the season's outlook. If the example of Georges Creek operators throughout so dull a year as 1914 could be followed in West Virginia in 1915, it is possible the spring of 1916 would show less skepticism on the part of Yankee consumers.

Pittsburgh District

A leading Pittsburgh district coal interest states that since Jan. 1 they have booked more contract tonnage than in the same period a year ago. In this instance, however, they admit that a similar comparison to Apr. 15 will not look at all as favorable for the reason that a year ago they were holding off from contracting because the wage scale was not settled.

Buyers are extremely apathetic in the matter of placing contracts. Much less than half the annual contracting has been done, and it even looks as though a considerable proportion of buyers would not contract at all at this time, presumably depending on the spot market until such a time as it may be desirable to get under cover with contracts. In business closed, the going prices on contracts at all desirable have not been over $1.10 to $1.15 (say 15c. under a year ago) on mine-run and 80 to 90c. on slack. Lower prices than 80c. and $1.10 have been done, though there are no specific instances of these. On mine-run, prompt lots can be picked up at say 10c. a ton less than these figures, and doubtless sometimes at under $1.

The contracting as a rule is being done on requirement contracts, intended to represent the full requirements the buyer may have during the twelvemonth, with a tonnage stated in the contract as representing the probable requirements. Operators profess confidence that buyers will not try to beat the contracts by purchasing outside prompt lots when they can be had at well under the contract prices, as is the case at present; but as to this, one naturally has his doubts.

There should be an incentive to buyers to contract for the twelvemonth at present low prices on account of both anthracite and bituminous scales expiring Apr. 1, 1916, so that the contracts will run into the period preceding the suspension, when there is always stocking of coal and a relatively high prompt market. There is also the incentive of present prices being low, but the deterrent influence that prompt prices are materially lower than contract prices, say to the extent of 10 or 15c. a ton.

No prices have yet been named to lake shippers, but there is a possibility that the Pittsburgh Coal Co. may undertake to name prices in a week or so. Inasmuch as there has been practically no inquiry for lake coal it is improbable that such prices, if named, would be anything but nominal. Early in the year there was a lone contract closed for a round tonnage of lake coal, said to be at an unmentionably low price, probably under $1.15 for ¾-in. Ordinary quotations, like $1.15 for mine-run, $1.25 for ¾-in., $1.35 for 1¼-in. are understood to be to "consumers," with 10c. off to dealers.

The real prices on lake coal will probably not be made for two or three months, perhaps not until July. It is the universal opinion that lake shipments will be very light in the fore part of the season and confined to the shippers who own mines or have long-term arrangements, while late in the season the Northwest may become disposed to stock up on a suspension scare.

Middle Western

The trend in some quarters is to withhold action in the matter of contracts for another season effective Apr. 1, because of the new alignment presaged in the sale of Indiana and Illinois coal, but most of the operators and wholesalers are now submitting bids on railroad, municipal and dealers' needs at the old figures. The major portion of contracts for Indiana and Illinois coals expires on Mar. 31. Some tendency is observable on the part of consumers to ask for concessions from prices prevailing during the last contract year, but on the whole producers and wholesalers evince no disposition to meet this view.

The agreements with the miners covering wages and tonnage rates extend until Apr. 1, 1916, so that no changes of this nature need be considered in figuring contract prices. It is quite apparent that the increased production of eastern Kentucky mines and the activity displayed by their representatives in the Western markets, will necessarily increase competition found by Indiana and Illinois coals, and may have the effect of reducing revenue on some contract business.

The creation of a selling organization to market 80 per cent. of the Indiana production, which is imminent, is causing some of the Indiana operators to await developments. In Illinois the same hesitancy is indicated, and it is reported that the Franklin County operators, who have a coöperative organization, are going to keep their contract quotations on a parity in territory where competition has existed between them in the past; on the other hand, where their coal is competitive with foreign production, it is stated the Franklin County operators will endeavor to meet competition. In other Illinois fields the operators will likely renew their contracts on the present basis.

Business generally has been so dull since the holidays that most of the operators are unwilling to commit themselves to business for a year's time which will not show remunerative returns, and there is a general disposition not to go below the contract figures of the past year. Some shippers do not intend to enter into contract arrangements, feeling from past experience that contracts are nothing more or less than an option on their product, with no corresponding advantage to the seller. If a dealer has a contract for domestic lump at $1.60 and the market price is lower during the winter season, he is very likely not to take his contract tonnage.

It is very likely that new contracts will eliminate to a large extent the sale of coal on destination weights, which has been one of the unfavorable features of past contracts with large consumers like the public-service corporations. There is also an evident disposition to curtail the sale of coal on a delivered basis and to quote mine prices only.

Discussion By Readers

Recognition of Bravery

Letter No. 4—I want to say that the editor's brief comments appended to Letter No. 2, Coal Age, Feb. 27, p. 383, expressing the desire of Coal Age to obtain the full and frank opinion of its readers in respect to what would be the most suitable recognition of acts of bravery performed by mine workers, will be much appreciated by all interested in this worthy question.

I noted, also, the two suggestions made by "Bykem" on the same page—first, in regard to setting a "standard of degrees of courage"; and, second, as to whether the award should be entirely honorary or otherwise. It seems to me that the words in the editor's comments to which I have referred above, namely, "Deeds of heroism are too costly to be purchased," make it clear that to standardize courage and set degrees of merit on such acts is not within the scope of mortal regulation. Such an attempt would show a great diversity of opinion as to what constitutes "degrees of courage," and, as a result, the award would not be satisfactory to all.

Mine Inspector Rose, p. 385, says, "Train and discipline every mine worker to detect dangerous conditions and to know how to avoid or escape them." Following these instructions, it is possible to establish *degrees of efficiency*, but, I think, we cannot establish similar *degrees of courage*. In the words of another, "Courage can sometimes be carried to the extreme, when it develops into foolhardiness, and no good then results."

In reference to the second suggestion, I would say that a life active-membership in the American Mine Safety Association and a gold medal commemorating the event and service performed would be a suitable award. In case the brave would-be rescuer met his death in the attempt, a suitable memorial could be drafted and presented to his family in proper form. I hope much good will be accomplished as a result of this timely suggestion.

I. R. Packard.

Bates, Ark.

Letter No. 5—In considering the matter of a suitable award in recognition of the brave and self-sacrificing work of mine rescuers, the first and most important question that presents itself is, as suggested in "Bykem's" Letter No. 1, Coal Age, Feb. 27, p. 383, Should the award be of a kind that will *compensate* the rescuer for the service he has rendered and, perhaps, help to partially amend for the injury or loss he may have sustained? My answer to this question is, Yes, by all means he should be compensated in proportion to the sacrifice he has made.

The next question that arises is, How or by what means shall a *lasting* award be made? Before answering this question, let us consider for a moment that, usually, the man who makes the sacrifice is one from among the working classes, on whose daily labor depends the support of a family. If this man is injured or incapacitated for further work as the result of his unselfish and self-sacrificing act of rescue, is it too much to expect that his future support and that of his family should, in some way, be provided for in the award it is proposed to make as a recognition of his deed? I would ask, Of what permanent value will an "honorable mention" or the presentation of a suitably inscribed medal be to such a one in his helpless condition?

Recalling that the nation makes adequate provision for the pensioning of its sons who have been disabled in their country's service, which called for the *killing* of their fellowmen, I would ask, Why is not the self-sacrificing effort for the *rescue* of a fellowman an even more worthy object for such a provision by law? In my opinion, a law should be enacted providing for the compensation or life pension of one injured or the support of the family of one killed in such service given freely for the rescue of a fellow-worker. It may be argued that the surviving dependents, in this case, are no worse off than those who are the victims of other accidents, but the case differs in being a self-sacrificing, heroic deed. The sufferer is not a victim of an accident.

It is evident to all, on reflection, that it must be a question of great concern to the members of mine-rescue corps as to what would become of their families or dependents in case of their own failure to return alive from the seething hole of foul air and poisonous gases into which they enter. These men are, without exception, volunteers in the work for which they train in the hope that they may be able to render efficient service to their fellows in time of danger. Their ambition is to save life—not to win an "iron cross" or other medal.

In considering this problem we must face and answer the question, What provision is to be made for the future support of a disabled rescuer and his dependents? Such things as honorable mention, iron crosses and suitably inscribed medals will not help to support a family deprived of their natural means of sustenance.

Geo. S. Stewart.

Reynoldsville, Penn.

Longwall in the Pittsburgh Seam

Letter No. 3—In reading the interesting letter of G. R. Waddell, favoring the general adoption of the longwall method of mining in the working of the Pittsburgh seam of coal, Coal Age, Feb. 13, p. 303, I observe that his chief argument in support of his contention was that "the extra expense for the building of packwalls in longwall work is offset by the reduction in other expenses."

The "other expenses" to which Mr. Waddell refers, in respect to room-and-pillar work, as stated in his letter, are: The turning of a large number of rooms, requiring the payment of yardage for driving the narrow room-necks and the crosscuts; the delay and cost of taking the cutting machines from one room to another; the laying of tracks and switches for each room turned off the entry; the increased cost of gathering the coal at the face of the rooms; and the large percentage of coal lost in pillars.

While I am not familiar with the Ohio field, I am well acquainted with the West-Virginia field and have had much experience in the longwall method of mining in England. Judging from this knowledge and experience, I fail to see how it would be profitable to work the Pittsburgh seam by the longwall-advancing system of mining.

Remembering that the thickness of this seam varies from 4 to 9 ft., I would like to ask Mr. Waddell where he proposes to get his rock or dirt with which to build the necessary packwalls that are required for the successful operation of longwall work. Even assuming that he only builds packwalls on one side of his roadways and trusting alone to the post timbers set at the working face for supporting the roof over the miners, he would still lack sufficient material for building purposes in this thickness of seam.

I fully agree with Mr. Waddell that the longwall method of mining is the best plan to adopt wherever the conditions are suitable for its use. This is particularly the case in the working of thin seams where it is necessary to brush the roof over the roadways or to lift bottom on the roads in order to maintain sufficient headroom for the movement of the cars to and from the face. This work, which is necessary in the mining of thin seams of coal, gives sufficient material for the building of the packwalls and gobbing the space between. Also, sufficient building material is often taken from the partings of bone or rock that occur in many seams. All this material that must be disposed of can be used to advantage in the longwall method of mining.

In closing, permit me to say that I am of the opinion that the retreating method of longwall would be more suitable than the advancing method in the working of the Pittsburgh seam, assuming that it were practicable to adopt this method.

J. Oldroyd.

Farmington, W. Va.

Letter No. 4—I have been much interested in the discussion of whether or not the longwall system can be successfully used in working the No. 8 seam, in eastern Ohio or the Panhandle district. Permit me to express my opinion on this subject and to say that the mine of the Labelle Iron Co., of Steubenville, which is working the No. 6 seam of coal, is now being successfully operated on the longwall system. In that mine, they are working a 1600-ft. breast, in the shape of a half-moon.

The operation has been so far very successful, for the reason that the natural conditions in respect to the bottom and top are favorable to longwall work. The bottom underlying the coal is of a hard nature and, so far, has not caused any trouble by heaving in the roadways. The coal is about 3½ ft. thick and the roof overlying the seam is a solid and hard gray stone. Packwalls are built between the roadways, which are 42 ft. apart. The material used for these packwalls is obtained by brushing the roadways to a height of about 6 ft. A longwall machine is used for undercutting the coal, and this requires 4 ft. of clear space along the face of the coal. After the coal is mined out, the roof gradually settles down on the packwalls, leaving a space of only about 15 in. between the roof and the bottom.

While the longwall system of mining has been a success in this seam of coal, however, I do not believe that it could be tried to any advantage in the No. 8 seam of eastern Ohio. The roof overlying the No. 8 seam consists, first, of a drawslate, which averages from 8 to 10 in. in thickness. Above this is the roof coal, from 2 to 18 in. in thickness, and then comes a gray soapstone from 4 to 6 ft. thick, which is very often of a soft nature and necessitates much timbering whenever a break has extended through the roof coal. Finally, the overlying limestone is very thick and hard to break.

If the No. 8 seam were to be mined on the longwall system the soft strata lying between the coal and limerock would not permit the gradual settlement of this hard stone. Furthermore it would be very expensive and almost impossible to build packwalls for the reason that they must be built to a height of about 6 ft., or the thickness of the coal and drawslate together. Then, what would happen if the heavy limerock should start to squeeze?

All men familiar with a squeeze in this seam of coal will agree with me that if it once started to sag or squeeze it would be impossible to keep sufficient posts at the working face to successfully undercut or load any more coal. It would also be impossible to keep the roadways open, because the squeeze would force the strata between the coal and limerock down on the roadways and it would be impossible to haul any coal. So far as the bottom is concerned I believe that, in a majority of the mines, it would be favorable to the longwall system, as the bottom is of a limestone nature. I have heard miners coming from England say that this seam could be worked on the longwall system, but I would have to see it tried before I could believe it can be done successfully.

W. H. Werker,
Deputy Mine Inspector.

Rayland, Ohio.

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Mining Laws, Legislation and Mine Regulations

Letter No. 40—I noticed in Coal Age, Feb. 27, p. 384, Mr. Lantz's criticism of Mr. Weigle's suggestion that mine foremen should be state officials. I am of the opinion that Mr. Weigle is on the right track in attempting to reduce accidents in our mines, and for this reason I will attempt briefly to sustain his contention, which Mr. Lantz regarded with disfavor.

In the State of Pennsylvania, the mine foreman is required by law, in all mines employing 10 or more persons, to look after the safety of the workmen employed therein. He cannot do this successfully when the burden of "coal getting" is placed on his shoulders. He will naturally try to please the coal company first, because he receives his compensation from them and is under a greater obligation to them than to the state or the workmen of whom he has charge. Mr. Weigle is trying, here, to relieve the foreman of his obligation to the company by suggesting that the companies be taxed, so that instead of paying the mine foreman they would pay him indirectly through the state.

In regard to the mine foreman not having anything to say in the operation of the mine, as to laying it out, system employed, etc., will say that the mine foreman is seldom consulted in regard to laying out a mine or the system on which it shall be worked, which questions are left to the mining engineer to decide. Yet the mine foreman is held responsible for the safety of the workmen in the mine, regardless of what system is adopted. It is true that the state's interest only relates to safety, and if the foreman is held responsible by the state, why should he be burdened with any duty except to look after the safety features and the enforcement of the mine laws?

It appears by recent court decisions that the company is not liable for accidents in the mines when a mine foreman is held responsible by the law of the state, and damage cannot be collected for injury to workmen unless some defect causing the injury had been brought to the superintendent's notice. Then, why should the coal company dictate the policy of the foreman when he is the responsible person and undoubtedly neglects his duty when he devotes a portion of his time to increasing the output of the mine or performs clerical work and numerous other tasks aside from his legal duties?

I believe the state should dictate or control the selection of the mine foreman, assuming that he is to perform these legal duties; but not to interfere with the company's business when that does not encroach upon safety or hamper him in fulfilling his duties as required by law. However, there should be nothing to interfere with the coal company's placing a man in the mine in charge of getting out the coal; but he should be under the mine foreman and work under his orders, so far as safety is concerned. Additional men, who should act as assistants to the mine foreman, could be employed by the coal company when the state mine foreman is unable to examine all places as required by law; but these assistant mine foremen should be paid by the company.

A schedule of wages could be arranged, according to the class of the mine, gaseous or nongaseous, the extent of the workings and the number of workmen employed. I might say that where the law now requires a certified foreman at all mines employing 10 or more men inside, one state foreman could attend to at least three mines, where the total number of workmen did not exceed, say 50, and the three mines were not too far apart so as to prevent him having plenty of time to legally attend to his duties. I am firmly of the opinion that the difficulties presented by Mr. Lantz could be easily eliminated, should a bill be drawn along these lines and presented to the legislature for action.

I am agreeing with Mr. Weigle because I believe he is working along the right line, as proved by my own experience in the mines during the last 25 years, in which time I have been officially connected with over 350 coal mines. I have observed that the mine foreman devotes entirely too much of his time to the coal companies' interests; and I am convinced that if he were compelled to drop part of his work there would be a great reduction in mine accidents.

MINING ENGINEER.

Somerset County, Penn.

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Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

CARBON MONOXIDE

This gas, formerly known in mining textbooks as "carbonic oxide," or "whitedamp," is the product of the combustion of carbon in a limited supply of pure air. Because the supply of oxygen is limited the combustion of the carbon is incomplete and the **monoxide** is formed instead of the **dioxide.**

Carbon monoxide is a **colorless** gas. It is extremely **poisonous,** owing to its being absorbed very rapidly by the hæmoglobin or red coloring matter of the blood, from which it is separated slowly and with difficulty. The effect on the system is therefore **cumulative** when exposed to the smallest percentage of this gas in the atmosphere breathed. The affinity of carbon monoxide for the hæmoglobin is from 250 to 400 times as great as that of oxygen, so that the blood corpuscles are quickly rendered inert and **death** is the sure result. The gas is not displaced by the oxygen employed in treatment, but is eliminated slowly by natural processes that take place in the system, unless the latter is too weak or the percentage of the gas absorbed is too great for such result to take place.

The **treatment** for carbon-monoxide poisoning is the enforced inhalation of pure oxygen, by the use of the **pulmotor.** This is a device that consists essentially of a small portable tank containing compressed oxygen, which is pumped into the lungs by a bellows, while another bellows withdraws the same from the lungs after use. The pressure of the gas in the oxygen tank automatically operates the bellows at a rate of 16 strokes per minute as in normal breathing. A face mask completes the equipment. It is important to draw the tongue forward with tongs provided for that purpose, and to close the gullet leading to the stomach, by a gentle pressure of the thumb on the throat, in order to avoid the gas filling the stomach.

The presence of the smallest percentage of carbon monoxide in the atmosphere breathed is **dangerous** to health and life because of its cumulative tendency, its possible toxic effect on the nervous system and the impairment of the vital organs of the body. The **fatal percentage** of this gas cannot be definitely stated because of numerous other factors that together determine a fatal effect. The more important of these are the following: The depletion of the oxygen of the air breathed; the length of the time of exposure to the poisonous atmosphere; the energy expended in physical work in such atmosphere; the state of health and the normal physical condition of the person.

Some persons are more sensitive to gas poisoning than others, owing to a less vigorous constitution, a temporarily weakened condition, a more nervous temperament, or previous exposure to gas poisoning, the baneful effects being hard to eradicate from the system. For these reasons, what would prove a fatal percentage in some instances of less purity of atmosphere, longer exposure, more difficult work, or physical ailment of any nature, would not necessarily produce fatal results under better conditions and more robust health of the individual exposed to the gas.

The Coal Age Pocket Book

Relative Rate of Absorption by Blood—The experiments of Dr. J. S. Haldane and others have shown that 0.02 per cent. of carbon monoxide in otherwise pure air produces about 20 per cent. of saturation in a brief period of time (20 min.?). Since pure air contains 20.9 per cent. of oxygen, the ratio of carbon monoxide to oxygen, in the air breathed, is 2 : 2090, or 1 : 1045. But the ratio of absorption, carbon monoxide to oxygen, in this case, is 20 : 80, or 1 : 4, the blood showing only 20 per cent. carbon monoxide and 80 per cent. oxygen. Hence, the relative **rate of absorption** by the blood, carbon monoxide to oxygen, is about 260 : 1, since 1045 ÷ 4 = say 260. In other words, the blood in this experiment absorbed carbon monoxide about 260 times as rapidly as it absorbed oxygen, under the same conditions.

Another **experiment** showed 50 per cent. saturation in the blood when the air breathed contained 0.08 per cent. of carbon monoxide. In this case, the ratio of carbon monoxide to oxygen in the air breathed is 8 : 2090, or 1 : 260. But the corresponding ratio of absorption is 1 : 1, the blood showing 50 per cent. of saturation, or equal quantities of these two gases. Hence, in this case also, the relative **rate of absorption** of carbon monoxide and oxygen is the same as before, namely, 260 : 1.

Another **experiment** showed 50 per cent. saturation in the blood when the air breathed contained 0.05 per cent. of carbon monoxide. Here the ratio of carbon monoxide to oxygen in the air breathed being 5 : 2090, or 1 : 418, and the ratio of absorption, as before, 1 : 1, the relative **rate of absorption** is 418 : 1, showing that the blood absorbed carbon monoxide, in this case, about 400 times as rapidly as it absorbed oxygen, under like conditions, in the two previous experiments.

The experiments suggest not only the variation in the rapidity of the absorption of carbon monoxide by the blood of different individuals, with varying constitutions and degrees of health; but show clearly the great affinity of the hæmoglobin of the blood for carbon monoxide as compared with oxygen. These facts demonstrate forcibly the danger of working in a mine atmosphere containing the smallest possible percentage of this gas even when the worker is in robust health.

Production of Carbon Monoxide in Mines—Carbon monoxide does not occur naturally in mines, but may be and often is produced in dangerous quantities under the practically unavoidable conditions and occurrences incident to coal mining.

This gas is produced in considerable quantities by any combustion, on a large scale, commonly occurring in the limited confines of mine workings. Examples of this are mine fires and explosions of gas or dust. This gas is also produced by the explosion of powder in blasting. It is produced in dangerous quantities by the slow combustion of fine coal and slack thrown in the waste, in poorly ventilated places and abandoned areas void of circulation. Carbon monoxide is the deadly component of afterdamp, which renders the latter so quickly fatal to life, as shown by the fatal results that follow many mine explosions.

Inquiries of General Interest

The Bituminous Mine Law

Will you kindly explain two statements made in the electrical division of the bituminous mine law of Pennsylvania (1911)? These statements both occur in Art. 11, which is entitled "Special Rules for the Installation of Electricity." This article is introduced by the statement, "The following rules shall be observed, as far as is reasonably practicable, in the mines."

The first statement occurs in Sec. 1, Rule 2, and restricts the normal capacity of a transformer to 5 kw. and that of a motor to 15 b.hp. It would be of interest to know the meaning of this provision of the mining law. The rule reads as follows:

> For work underground, when supplied with current at a voltage higher than medium voltage, no transformer shall have a normal capacity of less than 5 kw.; nor shall a motor have a normal capacity of less than 15 b.hp.

The second statement occurs in Sec. 7, Rule 83, which provides for the protection by gas-tight fittings of strong glass, for all incandescent lamps used in gaseous portions of a mine, except lamps not exceeding 8 cp. and without tips and requiring a voltage of not less than 220 volts.

I would like to ask, Why is it necessary to protect lamps of less than 220 volts, while it is not necessary to protect them when they are of a higher voltage?

FRED VINTON, Supt.,
Greenwich Coal & Coke Co.

Saxman, Penn.

Inquiry among mining and electrical engineers has failed to reveal any reasonable explanation for the requirements of these rules to which correspondent has well drawn attention. We understand that the entire electrical section of the bituminous mine law was drafted by an experienced electrical engineer thoroughly familiar with mining conditions. It is impossble to state what he may have had in mind when writing these two rules. As a matter of fact, a number of motors are in use in mines in Pennsylvania, having a less capacity than 15 b.hp.

Without knowing the particular phase or conditions that Rule 83 is intended to cover, the reading of the rule as it appears in the bituminous law and as quoted above is seemingly absurd.

We are glad correspondent has drawn attention to these unexplained points and hope that the same will receive the prompt attention of the Department of Mines at Harrisburg; and that an effort will be made to explain the real meaning of these rules or to have them eliminated from the statutes. We hope that other correspondents will draw attention to similar incongruities in the mining laws of their states.

Formula for Weight of Air

Kindly state if the following formula is correct for finding the weight of 1 cu.ft. of air, at any temperature t and barometer B. Some textbooks give the constants 1.3253 and 459.

$$w = \frac{1.3273 \times B}{460 + t}$$

Peoria, Ill. STUDENT.

The above formula is correct; the absolute zero being now taken as —460° F., the constant 1.3253 is changed to 1.3273.

Oil from Coal

Can you inform me what percentage of oil can be obtained from 1 ton of cannel coal? Also, what percentage of oil can probably be obtained from Blue Gem coal? The analyses of these coals are as follows:

ANALYSIS OF CANNEL COAL

	Percentage
Fixed carbon	51.10
Volatile combustible matter	40.00
Ash	8.10
Sulphur	0.80
Total	100.00

ANALYSIS OF BLUE GEM COAL

	Percentage
Fixed carbon	56.55
Volatile combustible matter	39.07
Ash	1.28
Sulphur	0.63
Moisture	2.47
Total	100.00

Any information you can give or obtain from the readers of COAL AGE, on this subject, will be much appreciated.

JOE GRAEF.

Newcomb, Tenn.

It is impossible to calculate from the analysis of a coal its possible yield of oil. In this respect, the distillation of oil from coal is very much like the coking of coal. The results can only be determined by an actual trial or test.

There will appear in COAL AGE, shortly, an interesting and valuable article on this subject, prepared by F. R. Wadleigh, whose experience and acquaintance with the matter bespeak for his article a careful reading by all who are interested in the future of the coal industry.

After referring to the extraction of oil from the cannel coals and bituminous shales of Scotland, where the industry originated, and describing briefly its later development in the production of fuel oils in Great Britain, Mr. Wadleigh gives some of the results obtained. In one instance, 58.5 gal. of crude oil beside other products were obtained from a cannel that was not a high-grade coal. He mentions, also, the continuous operation of a plant on a commercial scale which is yielding at present as high as 130 gal. of oil per ton of coal.

The subject is one of the greatest interest at the present time and is being thoroughly investigated with a view to ascertaining its possibilities. An interesting point to which the article mentioned above draws special attention is the fact that the distillation of the oil from the coal should be conducted at low temperatures, in order to prevent, as far as possible, the production of gas and to increase the yield of oil.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—In what proportion will gas be expanded, owing to a rise in its temperature from 70 to 95 deg. F.?

Ans.—Assuming a constant pressure, the volume of air or gas varies directly as the absolute temperature, or, in this case, the volume is increased in the ratio (460 + 70) : (460 + 95), or the ratio 530 : 555. The value of this ratio is 1 : 1.047; that is to say, the volume of the gas will be increased 1.047 times, owing to this rise of temperature.

Ques.—Find the force of a blownout shot when 8 lb. of powder has been used in the hole and 6 lb. of this has expended its force on the air current. The shot was fired in the intake at a point 4500 ft. from the fan. The intake airway is 8x10 ft.; the velocity of the air current, 700 ft. per min.; the temperature of the mine air, 60 deg F., and the barometric pressure, 30 in.

Ans.—It is impossible to give any answer to this question. The question is incapable of solution on any intelligent basis.

Ques.—What weight will break a steel I-beam that is ½x12 in. in section and 16 ft. between supports? The beam is equally loaded along its entire length. Assume the tensile strength of the steel as 50,000 lb. per sq.in.

Ans.—This is not a fair question to be asked in a general examination, unless textbooks are allowed or the moment of inertia of the beam is given. From the handbooks of manufacturers of steel I-beams, the moment of inertia of this beam may be found and is practically 312.3. The breaking load of the beam is then found by multiplying this moment of inertia by the ultimate fiber stress (50,000 lb. per sq.in.) and dividing 4/3 of that product by the distance between the supports in feet times the depth of the beam in inches. This gives for the breaking load, in this case,

$$L = \frac{4/3\, f I}{l d} = \frac{4/3 \times 50{,}000 \times 312.3}{16 \times 12} = \textit{say 54 tons}$$

Ques.—What grade would be necessary for a self-acting incline whose length is 1500 ft., in order to operate eight cars in each empty and loaded trip? Each car weighs 800 lb. and carries 2000 lb. of coal. A ¾-in. steel rope is used. Assume the friction of the load as $^1/_{50}$ of its weight, and the friction of the rollers as $^1/_{25}$ of the weight of the rope resting on them.

Ans.—Taking the friction as $^1/_{50}$ of the weight of the coal and cars, the total amount for 8 loads and 8 empties is given by the formula

$$\frac{n}{50}(W_c + 2W) = \frac{8}{50}(2000 + 2 \times 800) = 576\ lb.$$

Again, taking the friction of the rope resting on the rollers as $^1/_{25}$ of its weight, assuming a ¾-in. rope weighs 0.89 lb. per ft., the rope friction is

$$\frac{1}{25}(1500 \times 0.89) = 53.4\ lb.$$

This makes the total friction 576 + 53.4 = 629.4 lb. There being the same number of cars on each end of the rope, the weight of the cars is balanced. The weight of the coal is partly balanced by the weight of the rope when the load begins to descend the plane. The net weight acting to produce motion down the plane is, therefore, the weight of the coal less that of the rope; or,

$$8 \times 2000 - 1500 \times 0.89 = 14{,}665\ lb.$$

Finally, dividing the total frictional resistance by this net weight acting to produce motion down the plane gives the required tangent of the angle of inclination. Thus,

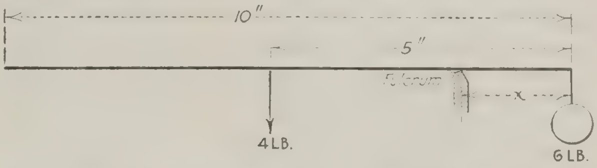
$$Tan\ a = \frac{629.4}{14{,}665} = 0.0429$$

and

$$a = 2° 27'$$

Therefore, under the assumed conditions, an inclination of 2° 27′ will be required to produce a self-acting incline, operating eight cars in a trip.

Ques.—An iron bar of uniform section, 10 in. long, weighs 4 lb. If a weight of 6 lb. is suspended from one end, at what point of its length will the weight of the bar balance the weight suspended at the end?



Ans.—Referring to the accompanying figure, the weight of the bar (4 lb.) acts through its center of gravity at the middle of the bar, 5 in. from either end. Let x equal the distance of the fulcrum from the end of the bar where the weight is suspended; then, $5 - x$ is the lever arm of the weight of the bar itself. When the weight of the bar balances the suspended weight, the moments of the two weights referred to the fulcrum as a center will be equal. Therefore,

$$6x = 4(5 - x); \text{ or } 10x = 20$$

and

$$x = 2\ in.$$

The point at which the weight of the bar will balance the suspended weight is, therefore, 2 in. from that end.

Ques.—What is the reason that firedamp found in wet places in mines is generally more pure and dangerous than that found in dry places?

Ans.—It is very probable that there is less carbon dioxide present in wet places than would naturally be found in the dry workings of the same mine, for the reason that slow combustion producing blackdamp is more liable to be taking place in the dry workings than in wet places. The presence of the blackdamp, as is well known, decreases the explosiveness of firedamp mixtures.

As a matter of fact, however, the conditions cited in the question are not always true, as dry workings are very liable to contain much fine dust suspended in the air, which increases the explosiveness of firedamp mixtures. This is not the case, to the same extent, in wet or damp places in mines.

Coal and Coke News

Washington, D. C.

The Supreme Court of the U. S. has made public the full text of its opinion in the so called North Dakota coal rate cases (Northern Pacific Ry. Co. vs. State of North Dakota, etc.) which involved the constitutionality of the special low rate on coal made by the state commission in intra-state business for the transportation of coal in car-load lots. This rate was made in order to favor the development of the North Dakota coal mining industry.

The opinion of the court is interesting not only from the standpoint of transportation but also from that of the coal business. In a word, the view of the court is that the desire to develop local industries does not warrant public authorities in compelling the carriage of products of those industries at less than cost. The opinion of the court says in summing up the case:

> It is presumed—but the presumption is a rebuttable one—that the rates which the state fixes for intrastate traffic are reasonable and just. When the question is as to the profitableness of the intrastate business as a whole under a general scheme of rates, the carrier must satisfactorily prove the fair value of the property employed in its intrastate business and show that it has been denied a fair return upon that value. With respect to particular rates, it is recognized that there is a wide field of legislative discretion, permitting variety and classification, and hence the mere details of what appears to be a reasonable scheme of rates, or a tariff or schedule affording substantial compensation, are not subject to judicial review. But this legislative power cannot be regarded as being without limit. The constitutional guaranty protects the carrier from arbitrary action and from the appropriation of its property to public purposes outside the undertaking assumed; and where it is established that a commodity, or a class of traffic, has been segregated and a rate imposed which would compel the carrier to transport it for less than the proper cost of transportation, or virtually at cost, and thus the carrier would be denied a reasonable reward for its service after taking into account the entire traffic to which the rate applies, it must be concluded that the state has exceeded its authority.

With reference to the North Dakota coal situation itself, which gave rise to the question of low rates in the first place, the court takes the view that, however important the industry, the state was not warranted in fixing an unduly low rate.

On this point, the opinion states:

> The state insists that the enactment of the statute may be justified as a "declaration of public policy." In substance, the argument is that the rate was imposed to aid in the development of a local industry and thus to confer a benefit upon the people of the state. The importance to the community of its deposits of lignite coal, the infancy of the industry, and the advantages to be gained by increasing the consumption of this coal and making the community less dependent upon fuel supplies imported into the state, are emphasized. But, while local interests serve as a motive for enforcing reasonable rates, it would be a very different matter to say that the state may compel the carrier to maintain a rate upon a particular commodity that is less than reasonable, or—as might equally well be asserted—to carry gratuitously, in order to build up a local enterprise. That would be to go outside the carrier's undertaking, and outside the field of reasonable supervision of the conduct of its business, and would be equivalent to an appropriation of the property to public uses upon terms to which the carrier had in no way agreed. It does not aid the argument to urge that the state may permit the carrier to make good its loss by charges for other transportation. If other rates are exorbitant, they may be reduced. Certainly, it could not be said that the carrier may be required to charge excessive rates to some in order that others might be served at a rate unreasonably low. That would be but arbitrary action. We cannot reach the conclusion that the rate in question is to be supported upon the ground of public policy if, upon the facts found, it should be deemed to be less than reasonable

One other point likely to be of considerable importance as a precedent in the fixing of coal rates elsewhere is made by the court in affording an analysis of the question what "cost" of transportation really is. The view is taken that such cost includes not only actual expense but also a fair share of general transportation expenses duly apportioned. The opinion says on that point that:

> We entertain no doubt that, in determining the cost of the transportation of a particular commodity, all the outlays which pertain to it must be considered. We find no basis for distinguishing in this respect between so called "out-of-pocket costs," or "actual" expenses, and other outlays which are none the less actually made because they are applicable to all traffic, instead of being exclusively incurred in the traffic in question.

Secretary Lane has submitted to the President the report of the Alaskan engineering commission on surveys of various routes for the new government road. The principal question to be determined is whether the line shall run to the east or to the west of Prince William Sound, and the decision depends largely on which part of the coal fields it will be thought best to develop first, as well as on the relative cost of constructing and maintaining the two routes. Negotiations are also understood to be in progress with the owners of the Copper River & Northwestern, and the Alaskan Northern railroads as to whether one of these lines shall be bought and used as a link in the new route.

HARRISBURG

When the Neville bill relating to the powers and duties of coroners was reached on the third reading calendar in the House, a motion was made to recommit it on the ground that a "snaky" amendment directed against coal miners had been inserted in the measure while it was in committee. This bill gave the coroner added powers in the investigation of deaths and the amendment to which objections were made, read as follows: "Provided also that such death did not occur in or by reason of an accident in any of the anthracite or bituminous mines of this Commonwealth." The amendment will now be dropped from the bill.

Senator Thompson, chairman of the Mines and Mining Committee of the Senate, stated that his committee will report out the Catlin bill (160) sometime during the week of Mar. 15. It will carry two amendments, one favorable to the operators and the other in the interest of the miners. The operators' amendment will reduce the time a man must work as a miner before becoming a foreman from five to two years. This will not be entirely satisfactory to the companies as they wanted no time at all specified.

The miners' amendment brings anthracite workers under the compensation act even more plainly than stated in the bill in its original shape. The modification in the wording is slight, but is thought to be highly important.

Representatives of the miners and operators have been battling for several days with the committee to get action favorable to their respective sides. Chairman Thompson has admitted that he is a nervous wreck, for he has been pushed harder, fought harder and besought harder than all the other senators combined on the Catlin bill.

The governor has suggested that all the revenue derived from the new tax on anthracite coal be turned over to the State Highway Department for road purposes. It will be two years at least until any of the revenue will be released, in case the act is finally declared constitutional, of which there is grave doubt.

The suggestion, however, reveals possibilities that cause anxiety in the anthracite region. The present act apportions a large part of the coal-tax revenue to the counties from which it is derived. The Legislature has the power to rearrange this apportionment and take all of the revenue, or most of it, from these localities, and the increasing demands for state projects might induce the Legislature to commit such an act.

The only excuse for singling out the anthracite coal as a revenue producer was the fact that the deposits are being exhausted and they cannot be replenished—that while the deposits last the producers or consumers should contribute more to the cost of permanent improvements. The argument applies more forcibly to the needs of the localities from which the coal was taken than to those of the state in general. If a special tax on anthracite is justified at all, the greater justification lies in giving the producing localities part, at least, of the revenue to guard against the time when it will vanish altogether.

In order to jeopardize local option, it is thought that orders will be issued to torpedo the governor's workmen's compensation bill and probably to strew a few floating mines in the channel of the governor's child labor bill. These provisions eliminate the common law defense in the workmen's compensation cases incorporated in the administration bill which Senator Crow requested Attorney-General Brown to change but which will stand as outlined when the bill is introduced in the Senate.

The refusal of the governor to free the employer from liability in cases where the accident is caused by the negligence of another employee or when the employee enters the employ of any corporation, knowing that the position in which he serves is dangerous, may mark the first disagreement between some senators on fundamental issues.

The common law defenses, as these provisions now effective are known, would be eliminated by the Governor's bill, and whether or not the employer agrees to abide by the provisions of the bill which are only elective he will be liable for compensation for that kind of accident. In another provision Senator Crow requested that compensation for permanent injury be decerased from 500 to 400 weeks. The governor will likely reduce the maximum payment from $10 to $8 a week and from $5000 to $4000. It has been found that out of 21,000 cases in one state only seven were totally disability.

Representative McClure introduced a bill in the house, to provide for the health and safety of persons employed in clay, ore and graphite mines and stone, slate, marble and granite quarries and that they shall be operated under the supervision of the State Department of Mines and shall be subject to such rules and methods of operation as may be recommended by the chief of the Department of Mines in accordance with such provisions of the coal-mine laws of the state as may be found applicable to the supervision of above quarries and mines.

The bill provides that inspections of the mines and quarries shall be made by certain district state coal-mine inspectors who shall be designated for the work by the Chief of the Department of Mines.

Representative Horton has introduced a bill in the house to amend section 6, of the Act of 1911 to read as follows: The superintendent shall provide a safety catch or other device to act on the rear end of the rear car of full trips that are being hoisted up slopes, and he shall also provide suitable signals to be placed on the rear end of the rear car of all trips hauled in the mines by locomotives of any kind.

Senator Kline has asked for an appropriation of $1,275,000 for the trustees of the University of Pittsburgh, $125,000 of this amount to be used for an addition to the School of Mines, which has been doing good work among the miners in the bituminous region.

PENNSYLVANIA

Anthracite

Nesquehoning—Owing to the decrease in business experienced during the winter, the Nesquehoning colliery, property of the Lehigh Coal & Navigation Co., has suspended operation until further notice.

Scranton—An announcement of General Manager C. E. Toby, of the Delaware, Lackawanna & Western R.R. Coal Department is to the effect that eight collieries of his company will remain idle until Apr. 1. Nearly 10,000 men and boys will be idle. The reason given, for the suspension, is the over-supply of coal and the poor demand, but it is hoped that things will pick up before the three weeks' suspension. The collieries closed are the Loomis, and Avondale in the Kingston district, Cayuga, Brisbin, Continental, Sloan, Dodge and Halstead in the Scranton district. Other collieries of the Lackawanna company are being operated only three days a week and indications are that the operation of these mines will also be further restricted.

Plymouth—Dodson No. 12 colliery, Plymouth Coal Co., is to be abandoned and allowed to flood. A force of men are at work removing pumps, machinery, etc. The Red Ash vein has already been flooded. For a time it was thought that the Kingston Coal Co. might purchase this and the Black Diamond Colliery at Luzerne, but negotiations fell through, the deal was called off and the old colliery, which in its time has sent millions of tons to market, employing about 500 men and boys, is evidently a thing of the past. The injunction secured by this borough against the operator, the late John C. Haddock, for damaging highways put a quietus to its further working as to take out any more coal would, it is alleged, do more and worse damage to the highways of the borough.

Wilkes-Barre—The coroner's inquest into the Oakwood shaft disaster at Prospect colliery of the Lehigh Valley Coal Co., Feb. 17, 1914, in which 13 men met death, resulted in finding the company negligent in permitting the use of naked lights where safety lamps were thought to be imperative. This was brought out by the testimony of mine foremen, explaining that the men would rather work with naked lights, as the roof at this place was 22 ft. high, and with safety lamps the men were unable to detect bad roof. They would sooner take a chance with the gas than with the roof, which was very faulty at this place. The jury recommended that hereafter safety lamps be used, and furthermore recommended the use of the new electric safety lamp recently approved by the Federal Bureau of Mines, for in their opinion men working in a vein 16 to 20 ft. high should have ample light.

Lattimer—Upon entering a smoke filled tunnel in the mine of the Pardee Coal Co. recently, after setting off a charge of dynamite, five men were overcome by the fumes. All were rescued, and all but one resuscitated.

Bituminous

Cecil—T. D. Gladden was awarded a verdict for damages of $750 against the Pittsburgh Coal Co. The litigation arose out of damage done to crops on his farm and to timber land by noxious gases and fumes that came from a burning gob pile of the defendant company. The pile is on land of the coal company adjoining the Gladden farm. The refuse that makes up the pile comes from the Jumbo mine of the coal company. In 1913 the gob got on fire and burned for many months. The coal company contended they were not responsible for the fire, and could not avoid the noxious gases.

Somerset—Coal operators and fishermen of the state are watching closely the case of the Commonwealth against Archbald Miller of the Loyalhanna Coal Co. Mr. Miller is charged with having turned mine drainage into Shade Creek to such an extent that the stream is no longer fit for fish. It was testified that the mine water had killed all the fish in the stream. The case has an important bearing on the authority of the state to protect streams from pollution when stocked from state hatcheries.

Pittsburgh—The movement of coke throughout the Pittsburgh district is slowly increasing, showing somewhat renewed activities in mills and plants using this fuel. This is regarded as the forerunner of increases in tonnage of other commodities. For the first 11 days of March the coke loading on roads in the Pittsburgh district increased between 6 and 7 per cent. as compared with the similar period the preceding month. A revival in coal traffic is not anticipated until the opening of navigation on the Lakes.

WEST VIRGINIA

Charleston—Suit was recently instituted in the Circuit Court of Raleigh County, by R. L. Milam, to recover from the New River Collieries Co. $93,000, principal and interest, alleged to be due on a contract between Milam and S. M. Miller, acting as the authorized agent and general manager of the New River Collieries Co. The contract which is said to have been made May 31, 1906, provided that Milam should turn over to the agent of the Collieries Co. options which he held on about 5000 acres of land in Raleigh County, adjoining the first coal operations of the New River Collieries Co. at Eccles.

Tunnelton—The Austen Coal & Coke Co. recently fired a part of its equipment of coke ovens, and it is believed that shortly 100 of them will be burning. This firm is said to have contracts enabling it to work practically its entire force of men, who were thrown out of employment by the destruction of the plant by fire about a year ago. About 300 men will be put to work in a short time, while others will be employed later.

Fairmont—A fire recently occurred in the tipple of the Consolidation Coal Co. at Montana, which for some time threatened to destroy the entire structure. A hose line was quickly gotten into operation, and a bucket brigade formed, and in about an hour the fire was under control. Two tipples occupying the same site as this one have been burned in former years.

Thomas—Hiram Haskell, boss driver at the Thomas No. 25 mine, was recently fined $50 and costs making $52.80 in all, after being prosecuted by District Mine Inspector, W. B. Plaster, for running a mine motor loaded with pipe for a pump line past a fire-boss' danger signal. The inspector while presenting the case to the justice remarked that he was glad to get his man while the result of his action would tend to secure the lives of men and not to avenge their loss.

KENTUCKY

Jenkins—The Consolidation Coal Co. in the Jenkins-McRoberts field reports continued improvement in the mining conditions with the announcement also that all the mines will resume full time Apr. 1. A large number of miners idle for several months are to be given work.

Henderson—H. F. Torry, of New York, is making a personal investigation of the Union coal basin, comprising 125,000 acres of coal and mineral rights in Union and Webster counties. Mr. Torry, an expert mining engineer, is said to be representing New York and English capitalists and is reported to be favorably impressed with the field.

Pineville—The spring meeting of the Kentucky State Mining Institute, which has heretofore been held in Lexington, will be held in Pineville this year on May 14 and 15. A state-wide first aid contest between teams from various mines is to be a feature of the meeting. This is to be the first meeting of the institute in the mining district and a larger degree of interest is looked for on that account. Miners in the eastern Kentucky field are already preparing to participate.

OHIO

Bridgeport—The Edge Hill Coal Co. and the Blyth Coal Co., of Salt Run, Ohio, have agreed to pay the 47-cent rate demanded by the miners, as a result of which demand the strike has been prolonged. The two companies employ several hundred men, and are preparing to reopen their mines for the immediate resumption of work. The miners are jubilant, declaring that the strike has been won and that other operators will fall in line.

INDIANA

Indianapolis—The bill introduced by Senator J. C. Kolsem, coal operator, Terre Haute, for the codification of the mining laws of Indiana, recently passed both houses of the Indiana legislature and was signed by the Governor.

The United Mine Workers of America will celebrate the 17th anniversary of the establishment of the eight-hour day by observing Apr. 1 as a holiday.

Vincennes—The new Oliphant-Wasson coal mine, near Bruceville, Ind., has begun operations.

ILLINOIS

Mount Vernon—It is stated that A. C. Snively, of Pittsburgh, recently closed a deal with George Thretkeld and W. H. Green, for the purchase of 10,000 acres of Jefferson County coal land.

Princeton—There was recently called in the Circuit Court a case in which the village of Dalzell sued for the condemnation of a piece of property owned by the Spring Valley Coal Co. This property is wanted for use as a street, and the village is pushing the matter of condemnation.

Pana—The Peabody mine broke the record recently when 4800 tons of coal were hoisted in 8 hours. This is an average of 600 tons per hour, or 10 tons per minute.

Freeburg—For the second time within a week, the leasehold of the Missouri & Illinois Coal Co., used in the operation of the St. Clair coal mine at Freeburg, was recently sold at public sale. The first sale was made by the sheriff to satisfy a judgment, and William J. Reichert was the purchaser. The same property was then sold again, a few days later, by the Master in Chancery, under a mechanic's lein held by the Southern Boiler Works, of Belleville, for $470.50. L. D. Turner was the second purchaser.

Carbondale—The Illinois Central R.R. makes announcement of a new branch line, extending east from Johnston City, Illinois, to Hanaford on the Eldorado Branch. This cuts through virgin coal fields, a large portion of which are owned by the United States Steel Corporation. Several new mines are contemplated in this district in the next year or so.

KANSAS

Ottawa—The coal mines at Ransomville are being dismantled, after having been in operation continuously since 1879. These mines were established by the late Capt. J. H. Ransom. Several years ago they competed with mines in southeastern Kansas. Recently the workings had reached so great a depth that profitable operation was impossible; 14,000 ft. of track will be removed.

ARKANSAS

Fort Smith—Judge Frank A. Youmans, of the United States Court, on Mar. 10, instructed A. S. Dowd, receiver for the Bache-Denman Coal Co., and nine of its subsidiaries, to dispose of the property at his discretion. It was agreed that the leases which the Bache-Denman Co., and others, held on three mines of the Sebastian County Coal & Mining Co. of Philadelphia, would be cancelled in consideration of the Sebastian company cancelling $20,000 debt against the corporation.

PERSONALS

T. J. Hoffman, who has been the central Ohio representative of the William J. Hamilton Co., has resigned to accept a position with the Elmer Miller Coal Co., of Toledo.

Carlton R. Mabley, for the past five years general manager of the R. I. V. Ball Bearing Co., has joined the selling organization of the S. K. F. Ball Bearing Co.

J. E. Hibbs was recently reëlected president of the Strange Creek Coal Co., which operates at Strange Creek, W. Va. F. L. Masten was elected secretary, and F. E. Truesdale, treasurer.

John M. Stauffer was recently elected president of the Stauffer-Quemahoning Coal Co. Walter S. Stauffer was elected vice-president, D. D. Martin, treasurer, and J. S. Braddock, secretary.

Edwin Husband, formerly superintendent of the Wadsworth Red Ash Coal Co., at Birmingham, Ala., has been appointed general superintendent of the National Coal Co.'s mines near Cumberland, Washington.

Stephen H. Green, formerly general manager of the Wadsworth Red Ash Coal Co. at Birmingham, Ala., has recently been elected president and general manager of the National Coal Co., Inc., with head offices at Seattle, Washington.

Thomas Sneddon has severed his connection as general superintendent of the Amalgamated Copper Co.'s coal mines at Diamondville, Wyo. Mr. Sneddon has been in charge of these mines ever since the amalgamated company acquired the property.

The body of William Hale, aged five, and his companion, Albert Tomlinson, aged ten, still living, were found on Mar. 13 in an abandoned mine near Banksville, Penn. The boys had been missing for a week, having wandered into the abandoned mine at play and become lost. The older boy was almost exhausted from exposure and hunger when the searching party arrived.

T. R. Johns, for a number of years general superintendent of the Edensburg Coal Co.'s operations at Colver, Penn., has sent in his resignation to take effect April 1. His successor has not yet been named. Mr. Johns is widely known among coal men of Pennsylvania. The mine at Colver is now producing in excess of 4000 tons daily, and under Mr. Johns' direction this plant has gained wide prominence.

J. H. Carlton, one of the best known mine foremen in the state, was fatally injured Mar. 11 by a fall of rock at the Palos mine of the Republic Iron & Steel Co. Mr. Carlton was about 40 years old and leaves a widow and four children. He was formerly mine foreman for the Tennessee Coal, Iron & R.R. Co. and had held similar positions with the Bessemer Coal, Iron & R.R. Co. at Belle Ellen, and the Sloss-Sheffield Steel & Iron Co. at Flat Top.

A. H. Woodward, vice-president and general manager of the Woodward Iron Co., it is rumored, is to become chairman of the board, and that R. H. Bannister, secretary, will become president, also retaining his duties as secretary. Mr. Woodward has grown up in the iron making business. He is at present head of the operations and has been actively in charge for some time. He is considered one of the best informed iron makers in the district. Mr. Bannister has been associated with the Woodward Iron Co. for a number of years.

OBITUARY

Alexander Hamilton, 72 years old, president of the Gartside Coal Co., of St. Louis, operating mines at Murphysboro, Illinois, also president of the Odd Fellows Building Co., died at his home, 2329 St. Louis Ave. on Mar. 9, after a short illness. Mr. Hamilton was born in Illinois and came to St. Louis at the age of five, and has been a resident of the city ever since. At the age of 15 or 16 years he entered the employ of the Gartside Coal Co., and for a period of over 50 years has been in active service in the coal trade, both operating and retail. Until a few days before his death he was at his office regularly. He is survived by two sons and two daughters.

John S. Atcheson, veteran coal and coke operator, recently died of apoplexy in Pittsburgh. About a year ago, Mr. Atcheson suffered a stroke of paralysis, and at the time of his death had just returned from a trip to the Isle of Pines. Mr. Atcheson was 51 years of age and was born in Allegheny. Since 1880 he had been engaged in the coal and coke business, and in company with J. W. Moore, H. C. Frick, Gilbert Rafferty, and Col. James M. Shoonmaker, he organized the Coal Association in 1884 and became its secretary. He was alone in his room, 614 Curry Building, at the time of his death. His body was discovered by A. M. Blattenberger, a business associate.

CONSTRUCTION NEWS

Harlan, Ky.—The Harlan Gas Coal Co., recently organized, is beginning the initial work on a coal development on the Wasiota & Black Mountain R.R. This will have, it is said, a daily capacity of 1000 tons to begin with.

Jeff, Ky.—It is announced here that the Lexington & Eastern R.R. Co. is making plans for the building of a 20-mile branch railroad line into the Cass' Fork section where an Eastern syndicate has just purchased a large area of coal lands for early development.

Cumberland, Wash.—The National Coal Co. has acquired a 25-year lease on two sections adjoining the present holdings and is opening three new mines and sinking a new slope. In addition it is building a new railroad tipple, bunkers and washery to handle 1000 tons daily.

Della, Va.—The coal operation here, which has been working every day for some time, will be closed down for about 90 days in order to remodel the tipple and lay additional tracks. Enough contracts have already been secured to keep the mine running every day for some time.

Clarksburg, W. Va.—The appearance of a large corps of Baltimore & Ohio R.R. engineers and their survey of a route on the Lowndes Hill and in the Romines Mills section have given rise to the belief that the company is preparing to build a line from Grafton to Weston. Immense coal deposits lie along this route.

Canonsburg, Penn.—Following the recent purchase by H. A. Davis, at Pittsburgh, of 200 acres of coal land, contractors are at work sinking two shafts preparatory to active operations on the property by May 1. The capacity of the new mine will be 800 to 1000 tons per day and about 200 men will be employed. The output of the mine will be used to supply the Standard Tin Plate Co., and the coal will be hauled directly to the Tin Plate company's plant in the mine cars and dumped into bins at the boiler house.

NEW INCORPORATIONS

Springfield, Ill.—The Gilmore & Solomon Coal Mining Co. has increased its capital stock from $5000 to $25,000.

Krypton, Ky.—The Krypton Coal Co. has been incorporated with $1000 capital by Clark Eversole, I. B. Richie and J. A. Collins.

Madisonville, Ky.—The Gordon Mining Company, with a mine in this (Hopkins) county, has filed an amendment to its charter, increasing its authorized capital from $1000 to $3000.

Pittsburgh, Penn.—J. Bert Ross, of Buffalo, with several friends, is incorporator of the Fairview Mining Co. of Pittsburgh; capital stock, $25,000. Mr. Ross was formerly owner of the Glenora mine in the Allegheny Valley.

Cincinnati, Ohio—The Luhrig Coal Co. has filed amended articles of incorporation reducing its capital stock from $700,000 to $52,500. The reduction indicates no change in the company's operations, it is announced, but is made for economical reasons.

INDUSTRIAL NEWS

Buffalo, N. Y.—There are now about 30 coal cargoes in Buffalo harbor, waiting for the opening of navigation. The Delaware, Lackawanna & Western dock, which has loaded most of the cargoes, has suspended operations for the present.

Buffalo, N. Y.—The Delaware, Lackawanna & Western Coal Co. has signed a lease for four offices on the ninth floor of the Prudential Building, Buffalo, and will remove there late in April. For some time the company has been located in the White Building.

Elkins, W. Va.—It it rumored that the Baltimore & Ohio Ry. will buy the Coal & Coke R.R. shortly. The Coal & Coke R.R. now runs into Belington, and should it be purchased, it would give the B. & O. a route from Elkins to Pittsburgh and Wheeling.

Geneva, Switzerland—It is stated that the largest coal depot upon the Rhine located at Strassburg was recently set on fire by a bomb dropped by a French aviator and is still burning. Four thousand tons of coal have been destroyed and 20,000 more are in danger.

Juneau, Alaska—The Juneau Land Office has rendered a decision canceling on fraud charges the applications for patents on 41 coal claims in the various coalfields comprising the McKenzie Anthracite Coal Co., the Carbon Mountain Anthracite Coal Co., and the Alaska Smokeless Anthracite Co. claims.

Washington, D. C.—A charge imposed by the Norfolk & Western and other railroads for dumping coal from piers into boats at Norfolk and Newport News in addition to the regular transportation freight was recently upheld by the Interstate Commerce Commission. Complaint made by the New England Coal & Coke Co. was dismissed.

Whitesburg, Ky.—An Eastern syndicate, composed of New York and Philadelphia capitalists, is said to be represented by a party of prospectors going along Carr's Fork and Troublesome Creek, in Knott County closing deals on a large boundary of timber and coal lands. Knott County has no railroad line but this development would mean a branch extension of the Lexington & Eastern.

Bristol, Tenn.-Va.—The Stonega Coal & Coke Co., one of the largest in the Virginia fields, has contracted for the entire power output of the Electric Transmission Co. of Lee County, with a power house in the Black Mountains. The Electric company's plant has a capacity for 3000 hp. but this will be increased to 12,000 hp., making it one of the largest steam power plants south of the Mason and Dixon line.

Marshfield, Ore.—Fred L. Wilson, a mining engineer and expert of Los Angeles Calif., who has been making an extensive study of coal deposits and possibilities of this section states that his anticipations are far exceeded by the results of the investigation. Coal mining is an industry that has never been extensive here, but Mr. Wilson prophesies that development will bring many eastern factories to this bay.

Scranton, Penn.—Shipments of anthracite during February were 4,275,107 tons as compared with 4,121,451 tons during the corresponding months of 1914, or an increase of 153,656 tons. The Lehigh Valley R.R. led in tonnage for the month with 887,267 tons; the Philadelphia & Reading was second with 692,743 tons, and Delaware, Lackawanna & Western, third, with 630,246 tons.

Philadelphia, Penn.—The proposed increase in freight charges on bituminous coal brought into this city has been forbidden by the Interstate Commerce Commission. The Commission ordered cancellation of increased railroad rates established on bituminous coal from Pennsylvania, Maryland and West Virginia mines to this city and Baltimore for transshipment to points inside the Delaware and Chesapeake Bay capes.

Philadelphia, Penn.—The Federal Grand Jury recently indicted the Pennsylvania R.R. for granting rebates to the Glen White Coal & Lumber Co. on the transportation of bituminous coal and coke from Kittanning Point, Penn., to points in New Jersey and New York. Two bills were returned. the first charging "the granting of concessions with respect to transportation of property in interstate commerce," and the second that the railroad willfully failed to strictly observe tariffs.

Harrisburg, Penn.—There were 600 men and boys killed in the anthracite mines during 1914, being a reduction of 24 as compared with 1913. Four hundred and thirteen men lost their lives in the bituminous regions, being a decrease of 198 as compared with the previous 12 months. The total production of coal was 237,221,835 tons. The anthracite output amounted to 91,367,305 tons, or a decrease of 259,659 tons as compared with 1913. The bituminous production was 145,884,530 tons, or a decrease of 24,081,829 tons as compared with 1913. The number of persons employed in and about the mines was 346,831.

Seattle, Wash.—Andrew Christianson, chief of the field division of the Interior Department for Alaska, whose headquarters were recently transferred from Seattle to Juneau announces regulations from Washington providing for the free use of coal upon public lands in Alaska, thereby permitting cannery, sawmill, and other operators all the coal they need free of charge with which to conduct their business. The new regulation, if taken advantage of, is not only expected to save considerable money for these concerns, but is also expected to provide employment for a number of people who are now in that territory.

Trenton, N. J.—The jury of the United States District Court on Mar. 11 rendered a verdict of guilty against the Central R.R. Co. of New Jersey, on charges of rebating. The indictment against the company charging 185 violations and the jury sustained the indictment. The rebating charge consisted of granting special rates to the Lehigh Coal & Navigation Co. for the shipment of coal from Nesquehoning in the anthracite fields of Pennsylvania to various points in Pennsylvania, New Jersey and New York. The minimum penalty for each count is a fine of $1000 and a maximum fine of $20,000. The court deferred sentence.

Coal Trade Reviews

General Review

Full effects of the usual pre-spring dullness are now felt and the hard coalers have made a drastic cut in working schedules. Bituminous consumers feeling out the contract market cautiously and competition keen. Favorable interpretation placed on developments to date. Shortage of steam sizes at interior points.

The large distributing centers are choked with anthracite coal and drastic curtailment policies have been instituted, one of the large hard-coalers having suspended operations at eight of its collieries for a period of three weeks. Although the dullness is perhaps somewhat accentuated, this general slowing down all along the line is characteristic of this period of the year, just preceding the heavy April cut in the circulars down to the summer level. As a result of the light working schedules, the consumption of the steam sizes is outstripping the production; many of the companies have been forced to draw heavily on their storage supplies, which are in some instances now almost depleted.

The bituminous agencies are completely absorbed in negotiations on new contracts. With consumers feeling out the market very carefully for concessions, and extremely cautious about closing, the sellers are generally more anxious than usual, though they express themselves as satisfied with the trend of conditions, considering the general depression in all lines. Operators are fighting aggressively for business, particularly where their old contracts are at issue, and in most instances they are willing to concede moderate reductions on old prices.

The prompt market is fairly well maintained, the producers holding coal more closely at the mines. The weakening in prices is less general than has been the case, and the market seems to be settling down into a situation more nearly on a par with that of a year ago. However, there is still a distinct feeling of depression throughout the trade, and all hopes for a rapid improvement have about disappeared.

The situation in the Pittsburgh district is more discouraging, buyers being firmly in control of prices. Retail buying in Ohio has practically ceased, and the demand is lighter all along the line, with the possible exception of the railroads which are taking a fair tonnage. The curtailed demand for the domestic grades has created a shortage in the steam sizes, which are now moderately active. Production is at the lowest point yet reached, and the outlook in the Lake trade is uncertain and far from satisfactory.

The Southern market is slowing down into one of the worst situations in the history of the trade. There is no activity whatever on domestic grades, a considerable tonnage of which is on demurrage, and mine operations are down to an average of one or two days a week, with a good many mines closed down entirely.

A rather strenuous demand for the steam sizes and a complete lethargy on the domestic grades are the salient characteristics of the Middle Western market. Even offers of April prices for March shipments are failing to stimulate any business, and with the exception of screenings, it is difficult to move coal at any price. This shortage of the steam grades is creating some interest in contracts among buyers. An increased number of mines are closing down which may have a beneficial effect later in the season.

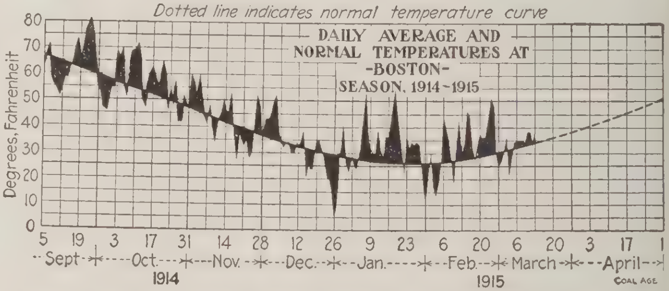
ATLANTIC SEABOARD

BOSTON

Market conditions ragged. Indications of Pocahontas and New River weakening. Inquiry very light. Georges Creek now competing for season business. Pennsylvania grades practically unchanged. Anthracite beginning to come forward for spring delivery.

Bituminous—Prices on Pocahontas and New River are still uneven, but perhaps less so than last reported. In other words, a weakening in prices, especially delivered prices, is less general than a week ago. The market is "settling down"; season figures have been made within a week that are about on a par with those of a year ago. Any firmness in water freights has now been discounted in practically all quarters and those shippers who entered contracts early in the season on the strength of "panic freights" will probably have to scale down their prices to something nearer the present level. For those shippers just entering the market the going is rather hard but the fact that transportation people realize that freights are almost certain to recede materially makes it less hard than was feared. If freights go back to 70@75c. the shippers without transportation of their own will not be at such a disadvantage.

The Georges Creek shippers are competing strongly for the contracts now coming into the market. In some cases business has been lost by these interests to those shipping from Hampton Roads but in other cases tonnage has been taken from the latter, so for the time being at least, the Georges Creek shippers are as strong a factor as usual in the New England market.



There are no new developments here in the position of the Pennsylvania grades. The outlook is not so favorable as when water freights were high from Hampton Roads but it is probable the shippers can hold the ground already gained unless there is a serious break in Pocahontas and New River. All-rail prices are fairly firm but the movement is not heavy. Stocks are ample and inquiry light. Anthracite barges are being withdrawn from the bituminous trade coastwise and that has a tendency to diminish receipts at this end.

Water Freights show further signs of weakening. If 75c. has not yet been named on large vessels, Hampton Roads to Boston, for spot leading, the feeling is that it will be very soon. Steamers are now on the way back from European voyages and it is understood that practically all of them will resume their regular runs as coastwise colliers, for the present at least. Less is heard of South American charters, although it may be only a temporary lull. Forty-five cents is once more the rate on barges from New York to Fall River and New Bedford.

Anthracite—Clear weather for some weeks allowed barges to move on schedule and the impending shipments on April prices are likely to be very large. The retailers have been able to get their stocks well worked down. Up the Maine rivers, stocks are very light and now that navigation has opened the dealers there are eager for early shipments. With some of the shippers, individuals in particular, cargoes have already begun to come forward on the reduced spring basis.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.90@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*.....	2.15@2.65	2.40@2.85	2.92@3.02	
New York*.......	2.45@2.95	2.70@3.15	3.22@3.32	
Baltimore*......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.70@2.80
Boston†.........	....	....	....	3.65@3.90
Providence†.....	....	....	....	3.55@3.73

* F.o.b. †On cars.

NEW YORK

Negotiations on new contracts taking definite form. Moderate concessions on old prices the rule but agencies regard the situation as satisfactory. Drastic curtailment in the anthracite production.

Bituminous—Competition of the most aggressive kind still marks the negotiations on new contracts, but conditions are now beginning to assume some definite form, and agencies express themselves as satisfied with the outlook, considering the prevailing adverse conditions in all lines. Consumers are feeling out the market carefully before closing, and in most cases are insistent upon a moderate concession on old prices; as a rule the seller is willing to meet this demand, in order to close with satisfactory customers. The conservative agencies are devoting little time toward getting any new business; they are fighting aggressively to retain their old business, but, as a rule, they do not show any disposition to create any abnormally competitive situation by trying to land their rivals' tonnage.

In the prompt market the trade is just holding its own. The old optimism as to the future still prevails, even among the most conservative observers, but it still fails to take any tangible form. The producers are reducing shipments by drastic cuts, a notable example being that of the Pittsburgh Coal Co., which is now outputting at the rate of only about 1,000,000 tons per month, as compared with 2,000,000 normally. This is having a decidedly favorable effect at the distributing centers, where consignment coal is being kept so low that some shippers are even moderately embarrassed for sufficient supply at times. The bunker business continues fair, and in fact is running somewhat ahead of normal. Prices continue on the following basis: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—Evidence of the extreme apathy in the anthracite trade is seen in the heavily curtailed working schedules which have gone into effect at the anthracite collieries. The storage facilities of the Delaware & Hudson Co. have been so heavily overloaded that eight collieries have been closed down for a period of three weeks. The Lehigh Valley has worked only two days a week during each of the past two weeks. The Reading did somewhat better last week, having operated three days.

A result of these heavy curtailment policies has been to reduce the output of steam sizes to considerably under requirements. Most of the companies have therefore been drawing on their storage supplies heavily, and in many instances these have been practically all picked up. With the possible exception of buckwheat No. 2, and broken coal, there are excessive supplies in every direction.

The market is not quotably changed, and we continue it on the same basis as last week as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	4.85@5.35	5.30	4.80@5.30
Chestnut	5.60	5.10@5.60	5.55	5.05@5.55
Pea	3.55	3.40@3.55	3.50	3.30@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.90@2.25
Barley	1.80	1.70@1.80	1.75	1.30@1.75

BUFFALO

Bituminous improving very slowly. As a rule all contracts are taken at lower figures than last year. No prospect of early improvement. Anthracite season practically closed. Orders for April are light.

Bituminous—Some of the members of the trade report the demand improving moderately, but even they concede that they have, in some instances, been obliged to accept contract prices 5c. or so below last year. It is difficult to see how the mines are going to run on such prices, but it appears that they are preparing to, for no contract would in these days be taken without a mine somewhere to stand behind it. There is a feeling of the utmost depression in the entire trade, except in the case of a few jobbers who are able to proceed on a profit of 5 to 10c. a ton; they are usually situated so that their running expenses can be reduced to very low terms.

A month or two ago there was expectation of a stir in general business at some time not far distant, but that has about disappeared now. But on the other hand there is no money stress and none is looked for; business is merely very dull and quite likely to remain so for some time. The activity expected from the European war has not appeared.

Prices continue at the bottom, $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower than Pittsburgh.

Anthracite—The demand is light as is usual during March, but shippers now report that even the April orders are light. As a rule the jobbers have more coal on hand than they reckoned on. The anthracite mines are running only about half time and stocking and loading into Lake vessels have been resorted to rather more than usual to take care of the surplus. If the Western trade should demand an early supply it would be easy to furnish it. The prospect is not encouraging.

PHILADELPHIA

Anthracite continues inactive. Movement at prevailing circular small. Bituminous on about parity with last week, the market indicating little change either in demand or prices.

Anthracite—Shaping conditions for the opening of the new coal year are now absorbing the attention of the anthracite operators. Contrary to expectation, it is not believed that there will be any change in the circular of prices compared with last year. The differential of 25c. per ton at Tidewater and 15c. on the line between stove and chestnut will still obtain. The individuals, of course, if the market warrants it, will exact as much as they can above the so-called circular, and vice versa, will concede enough from their prices to move their output, when necessary; they use the basis of the printed circulars, but suit themselves about maintaining it.

There is no difficulty whatever at the present time in securing all the coal required, at the opening or spring prices. Quite a tonnage is being moved by individuals, and it is alleged that one or more of the large companies are announcing prompt shipments on orders at the April figures. This condition however, is no different from normal years, excepting that possibly the market broke a little earlier, owing to the open weather which has prevailed most of the winter season.

Production continues on about a 50 per cent. basis, and it is understood some of the larger companies are disposing of part of their output by forwarding it to the Lakes for transshipment. Vessels have been chartered to load this coal, holding it until navigation opens. In this way, it is possible to operate a greater length of time than the local and tidewater demand would warrant.

Broken and buckwheat still continue short.

Bituminous—There is little to be said regarding bituminous. The market shows no disposition to improve, either in demand or prices, and the efforts of salesmen are concentrated on renewing old contracts.

BALTIMORE

Winter's close is marked by extreme dullness. No longer any doubt as to cutting on contracts.

A period of great dullness marks the closing days of winter. The demand for coal in the mining districts is at a minimum and prices are very poor on what spot business develops. Through western Maryland and in West Virginia there are offerings of low grade steam coals down as low as 80c., and much of this is at less than actual production cost. Even the high grade fuels are offering at from $1.15 to $1.25. The situation in Pennsylvania is about the same on the best coals, although the lower grades as a rule hold ten cents higher than the same grades from neighboring states.

In some cases there has been a cut of five and ten cents on new contracts, even on good fuels. Producers are showing more than usual anxiety to get under cover but there are some who say that there will be regrets later when business is more brisk. It must be admitted, however, that the early summer will be dull from an industrial viewpoint.

The foreign business is the only thing to hold up well at this port. Six more export charters were announced closed the past week for loading here.

HAMPTON ROADS

Dumpings continue fair. Number of small cargoes move to South American and West Indian ports. Supply at the piers still above normal.

Dumpings over the tidewater piers for the week may be called about fair. There have been some large shipments coastwise to New England and some few small ones south but the movement has not been as heavy as under normal conditions. Export cargoes have been made to a number of different ports in South America and West Indies and although the number of vessels has been fair the cargoes, with one or two exceptions, have been very small and the total coal exported was not large. The number of bunker steamers has not been as heavy as anticipated although this business has held up remarkably well when the war conditions are taken into consideration.

The supply of coal at all piers is still somewhat in excess of normal. It is expected that a considerable part of this will be shipped during the coming week as a number of coastwise vessels are due for cargoes and the government will probably take some coal. Practically no high volatile coal was moved during the week, although there have been some small shipments of nut and slack New River and Pocahontas in addition to the mine-run.

There appears to be no change in prices at tidewater on the grades of coal shipped through here, although it is understood that April contract prices are now being quoted on March business.

The following cargoes cleared from Hampton Roads ports, between Mar. 5 and Mar. 12, inclusive:

Norfolk			Newport News		
Vessel	Tons	Destination	Vessel	Tons	Destination
Talisman	2400	Port au Spain	**Sif**	4637	Fort de France
Josey	3378	Havana	**Hamborn**	1550	Georgetown
Tabor	5400	Canal Zone	**Josef Frerick**	2940	Cienfuegos
Magnus Manson	2399	Pernambuco	**Nora**	5169	Montevideo
Frankrig	2181	Barbados	**Parana**	5800	Brazilian ports
A. M. Davenport	1718	Para			
Falk	1169	Manzanillo			
Denis	2050	Para			
Tottenham	4579	Curacao			
Barque Ortrud	2186	Genoa			

Note—Steamers are indicated by **bold face type**, all other being schooners.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Ubbergen	Dutch	Baltimore	Tela and Truxillo	1150	
Camilla	Norwegian	Baltimore	Bocas del Toro	1530	
Ruth B. Cobb		Baltimore	Kingston	530	$3.10
Lydia M. Deering		Philadelphia	Porto Rico	1063	
William H. Clifford		Philadelphia	Porto Rico	1378	2.60
Bilbster	British	Baltimore	Savona	2790	
Rebecca Palmer		Norfolk	Rio Janeiro	2125	6.50
Dorothy Palmer		Norfolk	Rio Janeiro	2315	
Andreta (ship)	Italian	Philadelphia	Italy	1619	
Doris (bark)	Italian	Philadelphia	Italy	1296	
Chas. Noble Simmons		Baltimore	Kingston	716	
Elizabeth T. Doyle		Norfolk	Para	660	5.50
Orleans		Norfolk	Brazil	605	
Edw. J. Lawrence		Philadelphia	Guantanamo	2483	2.50
Antinoe	British	Baltimore	Marseilles	1477	10.32
Henry S. Little		Atlantic range	Guantanamo	984	2.75
F. & T. Lupton		Atlantic range	Guantanamo	797	

Note—Steamers are indicated by **bold face type**, all others being schooners.

OCEAN FREIGHTS

Some new record high rates quoted. Heavy tonnage moving to Italy. Steamers scarce and owners showing little interest in coal charters.

The market has again advanced. A British steamer of 6500 tons coal capacity, has been chartered for three trips from Virginia to the West Coast of Italy, at or about $10.54, steamer to load the first cargo in April; $13.44 is bid on grain to the West Coast of Italy for March loading and $12.72 for April loading, and owners are not inclined to take coal at much less than these figures, as the cost and dispatch for loading and discharging grain are about the same as coal and the charters are cleaner

A large amount of coal is being moved to Italian and other Mediterranean ports, but shippers have been obliged to charter steamers on time charter to transport same, either for round voyages or for periods.

Rates from the Plate are easier and consequently outward rates firmer. Very few steamers are available for Cuban and West Indian trades as the bulk of these boats have been absorbed for other business.

Coal freights by steamers are about as follows:

To	Rate	To	Rate
Havana	$2.50@2.75	Guantanamo	$3.00@3.25
Cardenas or Sagua	3.25@3.50	Demerara	5.50@6.00
Cienfuegos	**3.00**	Bermuda	3.00@3.75
Port au Spain, Trinidad	**3.50**	Vera Cruz	**3.50**
St. Lucia	**3.50**	Tampico	**3.50**
St. Thomas	**3.25**	Rio	**10.80**
Barbados	**3.50**	Montevideo, Buenos Aires or La Plata	**10.20**
Kingston	3.00@3.25	Mediterranean	**12.48**
Curacao	**3.25**	Valparaiso	8.40@9.60
Santiago	3.00@3.25		

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OHIO VALLEY

PITTSBURGH

Supplies far in excess of demand and prompt market softer than ever, affecting the annual contracting movement, which is proceeding very slowly and at prices 10@15c. below those of a year ago.

The situation as to the volume of free coal offered and prices is the worst for many weeks. Perhaps on account of the sharp decrease in domestic demand, or perhaps on account of operators having expected altogether too much in the way of general demand, the relation between supply and demand is more out of balance than for a long time. Production is at the rate of 60% of capacity, perhaps a trifle more, while the demand is 10 or 20% under this and the natural result is price demoralization.

As a temporary condition, to be righted by the action of natural trade laws, the situation need not be considered so extremely regrettable, but it chances that this is the annual contracting period, and the influence of the spot market upon contracting has been disastrous. Sellers as well as buyers realize that this is strictly a buyers' market. The result is that what contracting is done, is on a basis 10 to 15c. lower than a year ago and some buyers are so affected that they do not take advantage of the fact that it is a buyers' market, and refrain from participating at all. Their policy apparently is to buy in the prompt market for a time, expecting to take to cover under contracts should appearances of returning strength develop. On contracts for the twelvemonth to Apr. 1, 1916, the usual asking prices are 80@90c. for slack and $1.10 @1.15 on mine-run, but some desirable contracts have been closed at less than these figures.

While the situation is on the whole unsatisfactory from all viewpoints, one large interest reports that since Jan. 1 it has booked a slightly larger volume of contract business than in the same period a year ago. Prompt prices are scarcely quotable. Slack, of course, is higher for prompt than on contract, as contracts would run through the Lake shipping season, when slack is particularly plentiful. Free mine-run is readily offered at $1.05 and $1.10, but has sold at considerably less, and probably in a number of instances at under a dollar. We quote the following as about the higher prices obtainable for free coal, under favorable conditions: Slack, 90c@$1; nut and slack, 95c.@$1.05; nut, $1.05@1.10; mine-run, $1.05@1.10; ¾-in., $1.15@1.20; 1¼-in., $1.25@1.30, per net ton at mine, Pittsburgh district.

No prices for Lake coal for the season have been named, but some of the operators may make a start at naming quotations within a week or ten days. It is the universal opinion that shipments will be light in the fore part of the season, but there are many who expect a fairly large movement late in the season, based upon stocking up against a mining suspension a year hence when both the anthracite and bituminous scales expire. One prediction is made that Lake shipments will be 25,000,000 tons, against 23,000,000 tons a year ago, but such an estimate would not be sanctioned in all quarters.

TOLEDO

Betterment in the rural demand for anthracite and Pocahontas coal. Slack is strengthening. Navigation to open early.

A slight strengthening in slack market is the only change noticeable in the Toledo coal market. Prices are down to bed-rock with little prospect of improvement until conditions change. There has been some activity during the past week or ten days in the Pocahontas and anthracite demand from the rural districts. Prospects are good for an early opening of navigation. Railroads are buying but little coal. Considerable interest is being expressed in the coal rate problem which is now before the Ohio legislators.

COLUMBUS

Trade still quiet in the extreme. Both the domestic and steam trade are slow. Uncertainty surrounds the Lake trade. Prices are rather low all along the line.

Domestic demand is weaker than a week ago, which coupled with a slack demand for steam sizes caused a quiet market all around. There is little hope for immediate improvement and future prospects are not encouraging. Dealers are reducing their stocks and not buying any more than is necessary to tide them through. Retail business is necessarily slow because of the warm weather. Reports from traveling salesmen show that retail stocks are rather low. Pocahontas and West Virginia splints appear to be in the best demand from the retail trade.

Steam business is still slow and there are no signs of improvement. Railroads are taking a fair amount of fuel but manufacturing establishments are not buying to any extent. Contracts are not being renewed as most of the factories are purchasing in the open market. What few contracts have been closed have been at a sacrifice of profits generally. Production is at the lowest point in weeks. It is estimated that the Hocking Valley only produced about 20% of normal and the same figures are given for Crooksville, Cambridge and Jackson fields. In the Pomeroy Bend field the output is estimated at 35% or lower.

The Lake trade is a thing of considerable uncertainty. Docks of the Upper Lake ports apparently have a good surplus and it is believed the season will be late in opening. Chartering of boats is not active and only a small amount of coal has been loaded.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.60
Coarse slack	0.55	0.60	0.50

CLEVELAND

Coarse coals have been cleaned up for the first time in several weeks and the market is generally stronger. The retail trade is doing a fair spring business, filling out domestic stocks for spring use.

Operators who have been sending a large tonnage of three-quarter coal into the Cleveland market on consignment have very much curtailed their shipments the last week and the local market is without coarse coal except that brought in on contract. One of the worst offenders has announced that henceforth its mines will be closed two to three days a week until there is a real demand for three-quarter coal. The smaller shipments of the last two weeks and the fact that all spot stocks have been cleaned up, sent the price of West Virginia No. 8 three-quarter to $1.85 to $1.90 on track for immediate delivery. The undertone of the coarse coal market is weak, but it will continue strong enough to bring these prices if consignment coal is kept off the market.

Fine coal also is in better shape. There is very little free coal coming into this market and brokers are able to get a fair price. Middle district slack has been selling for $1.70 to $1.75 and Fairmount at $1.80 on the spot market.

Only 230 cars of coal came in over Sunday and the trade was in position to take this without difficulty. This seems to be about the absorbing power of the trade at the present time. Although the market is very narrow shipments of the last week have been light enough to keep prices on a profitable basis, at which they will continue unless something breaks loose as has so often happened the last few months.

The weather has been against the retail trade, but not warm enough to do without furnace fires. Domestic consumers are running low and orders for half-ton to two-ton deliveries are rather plentiful; but it takes a good many to make a day's business, and there are not enough such orders to help the wholesale market for domestic coals.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.05	......	......	......	......
Lump, 6 in.	......	......	$2.30	......	......
Lump, 1¼ in.	......	$2.35	2.10	......	......
Lump, ¾ in.	......	2.20	2.00	$1.90	$1.90@2.00
Egg	3.15@3.20	......	......	......	......
Egg, 6 in.	......	......	1.95	......	......
Mine run	2.45@2.50	2.10	1.90	1.80	1.75@1.90
Slack	......	1.90	1.80	1.90	......

CINCINNATI

Business on a summer basis, though there is a better demand for steam grades. Domestic coal is not moving at all.

With the cessation in the demand for the prepared grades a stimulation of the steam market has resulted, forming the only factor of an encouraging nature in the trade. This is due to the small production of screenings, and the resulting scarcity of that grade. Mine-run has also participated in the rise, although it is not at a premium. A slight improvement in the demand, caused by a better feeling in manufacturing and industrial circles, has accentuated this phase of the situation.

BIRMINGHAM

Steam coal practically the same, with no evidence of immediate improvement. Lump coal very quiet.

Steam coal has about held its own, though no great improvement has been noted; prices remain the same and inquiries are few and far apart. Shipments this month are about the same as last month. Lump coal shows no life whatever, and many mines have coal on demurrage which they are selling at far less than the regular price. No improvement is now anticipated in this branch, until later on in the summer and early fall, unless conditions change unexpectedly. Blacksmith coal, while falling off slightly in tonnage, continues at the same price, and producers have little cause for complaint.

LOUISVILLE

Situation developing into the worst in years. Operations heavily curtailed with many mines closed entirely.

Operators and dealers in touch with the Kentucky coal market use such words as "desperate" and phrases such as "worst since '93" to describe the state of affairs. Operations at the rate of one and two days a week are the rule, with a few exceptions, while there are many mines, in both the Eastern and Western fields, which have closed down altogether.

Domestic sizes are very heavy, due to the balmy weather, large overstocks in retailers' hands and an enormous amount of coal on the river. Steam coals are somewhat firmer. Prices asked for block coals range from $1.25 to $1.50, while nut and slack is offered at from 60 to 75c. These are for the best grades of coal f.o.b. mines.

COKE

CONNELLSVILLE

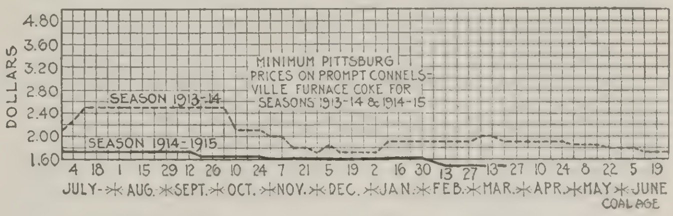
Market stagnant and prices largely nominal. Consumption increased of late, but no increase in production and shipments in the week.

There are no new features in the situation. Consumption of coke in general has increased further, but merely by the blowing in of blast furnaces by steel interests and thus not increasing the demand for merchant coke. Prices quoted are necessarily largely nominal, but there is practically no doubt that coke of standard brand could be bought at the figures named: Prompt furnace, $1.50; contract furnace to July 1, $1.60; contract furnace to Jan. 1, $1.75; prompt foundry, $2@2.20; contract foundry, $2.15@2.30, per net ton at oven.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 6 at 274,652 tons, a decrease of 283 tons, and shipments at 274,104 tons, a decrease of 4357 tons.

Buffalo—There is no stir in the trade. Iron furnaces are running at a moderate rate, with not much prospect of an early increase of output. There is more building in iron and steel than formerly and with a fair activity in that line alone the furnaces will soon need to run stronger. All prediction as to what will be needed in Europe has been dropped. Prices are still very low, on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—Furnace and foundry coke remain unchanged with slow demand. Domestic coke is being quoted freely at April prices. Prices are as follows: Byproduct, $4.45@4.75; Connellsville, $4.65@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4@4.10; furnace, $4.40@4.65.



THE STEEL INDUSTRY

Situation quiet but generally encouraging. Buying far ahead on war orders.

While March thus far has put new business on the books of most steel companies at a somewhat less rate than that of February, the scale of mill operations has been encouraging. For the whole industry it is around 60% and for a part of last week the Steel Corporation's steel ingot output was above 69%.

On certain products it is evident that the buying since the first of the year was in compensation for the remarkable stagnation in the closing months of 1914, but elsewhere there are indications of activity of a broader and more hopeful character. This is noticeable in construction lines and in the unusual business on hand at shipyards.

Trade due to the war is increasing and some of the European governments, in their negotiations here, appear to be looking months ahead. France must get much of her steel from the United States. There may be some exaggeration of the extent to which iron and steel and metal-working operations are based upon war demand; but in machine tools, particularly lathes and all turning machines, the purchases for Europe have turned depression into prosperity for many concerns. Six months' orders in these lines have run into many millions of dollars.

The signs of new buying in view of the approach of the open season are not numerous, but structural work is growing and the implement works are making larger demands upon bar mills.—"The Iron Age."

MIDDLE WESTERN

CHICAGO

Demand for domestic coal stagnant. Screenings high priced with output limited. Smokeless and splint coals weak.

There is but little stir in the markets at present, and conditions are fully as depressed as they have been for a number of weeks past. With the exception of screenings, it is difficult to move coal at any price, and in numerous cases the trade is quoting April figures for March shipment. This is particularly true of smokeless, splint and independent anthracite shippers and even these quotations have not stimulated business. There is some lessening of coal on tracks.

Screenings from all districts still continue their upward trend. Very little fine coal is left at the mines, and the general reduction in output causes a corresponding decline in the production of screenings. As a result, the supply is hardly equal to the demand, and predictions are made that still higher prices will prevail, because there is no prospect of any betterment in the demand for the coarser sizes in the immediate future. Steam users have been little inclined to renew contracts, but now that screenings are stronger, they may evince more of a disposition to commit themselves.

An increased number of Indiana and Illinois mines have been closed down for the summer months, and this action should have a stimulating effect later. The dealers still continue to carry minimum stocks, and the retail demand is quite light.

Smokeless coals are quite dull, and little business is being placed with contracts hardly being considered. It is felt that Lake business will not be inaugurated until some time in July.

In splints there has been some recovery, the demurrage coal having been absorbed.

Eastern Kentucky fuels are in a bad way, and a considerable tonnage has been sold at sacrifice prices.

The coarser sizes from Franklin and Williamson County are steady, in view of general market conditions, although shipments are light; screenings from these districts have advanced very rapidly, having sold as high as $1.05 per ton.

The situation in the Springfield district is dull except in screenings, which show a marked bullish tendency.

The curtailment in production of the Indiana mines is notable. Screenings from this section have not advanced so rapidly as from other districts, but are held at fairly good figures.

Prevailing prices are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.50	$1.30@1.40	....	$1.30@1.40	$1.40@1.75
4-in. lump..	....	....	$1.40@1.75	....	....
Steam lump	....	....	1.25@1.35	1.20@1.35	....
2½-in. lump.	....	....	1.35@1.50	....	....
1¼-in. lump.	....	....	1.20@1.35	1.20@1.35	....
Mine-run...	1.05@1.20	1.00@1.05	1.00@1.10	0.95@1.10	....
Egg........	1.25@1.40	1.30@1.40	1.20@1.30	1.15@1.30	....
No.1washed	1.20@1.50	....	....	....	1.50@1.65
No.2washed	1.20@1.40	....	....	....	1.40@1.50
6x3-in. egg.	....	....	....	....	1.50@1.65
Nut........	....	1.15@1.25	1.10@1.25	1.10@1.20	....
No. 1 nut..	1.35@1.50	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	0.85@1.00	0.80@0.95	0.80@0.95	0.85@0.95	0.90@1.00

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.30@1.40	$1.10@1.40	$1.50@1.75	$1.50@1.75	....
1¼-in. lump.	....	....	....	....	$1.15@1.40
Mine-run...	1.05@1.15	1.15@1.25	1.00@1.40	1.00@1.10	0.90@1.15
Egg........	....	1.00@1.10	1.50@1.75	1.50@1.75	....
No. 1 nut..	1.30@1.40	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	0.85@0.95	....	....	....	....

Knox and Greene County 5-in. lump, $1.35@1.50; 3-in. lump, $1.20@1.30; 5-in. egg, $1.20@1.30; 3-in. egg, $1.15@1.25; mine-run, $1@1.10; screenings, 80@95c.

ST. LOUIS

Longest mid-winter season of low prices in the history of the trade. Shortage of steam sizes. Mine operations heavily restricted. Manufacturing demand slowing up.

The past week has been another of unparalleled depression, making one of the longest low-priced periods for the mid-winter season in the history of the local coal trade. The only demand at the present time is for steam coal, which is strong for the smaller sizes from all fields; this is due to the fact that the tonnage of coal produced has fallen off remarkably in the last few weeks because of the light demand for the larger sizes. Thus, in spite of an unusually small demand for steam coal the price for screenings is at the top notch. With very little indication of any colder weather coming from now on, a strong steam market can be anticipated for the coming few months.

In the southern Illinois field, mines are working two days a week, with a maximum of three, and in some instances several mines have suspended operations altogether.

In the washed sizes, Nos. 3, 4 and 5 are in good demand, while Nos. 1 and 2 are heavy. Lump and egg from the high grade fields are going at the buyer's figure, and in Standard field there is no difference in the price of 2-in. lump and mine-run. The country demand for all grades of coal is remarkably light, and there has been a general falling off in manufacturing lines for the past few weeks that has been quite noticeable.

There is no anthracite moving in at all to speak of, and an unusual tonnage of West Virginia smokeless is under demurrage at East St. Louis, rejected on account of weather conditions.

INDIANAPOLIS

Screenings decidedly stiffer because of the curtailed supply. Otherwise the market is heavy and operations severely restricted.

March weather continues spring-like and the coal industry lags. The only feature of interest is the stiffer prices on screenings, 90c. being obtainable for good grades. Yards are buying domestic grades as they need the coal and will follow that policy until the end of the season, as they carry no Indiana coal during the spring and summer months. There continues to be a slight improvement in industrial conditions, which makes a better movement of steam grades, though this is so small that it takes the accumulation of several weeks to show there is material advance. Mines are making half-time or a little better. Consumers will expect the usual price reductions Apr. 1, but it is doubtful if there will be any at the mines.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during February and the past four months in short tons:

	November	December	January	February
Pocahontas Field........	837,577	798,182	912,682	835,826
Tug River District......	253,975	227,944	298,766	243,910
Thacker District........	235,080	227,938	257,580	195,557
Kenova District.........	90,772	90,030	98,422	67,667
Clinch Valley District....	237,831	135,362	169,581	129,193
Other N. & W. Territory	3,849	1,686	3,769	1,785
Total N. & W. Fields..	1,659,084	1,481,142	1,740,800	1,473,938
Williamson & Pond Creek R.R..................	62,505	62,271	58,296	58,101
All other railroads......	131,269	97,752	87,842	88,982
Grand total...........	1,852,858	1,641,165	1,886,938	1,621,021

FOREIGN MARKETS

GREAT BRITAIN

Exports restricted because of the acute shortage in the local markets. Efforts to keep prices down.

London, Mar. 5—The coal industry remains in the abnormal condition which the effects of the war have brought about. Despite the restricted exports, the demand on every hand is now exceeding the supply, and prices of nearly all qualities are at a very high level, while some are still advancing. Considerable interest has been aroused by the remarks of Sir Arthur Markham in the House of Commons concerning the increase in the cost of production, and the subsequent undertaking of the Yorkshire collieries with which he is connected to charge no more than $3.60 per ton at the pit. Meanwhile the report of the Retail Coal Inquiry, which has just commenced its proceedings, is expected to be issued with as little delay as possible, and is awaited with interest.—"The Iron & Coal Trade Review."

Mar. 4—The situation grows worse. Holders of free coal (and there is very little available) can practically make their own price. For April shipment no business is being done, buyers holding for cheaper prices, and sellers anticipating a further rise. Quotations are approximately as follows:

Best Welsh steam.... ..	$7.20	Best Monmouthshires.......	$6.00
Best seconds...........	6.72	Seconds..................	5.76
Seconds................	6.24	Best Cardiff smalls..........	4.80
Best dry coals..........	5.25	Cargo smalls..............	4.32

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport both net, exclusive of wharfage.

Freights—Tonnage is in great demand, and is very scarce, owing mainly to Admiralty requirements. Rates are approximately as follows:

Gibraltar.........	$5.28	Naples..........	$8.16	Las Palmas......	$5.04
Malta............	....	Venice, Ancona...	10.20	St. Vincent.......	5.28
Marseilles........	6.19	Alexandria.......	8.16	Rio Janeiro......	7.80
Algiers...........	7.20	Port Said........	7.20	Monte Video.....	6.96
Genoa............	7.92			River Plate......	7.20

Note—These quotations are based on an exchange rate of one shilling equals 24 cents.

Coal Contracts Pending

As the result of an investigation into numerous complaints regarding a number of contract items emanating from a certain apparently authoritative source, it has been found that many of these were grossly misleading and others only partially correct. This particular source of information has been eliminated and a more rigid censorship established throughout the department to avoid a recurrence of such an incident.

We wish to take this occasion to extend thanks for the many kindly criticisms which led up to this disclosure, and also to remind our readers that in a number of specific cases, the information printed in these columns was entirely correct even though an energetic denial was made by the prospective purchaser. All coal salesmen are familiar with certain types of negotiations, conducted through underground channels and shrouded in an impenetrable mystery which will not stand the light of publicity. It is to be expected that the announcement of such transactions will be regarded with a certain disfavor, if not open resentment. We do not believe this to be in accord with the accepted business principles of today—a conclusion in which we have been sustained by the more thoughtful and conservative members of the coal industry.

We propose to build this department into one of the most authentic and valuable features of our paper. Your kindly coöperation is invited.

No. 189—Bristol, Conn.—The Bristol & Plainsville Ry. Co. states that it is not in the market for any coal at the present time (p. 399). Address Agt. E. Cockings, Bristol & Plainsville Ry. Co., Bristol, Conn.

No. 226—Portland, Ore.—Bids on this contract (p. 446) involving 2000 tons of steam coal will be received until Mar. 31 and awards made Apr. 15 or May 6. Address Chief Clerk, Board of Education, 401 Court House, Portland, Ore.

No. 242—Rutland, Vt.—This contract (p. 447) provides for an annual tonnage of 150,000 to 200,000 gross tons of bituminous coal, delivery of approximately one-half to be made at Norwood, N. Y., and the balance at Rotterdam Junction, N. Y. For shipment beyond, the Rutland R.R. Co. is to have the privilege of accepting its requirements for delivery at either point without accepting the proposition as a whole. The car supply for at least the tonnage to be shipped to Rotterdam Junction to be furnished by the Rutland R.R. Co. Should the bidder not wish to quote for delivery at Rotterdam Junction and Norwood, the proposition will be accepted for delivery f.o.b. mine; but should the proposition be made on this basis, the bidder should give the freight rate from the mine to Norwood and Rotterdam. Address Pur. Agt. James E. Kilborn, Rutland R.R. Co., Rutland, Vt.

No. 258—Albany, N. Y.—Sealed proposals will be received until noon, Mar. 24, for supplying various state institutions with coal for one year beginning Apr. 1, 1915 (p. 447). Address Agt. and Warden Thomas Mott Osborne, Sing Sing Prison, Ossining, N. Y.; Agt. and Warden Charles F. Rattigan, Auburn Prison, Auburn, N. Y.; Agt. and Warden William J. Homer, Great Meadow Prison, Comstock, N. Y.; Agt. and Warden John B. Trombly, Clinton Prison, Dannemora, N. Y.; Medical Supt. R. F. C. Kieb, Matteawan State Hospital, Beacon, N. Y.; Medical Supt. Charles H. North, Dannemora State Hospital, Dannemora, N. Y.

No. 268—Buffalo, N. Y.—Bids on this contract (p. 448) were not opened until Mar. 19 instead of Mar. 15 as previously announced. Address Clerk of the Board, Board of Police Commissioners, Headquarters Bldg., Franklin and Seneca St., Buffalo, N. Y.

No. 295—Danville, Penn.—Bids will be received until Mar. 20 for furnishing the State Hospital for the Insane with 10,000 tons of No. 1 buckwheat, 500 tons of egg, and 100 tons of chestnut (p. 487). Deliveries are to be made as ordered at the hospital coal dump, between Apr. 1, 1915 and Mar. 31, 1916, and the coal must be free from slate and dirt, freshly mined and of the best quality. Address Steward H. B. Schultz, State Hospital for the Insane, Danville, Penn.

No. 296—Leavenworth, Kan.—Bids will be received until noon, Mar. 20, for furnishing coal for the county court house, county jail, county hospital, and for the poor of the county (p. 488). Address County Clk. J. E. Voorhees, County Clerk's Office, Leavenworth, Kan.

No. 301—Housatonic, Mass.—The Monument Mills Co. advises that it is not in the market for coal as noted in a previous issue (p. 488). Address Treas. Jno. H. C. Church, Monument Mills, Housatonic, Mass.

No. 319—Lowell, Mass.—The Lowell Hosiery Co. will be in the market for 1100 tons of bituminous coal about Apr. 1, delivery via B. & M. R.R. Address Pur. Agt. E. A. Thissell, Lowell Hosiery Co., Lowell, Mass.

No. 320—Clarion, Iowa—The Clarion Light Plant will be in the market during April for 1000 tons of ¾-in. Christopher Illinois screenings, the present contract price being $3.26, delivered in bin. Address G. Mack, Clarion Light Plant, Clarion, Iowa.

No. 321—Indiana and Ohio—The Cincinnati, Hamilton & Dayton R.R. Co. is in the market for coal for its different coaling stations at Morefield, Montezuma, and Connersville, Ind., and Hamilton, Ohio. This company requires approximately 200 tons of mine-run lump or other grades of coal suitable for locomotives per day. Address Fuel Agt. E. E. Foos, Cincinnati, Hamilton & Dayton R.R. Co., Baltimore, Md.

No. 322—Providence, R. I.—The Brown & Sharpe Mfg. Co. will be in the market about Apr. 1 for 10,000 tons of anthracite and bituminous coal. Address Brown & Sharpe Mfg. Co., Providence, R. I.

No. 323—Indianapolis, Ind.—The Artificial Ice & Cold Storage Co. at this place will contract about Apr. 1 for their coal supply. This company generally consumes about 150 tons of No. 6 Indiana screenings for steam purposes per week. Address Treasurer, Artificial Ice & Cold Storage Co., Indianapolis, Ind.

No. 324—Buffalo, N. Y.—Bids were received until noon, Mar. 16, for furnishing 2000 tons of anthracite and bituminous coal for the 65th Regiment, National Guard. Address County Treasurer's Office, Buffalo, N. Y.

No. 325—South Whitley, Ind.—The Grip Nut Co. at this place is in the market for 1500 to 2000 tons of mine-run coal per year, the previous contract having expired Dec. 1, 1914. Quotations for this supply should be made f.o.b. South Bend, Ind. Address Purchasing Agent, Grip Nut Co., South Bend, Ind.

No. 326—Cheboygan, Mich.—Sealed bids will be received until Apr. 6, for furnishing about 1700 tons of Pennsylvania lump and Michigan 1¼-in. steam lump coal at the Water Works. Address City Clerk, Cheyboygan, Mich.

No. 327—Pine Bluff, Ark.—The Pine Bluff Co. at this place will soon be in the market for about 11,000 tons of Arkansas slack coal, the usual price being $2.10 per ton. Address the Pine Bluff Co., Pine Bluff, Ark.

No. 328—Vinton, Iowa—The Municipal Electric Light & Power Plant at this place will soon be in the market for about 3500 tons of washed nut southern Illinois coal, the present contract being closed at $3.19 per ton. Address Supt. W. E. Klingam, Vinton, Iowa.

No. 329—New Castle, Ind.—The contract with the Maxwell New Castle Mfg. Co. for screenings for steam purposes will expire on Apr. 1. Address Gen. Mgr. W. G. Jameson, Maxwell New Castle Mfg. Co., New Castle, Ind.

No. 330—Moline, Ill.—The Republic Iron & Steel Co. will be in the market for approximately 600 tons of screenings, 100 tons of 1¼-in. lump, and 100 tons of nut coal per week, about Apr. 1. Address Purchasing Agent, Moline Iron & Steel Co., Moline, Ill.

No. 331—Springfield, Mass.—The City of Springfield will contract for from 8000 to 10,000 tons of anthracite and bituminous coal about Apr. 1, deliveries via B. & A. R.R. and N. Y.

N. H. & H. R.R. and by wagon. Address Municipal Department, Springfield, Mass.

No. 332—Buffalo, N. Y.—Sealed proposals will be received until noon, Mar. 20, for supplying 35,000 tons of ¾-in. slack coal and 1000 tons of mine-run coal for the Hamburg-Canal Pumping Station. Address Comr. Col. Francis G. Ward, Department of Public Works, Buffalo, N. Y.

No. 333—Loudonville, Ohio—Bids were received up to noon Mar. 15 for furnishing 1200 tons of mine-run coal to the local light plant. Address Clk. John Deyarmon, Board of Trustees of Public Affairs, Loudonville, Ohio.

No. 334—Jersey City, N. J.—Bids were received up to 8 p.m. Mar. 17 for supplying the public schools with anthracite coal for a period beginning Apr. 1, 1915, and ending Mar. 31, 1916. Address the Secretary, Board of Education, Jersey City, N. J.

No. 335—Terre Haute, Ind.—The Board of Education at this place will be in the market probably during April for approximately 4500 tons of 1¼-in. No. 4 vein soft coal. The present contract price is $2.08 per ton. Address Board of Trustees, Terre Haute, Ind.

No. 336—Albany, N. Y.—The Board of Education will contract either in April or May for about 5000 tons of egg, chestnut and stove coal, the usual cost per ton being about $5.55. Address Board of Contract & Supply, City Hall, Albany, N. Y.

No. 337—Cedartown, Ga.—The Water & Light Department will soon be in the market for about 2400 tons of bituminous coal. This contract is awarded on a test basis as well as by cost per ton. Address Supt. W. T. Hardy, Water & Light Dept., Cedartown, Ga.

No. 338—Central City, Neb.—The Central City Light & Water Works will be in the market about Apr. 1 for approximately 1800 tons of Rock Springs slack coal, the present contract price being $3.71 per ton. Address Leonard Anderson, Central City Light & Water Works, Central City, Neb.

No. 339—Warsaw, Ind.—The Winona Electric Co. will soon be in the market for next season's supply of screenings. Address Pres. W. B. Frazer, Winona Electric Co., Warsaw, Ind.

No. 340—Rochester, N. Y.—Bids will be received until noon, Mar. 19, for furnishing the public schools with coal. Address Secy. J. S. Mullan, Board of Education, Municipal Bldg., Rochester, N. Y.

No. 341—Anderson, Ind.—The Patent Vulcanite Roofing Co. will be in the market about Apr. 1 for its coal supply for next season. Address Patent Vulcanite Roofing Co., Anderson, Ind.

No. 342—Albany, N. Y.—Sealed proposals will be received until 2:30 p.m., Mar. 23, for furnishing the various state charitable institutions with coal for a year beginning Apr. 1. The following are the quantities involved:

	Bituminous		Anthracite	
Institution	Grade	Tons	Grade	Tons
Albion	Mine-run	1800	Chestnut	140
Batavia	Mine-run	1200	Stove	35
Bath	Slack	4000[1]	Stove	400
			Chestnut	100
			Buckwheat No. 3	14,000[2]
Bedford	Mine-run	2000	Stove	690
			Chestnut	350
Elmira	Mine-run	6000	Egg	125
			Stove	125
			Chestnut	125
Hudson	Mine-run	3000	Pea	700
Industry	Mine-run	375	Stove	1,720
			Chestnut	455
Iroquois	Mine-run	1400	Chestnut	30
Napanock	Mine-run	1300	Stove	150
Newark	Mine-run	4000	Stove	225
			Chestnut	35
Oxford			Stove	60
			Chestnut	40
			Buckwheat No. 1	1,640
Randalls Island	Gas	400	Stove	100
	Slack	900	Pea	300
			Buckwheat No. 3	3,000
Ray Brook	Mine-run	2300	Stove	150
Rome			Stove	350
			Buckwheat No. 1	5,500
Sonyea	Mine-run	2500	Egg	900
			Stove	500
			Chestnut	1,500
			Pea	3,200
Syracuse	Mine-run	500	Stove	200
			Buckwheat No. 1	2,000
Thiells			Chestnut	500
West Haverstraw			Stove	300
			Chestnut	30
Yorktown Heights			Stove	30
			Chestnut	30

[1] Or 14,000 gross tons Buckwheat No. 3 (no slack).

[2] Or 10,000 gross tons Buckwheat No. 3 and 4000 gross tons slack.

Address Purchasing Committee, Rooms 602 and 603, Capitol, Albany, N. Y.

No. 343—Chicago, Ill.—Bids will be received until Mar. 22 for furnishing the Rock Island Lines with its supply of coal, the contract to expire Mar. 31, 1916. The amount required is from 200 to 400 tons of mine-run and lump coal per day. In submitting bids, the following information is requested: Name and location of mine; name of railroad located on; name or number of vein of coal on which bid is based; screen area and size of openings and whether shaker or bar screen; whether coal can be loaded on closed cars; whether bidder has track scales for weighing all grades of coal produced and whether scales are so arranged that empty cars may be weighed. Copy of coal analysis should accompany bid, stating whether taken from face or car sample; also name of person making the analysis and date. Address Fuel Agt. D. B. Sebastian, Rock Island Lines, Chicago, Ill.

No. 344—Attleboro, Mass.—Sealed proposals will be received until noon Mar. 24 for furnishing the city government with coal as follows: No. 1—450 tons of bituminous, delivered in two shipments of 225 tons each, on cars at Attleboro. No. 2—450 tons, delivered in two shipments of 225 tons each in the coal sheds of the Attleboro Water Works Pumping Station. Address Supt. of Pub. Wks. H. J. Goodale, Room 9, Sturdy Block, Attleboro, Mass.

No. 345—Salem, Ohio—Bids were received up to noon Mar. 5 for supplying coal to the water works pumping station for one year, beginning Apr. 1. Bidders were to state whether coal was to be delivered at pumping station or f.o.b. cars Salem, and each bid was to be accompanied with an analysis of the coal proposed and by a certified check for $200. Address Dir. of Pub. Ser., I. N. Russell, Salem, Ohio.

No. 346—Chicago, Ill.—Sealed proposals will be received until Mar. 20, for supplying steam coal f.o.b. the power house of the Sears, Roebuck & Co., which is located on Homan Ave. alongside the B. & O. C. T. tracks. During the past year this company consumed approximately 45,000 tons of steam coal, and in general it maintains a supply of 3000 tons. Address Pur. Agt. J. H. Westrich, Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill.

No. 347—Burlington, Iowa—Sealed bids will be received until Mar. 29 for furnishing the municipality with coal for the fiscal year ending Mar. 31, 1916. Address City Clk. Robert Kroppach, Burlington, Iowa.

CONTRACTS AWARDED

Note—Successful bidders are noted in **bold face** type.

No. 170—Pontiac, Mich.—This contract (p. 399), which provides for furnishing the Pontiac State Hospital with a supply of coal for one year, has been awarded to the **Ohio & Michigan Coal Co.,** Detroit, Mich. The quantity required is as follows: 8000 tons of Pocahontas mine-run; 500 tons of anthracite grate coal; 500 tons of stove coal. Address Steward E. H. Halsey, Pontiac State Hospital, Pontiac, Mich

No. 214—Grand Junction, Colo.—This contract (p. 446), which provides for furnishing about 7500 tons of bituminous coal, has been awarded to the **Grand Junction Mining & Fuel Co.** Address Gen. Mgr. E. A. Sunderlin, Grand Junction Electric, Gas & Mfg. Co., Grand Junction, Colo.

No. 229—Bennettsville, S. C.—The Bennettsville Electric & Water Plant advises that it has closed its contract (p. 447). Address Mgr. E. C. Morrison, Bennettsville Electric & Water Plant, Bennettsville, S. C.

No. 291—Guantanamo Bay, Cuba—The bids on this contract (p. 487), which provides for furnishing and delivering 10,000 gross tons of navy standard coal at the U. S. Naval Station, Guantanamo, were as follows:

Name of Bidder	Bid	Coal
American Coal Exporting Co.	$5.61	Pocahontas New River
William C. Atwater	5.82[1] 6.00[2]	Pocahontas
C. G. Blake	5.83	New River
Berwind-White Coal Mining Co.	5.65	New River
Castner, Curran & Bullitt, Inc.	5.82	Pocahontas
	5.32[3]	New River
Chesapeake & Ohio Coal & Coke Co.	6.25	Admiralty Navy Standard
Dexter & Carpenter	6.15	Pocahontas
Archibald McNeil & Sons Co.	5.90	New River
Maryland Coal & Coke Co.	5.70	New River
Northern Coal Co.	5.55	New River
New River Coal Co.	6.27	New River
Pocahontas Fuel Co.	5.795	Pocahontas
Smokeless Fuel Co.	6.04	Pocahontas New River
Willett & Martin Co.	5.70	New River
Willard Bros.	6.35	New River

[1] Loading in foreign vessels. [2] Loading in American vessels. [3] Awarded contract for 5000 tons, delivery by schooner.

Success Number

COAL AGE

Volume 7, No. 14
Issued Every Saturday
Hill Publishing Company

NEW YORK, APRIL 3, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

SUCCESS
in the
Rocky Mountain Region

That the pre-eminent standing of the Wico Safety Electric Mine Lamp is not confined to the East is strongly emphasized by its adoption as regular equipment in the mines of the

Colorado Fuel & Iron Co.
and the
Union Pacific Coal Co.

Once more we wish to point out that the Wico Safety Electric Mine Lamp is the only one with a successful "commercial" past. ¶ Claims for other lamps are speculations at best. When they have stood the acid test of time under service conditions, operators can put more confidence in them But the "*safe*" course is to adopt the tried product. ¶ Send for our literature,—a booklet of interesting facts. Address the Witherbee Igniter Co., Springfield, Mass., or the Rivenburg-Blackwood Co., 5085 Jenkins Arcade, Pittsburgh, Pa., Coal Exchange Building, Scranton, Pa., or the Western Sales and Supply Co., 370 Gas and Electric Building, Denver, Colorado. ¶ The Wico Lamp is approved by the U. S. Bureau of Mines, for use in gaseous mines.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

THIS is the Success Number of Coal Age. In it you will find many stories of machines or methods that have been successful in doing things at the mines in a better, quicker, cheaper way.

And here, on this page, I want to call your attention to the successful results *advertising* has obtained for a very large number of men and firms in our industry.

The man who becomes acquainted with a machine or piece of equipment through reading the ads, and who buys and installs it, and thereby obtains an increase in tonnage, or a decrease in costs or labor, or a greater degree of safety—

For that man advertising has won a success.

On this page you have read of a great many such instances, in the past few weeks.

The manufacturer who advertises a machine which will save money or get better results at the mines and who sells his product to you by reason of your having read about it in the ads—

For that manufacturer advertising has won a success—and you have read of such instances on this page, too.

In fact, from the many sources of information on this subject, which I have, I know that the great majority of you readers are getting a real, practical benefit from the advertising section of Coal Age each week.

And I know, beyond possibility of doubt, that the advertisers are profiting tangibly by the interest you men at the mines are taking in the printed stories about their products in Coal Age's *Buying Section.*

So right here, at the beginning of the Success Number, I want to say that advertising—the kind you and I believe in—must be rated as one of the real successes of our industry.

YOU remember the good advice a father gave his son, to make him sure of winning Success—

Early to bed,
Early to rise,
Hustle like Hell—
And advertise.

COAL AGE

Vol. 7 NEW YORK, APRIL 3, 1915 No. 14

EVERY thought, every effort, of every human being is aimed at the accomplishment of something. That something may be good, bad or indifferent, but whatever it is, we one and all earnestly desire that the outcome be successful.

* * *

IT IS FOR THIS REASON, and because the word SUCCESS has such a universal appeal, that coal-mining people have responded so generally to our invitation for co-operation in getting out this special issue of Coal Age. We hope the ethical contributions that follow will furnish much inspiration to our readers, and we sincerely trust that the technical articles appearing this week will increase the sum total of engineering knowledge as it applies to coal mining.

* * *

ABOUT 100 ARTICLES were submitted to us for publication in this SUCCESS issue. A great many were returned as not complying with the rules laid down. Quite a few articles were interesting and valuable, but not adapted for this number, so these will be published in succeeding issues. Enough material was received to fill two or three papers the size of this one; so instead of one SUCCESS issue, we will in reality have a series bearing largely on this most interesting subject. Therefore, if your article isn't among those on the following pages and has not been returned to you, it is being saved for a subsequent number.

* * *

PERHAPS THE MOST COMMON and yet the most important point on which the writers in this issue agree is that success is a relative term; that is, a man may succeed and be a success without having accumulated a great fortune, or without having risen to a position of great power and influence. The critical or turning point in a man's life often hinges upon his individual answer to the query—what constitutes success?

* * *

IT IS A LONG STEP on the road to success if one's philosophy can be reduced to a simple definite form. Shooting at random is a waste of ammunition; we must know what we are aiming to do before we can do it. A man is not a man unless he stands for certain fixed principles, and a fellow is foolish to seek to accomplish that which conflicts with these principles.

* * *

THE ENGINEER ON $200 a month, in the view of many people, is a success if he contributes to the world of knowledge or ideas. These same individuals would view the man of money, whose attainments are mostly of a material or physical order, and who employs the engineer, as less of a success, notwithstanding his wealth. As in most matters of such diverse opinion, the average point of view is perhaps best, and the average man happiest.

* * *

AT ANY RATE, it is a wise Providence that has created different men with contrary ideas. It would be a sad world if we all sought the same goal in the same way. Therefore, it is good that some men overvalue the intellectual, while others overvalue the physical and emotional.

* * *

ONE WRITER HAS SAID that "*success is the product of a man's personality.*" There is no doubt that the measure of success depends on the degree to which we make our personality a factor in human affairs. Expressed in another way, our success is in proportion to the responsibilities we shoulder. Hence, if we would be successful, we should seek responsibility rather than attempt to avoid it. The moment we refuse to carry responsibility, we have taken a strangle-hold on ambition. If ambition is dead how can we find success?

The Meaning of Success

By Berton Braley

Success doesn't consist alone in making money, though the successful man ought to make money. Neither does it consist alone in accomplishing ambition, though the successful man should realize his ambition. Success does not consist wholly of the acquirement of fame, though fame should come to the successful man. Success is a combination of all these requisites, with others.

The mine operator who produces the biggest dividends may not be the most successful operator, because he may be getting his results by gutting a mine, by grinding and gouging his labor and by stinting on replacements and repairs, thus laying up trouble that will wipe away the profits in years to come.

Yet such a man may well acquire temporarily the reputation of success; and that is wrong, because there is nothing temporary about true success. It is too big, too comprehensive, too real to be obliterated from the scheme of things in a day or two or in a year or two.

The truly successful operator or the truly successful executive in any line will make money for his stockholders and himself and add to the world's supply of available wealth, but he will do this with justice to his labor, benefit to his properties and with clear recognition of the fact that in this human world the first duty of a man is to be a decent human being.

After all, that man is the most successful who occupies the biggest place in the hearts of his fellow-men; and it is true that in time this confidence, this trust, this liking of men pays dividends, not alone of peace and comradeship, but of gold. Dispute and contention are the costliest things in the world, and where there is understanding and affection they rarely occur—or last long when they do.

So the success which is rightly won is an enduring comfort and happiness. It is only the success which is wrung from the suffering and the blighted hopes of others that turns to dust and ashes in the mouth.

* *

An Alabama Success

By Henry S. Geismer*

SYNOPSIS—How a seam of coal averaging less than 36 in. in thickness was quickly and successfully developed. Economy in coal consumption. All pumps are eliminated.

In Alabama there is a mine that loaded its first ton of coal on Aug. 6, 1913. Exactly 366 days later it had reached a daily output of 1100 tons, and by November of that year a daily average of 1223 tons.

There is nothing startling about that until you are told that the seam of coal runs from 32 to 36 in. in thickness, and every employee required to produce that tonnage had to be recruited from camps that had long since passed the experimental stage.

By name it is the Sipsey mine of the Maryland Coal & Coke Co., and it is the only mine owned by this corporation. When it is considered that the organizers of the Maryland Coal & Coke Co. took possession of a tract of land six miles from a railroad, in a veritable wilderness, and across a river at that, and then discovered that it held a thin seam of coal, it seems remarkable that it has a mine at all.

Possibly the fact that Henry T. DeBardeleben and Milton H. Fies were the moving spirits behind the Maryland Coal & Coke Co. is sufficient explanation of its remarkable accomplishments. The first is a son of the most famous

---

*Consulting engineer, Birmingham, Ala.

The Sipsey Mine Tipple

One of the Sullivan Ironclads

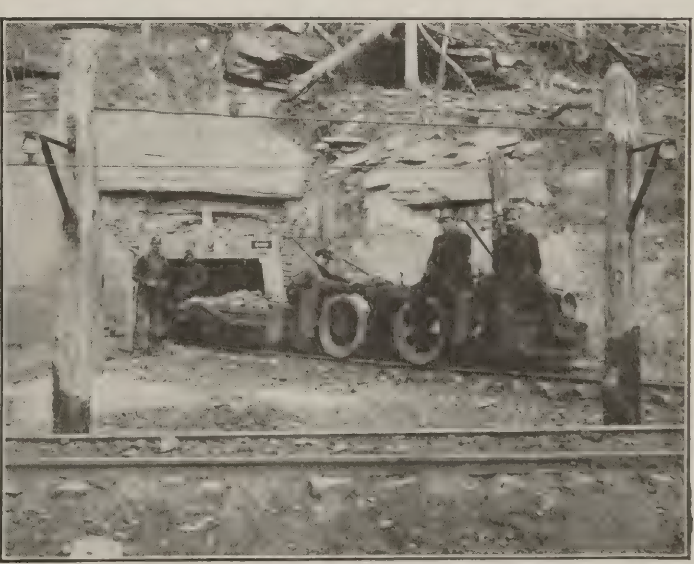
The Miners' Houses

Steel Bridge over River

Coal Ready for Shipment

Loading Boom

Two Trips Enroute to Tipple



Locomotive Coming out of Drift Opening

mineral developer in Southern history and a son who was not willing to be known to posterity simply as a great man's son. The second is a Columbia School of Mines graduate who was not afraid to work as a rodman a year or so just for experience, notwithstanding that his father was well able to keep him in spending money.

A Real Accomplishment

If you should ask these two very young men to explain to you how they have been able to develop a mine (the first mine they have been financially interested in together) in a wilderness and keep it running at a maximum output to a minimum of five working days a week during such a winter as we have just passed through, they would in all probability shake their heads, but if by chance they should invite you to go out to the mine and judge for yourself, this is what you would see: A drift mine in which all of the cutting is done by Sullivan electric chain machines, all of the hauling done by electric locomotives, all of the ventilating done by means of motor-driven fans, all slack coal washed in an electric driven washer and all of the necessary power for the entire operation furnished by two 175-hp. boilers.

They burn only 0.9 ton of coal for their own use in producing each 100 tons of coal. Can you beat that? Wait! There isn't an inside pump on the job. That's what these men have done for themselves.

And while they have been doing all this, Uncle Sam has been busy also, and now in less than one year the terrible river that frightened all of the previous investigators will be made navigable, and the Maryland Coal & Coke Co. will be able to load coal upon its own barges and start them off to the Gulf of Mexico.

If you want to observe Mr. DeBardeleben and Mr. Fies overflowing with gratitude just ask them why they were so determined to risk their future in such an apparently unpromising field.

"Did you ever burn any Sipsey coal?" they will say, and then if you reply in the negative they will add, "Well just burn some and you will understand."

This is a pretty good illustration of the possibilities of David Crockett's favorite proverb, "Be sure you're right, then go ahead."

But just a word of warning to those who are inclined to jump at conclusions and who might be tempted to take Mr. DeBardeleben and Mr. Fies at their word. There are several mines in Alabama on this same Black Creek seam of coal the write-up of which would appear ridiculous in a Success number of any paper other than a comic weekly, and that in spite of the fact that they were not six miles from a railroad when they were discovered.

Perhaps their workings have not been as carefully planned in advance, their mechanical equipment not as wisely chosen, their coal not as well prepared at their tipples and their product not as intelligently marketed; at any rate, they were sure they were right, but they didn't go ahead.

* *

The Way to Success

By Ernest Marshall*

It is through the working of a law that success comes in any business or undertaking. Chance plays no part whatever, for in the operation of nature's laws there is no such thing as chance or accident. Man and his fortunes are no more the things of chance than is the tree from its earliest growth. He is the product of the elements and is produced through the working of a law.

First, then, we will state that your thought, or spirit, is your real self and not your body. Thought is an invisible substance and acts apart from your body, moving and influencing others. This thought acts at all times, whether sleeping or waking. Therefore, thought is your real power, and as you learn how it acts, how to hold it, use and control it, you will become successful in that you will be able to accomplish what you set out to do.

Self-control, concentration and clear thinking are the elements that make for success. Your prevailing mood or your frame of mind has to a great extent a direct influence and effect on your success or failure in any undertaking. Whatever of thought you think or receive you send from you again as an invisible substance to act on others. Therefore, it is the kind of thoughts which you create and which you send out that produce a favorable or unfavorable effect on others. Thus it can be said that when determined thought meets determined thought and unites on a similar purpose, a double power for success comes of such union.

Further, carrying out this idea, we can say that thoughts attract thoughts of like kind. By keeping any certain thought fixed in your mind—such as for instance the thought of strength or health—the more of that thought element is attracted to you. Keep in mind the idea of force, go-ahead push, aggressiveness, stick-to-it-iveness, and you attract to you the elements which give you these qualities. Right thinking, serenity, self-confidence, determination, are the qualities we must aim to acquire in order to bring success. Whenever you think, you are affecting your fortunes for good or ill, all depending on the kind of thoughts you create and the impression they make on others. Every thought, whether silent or spoken, has real value.

Determination

If you fix in your mind a persistent determination to succeed in any kind of business you are engaged in, a process of thought construction, or unseen element to draw assisting forces to you, is begun. Let us further explain what is meant by "assisting forces"—first, ever-growing fertility of mind to breed new plans for pushing your business; and second, drawing you to the best people to aid you in working out your plans. To best gain this power we would say that silent, persistent resolve in your mind to do what you set out to do will do the work, and it will do it if you persevere in holding to this frame of mind. To think persistently that you can accomplish a thing, to push hard on your one aim and purpose, will create for you a power which is certain to produce results, if you keep but the one purpose in your mind at a time.

---

*Roscoe, Penn.

You will never find success in any profession until you seek for it within yourself. It is what you feel, what you think and what you do—not any one of these, but all of them—that help you to attain success. You may do all that the situation requires, but if you have no personal feeling in the matter your deeds will be almost barren of results. Have but one purpose at a time; there is no business in which you will succeed if you divide your interests. Too many "irons in the fire" speak failure, and it is usually attributed to "bad luck" by the victim. A great many of the failures are caused by the victim dabbling in too many things at one time, which takes a man's mind off his business and divides his energy. Many men belong to a class that are still more hopeless than the proverbial "fools," who will learn in no school but that of experience.

I do not wish it to be understood to say that you must have but one interest in life, but that you must have but one interest at a time in order to attain the goal of success. The laws of nature are changeless; the law of mind over matter, if closely followed, is bound to bring you that much-longed-for success. Think of one thing at a time; put all your mental, physical and spiritual strength into the accomplishment of the project you have at hand. Be direct and send your thought as straight as an arrow to the target of your desire. Don't swerve from your purpose to accomplish what you set out to do, and success is yours.

Success lies in you, and you only. When you come to an obstacle in your path to success, do not try to go around or climb over it or wait for it to move out of your way, but boldly put your shoulder to the wheel and push it away. Every person should strive with all his might to overcome the three principal obstacles to success, which are—discouragement, delay and hard knocks. One might just as well ask another man to walk for him as to ask someone to help him to success.

Depend upon yourself and go at anything you undertake determined to win and don't give up.

There is much inspiration in Herbert Kaufman's words:

Success is not for those who quail;
She gives her most to those who fail,
And then with courage twice as great
Take issue once again with fate.
'Tis better far to risk a fall
Than not to make attempt at all.

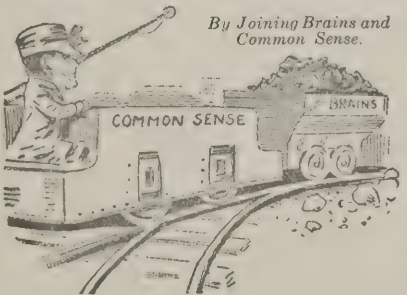
The Secret of Achievement

By Michael Bernard

Written Expressly for COAL AGE

When he was young he learned by heart
Those proverbs, maxims, saws and rules
That formed a necessary part
Of teaching in the older schools.
He followed all their sage advice,
Was punctual as day or night,
Persistent, patient and precise,
Unostentatious and polite.

But though he toiled with all his strength
And humbly did his honest share,
The firm conviction grew, at length,
He wasn't getting anywhere;
For still his job remained the same
As that on which he first began,
Until the resolution came
To modernize his working plan.


By Joining Brains and Common Sense.

The Firm Conviction Grew.

And so he purged his ancient creed
Of all that made it blind and dead,
And from restraint and error freed,
He plugged away, but used his head.
He found success was never gained
By plain, untiring diligence,
But that this object was attained
By joining brains and common sense.

The sneers of some were faintly hid,
While others branded him a fool,
Because, in everything he did,
He followed close the golden rule;
But when the miracle was wrought
And he had gained the laurel crown,
His joy was heightened by the thought
That he had dragged no brother down.

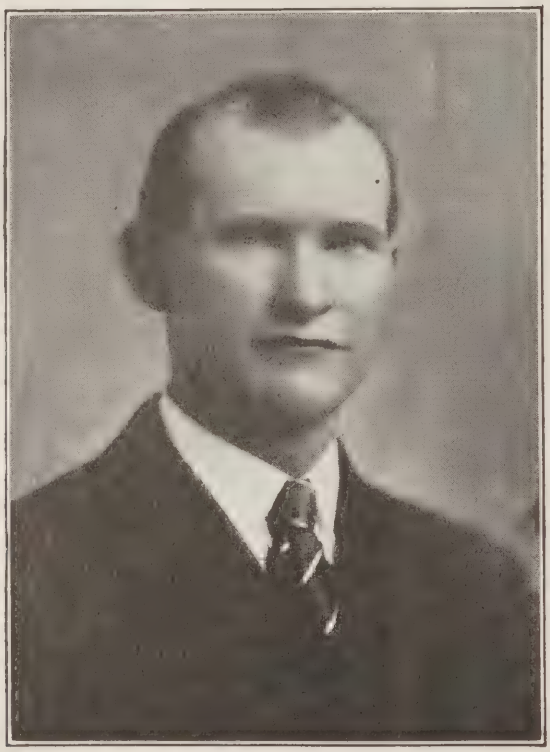
FOR PROGRESS *isn't plodding, nor tenacity, nor pains;*
Success rewards the man who tempers energy with brain.
And he who spurns his mind and on his brawn alone relies
May well expect to be a slave until the day he dies.

John F. Meagher

How would you like to be general superintendent of coal mines for the largest industrial concern in the South and still be only thirty years old? Wouldn't it make you feel that the mining game wasn't so bad after all? Below is the likeness of the man in this position—John F. Meagher, of Pratt City, Ala., who for three years has been general superintendent of coal mines for the Tennessee Coal, Iron & R.R. Co., in charge of six or eight divisions embracing 18 or 20 mines.

There is a story, you know, about a man who left his own home and went into a foreign country to seek diamonds. Unsuccessful there, he came back home and found a big one in his own front yard. This is true in some degree of Mr. Meagher. You will see later that he once took a little side trip, only in this case he not only found the diamond on his return, but the other fellow found one too.

The famous Georges Creek Coal Basin in Maryland furnished the coal-mining industry with the subject of this sketch. He was born at Lonaconing, in Allegany County, on Jan. 2, 1882. In 1887, when he was five years old, his parents moved to Pratt City, his father going to work in the mines, and later serving as mine foreman for a number of years.



Mr. Meagher of Alabama

In 1898, when he was sixteen years old, Mr. Meagher graduated at the Pratt City high school. Later he took the civil-engineering course of the International Correspondence School of Mines.

Early in life, Mr. Meagher gave evidence of the untiring energy and abundant capacity he possesses for work, and during school vacation in 1894 he got the permission of Samuel Allsop, then foreman at the old Drift Mines of the Tennessee Coal, Iron & R.R. Co., to go to work as a hand pumper. The first day he worked in water up to his waist and the next day he could hardly get out of bed, but he stuck to the job and in a few days found it too easy, so he helped his father mine and load coal.

In the fall of 1895, he started in the engineering department of the Pratt Mines Division of the Tennessee Coal, Iron & R.R. Co. as extra rodman and worked at this during his school vacations in 1896 and 1897. As soon as he graduated from high school in 1898, he accepted a regular place as rodman and worked up to transitman in 1902. In the meantime he was burning the midnight oil taking a course in civil engineering.

In March, 1903, he listened to the siren and took the little side trip mentioned above, accepting the position of division engineer of the southern district for the Weaver Coal & Coke Co., of Chicago, with headquarters at Duquoin, Ill. But the call of the Pratt mines and Village Creek water was too strong and in September of the same year he returned to become assistant division engineer of the Tennessee Coal, Iron & R.R. Co.'s Pratt Division. In the early part of 1905 he succeeded H. S. Geismer as division engineer. In these positions Mr. Meagher acquired an intimate knowledge of the mines and began to develop the qualities of management which have led to his present success.

In May, 1906, he was promoted to assistant superintendent of the Wylam Division and on July 1, 1907, was transferred to Whitwell, Tenn., as superintendent of that division, a position which he held with marked success until December, 1910, when he resigned to become superintendent of the Mulga mine of the Birmingham Coal & Iron Co. In November, 1911, he was promoted to general superintendent of coal mines for the latter company, which place he retained until May 1, 1912, when he came back home, so to speak, and accepted the position of general superintendent of coal mines for the Tennessee Coal, Iron & R.R. Co., with headquarters at Pratt City.

The frequency with which promotions have marked his course is of startling interest in reviewing Mr. Meagher's career. But when those who know him best from experience and association with him relate incidents concerning his ability to handle men and emergencies, the reasons for his success become evident. As for the men who have worked under him at various points, they are a unit as regards their loyalty and firm faith in "John," as he is known to them. It is a characteristic quality of Mr. Meagher that in meeting emergencies he first deals with the conditions, adjusts them, gets everything going right again and then ascertains the cause of the trouble. Questions are easy to answer when they are put at the right time and in the right way. He has a keen knowledge of what constitutes a day's work for a man in the mines, and it is doubtful if he has an equal in this line in Alabama. His practical knowledge of the engineering end of the mining game stands him in good stead, and this, coupled with natural talent for the mastery of every detail of his work, makes him an invaluable man.

Mr. Meagher takes keen interest in "Safety-First" work and has always been among the first to reach the scene and get in the thick of things when trouble occurred at any of the mines in the district. He is prominent in the "Safety-First" work of his own company.

Success can fairly be attributed to John F. Meagher, and there's not a man who knows him who is jealous of the fact, so unassumingly does he carry his laurels and exercise his authority.

Electrification of the Small Mine

By F. J. Foley*

SYNOPSIS—An actual instance where the installation of electrical equipment and the purchase of central power reduced the power cost from 7c. to 4c. per ton of coal produced.

When we look upon the application of electricity to coal mining as it is today, and remember how comparatively recent is its adoption, there are many things for which the coal operator can feel thankful.

As late as 1880 little or no machinery of any kind was used. The first use of electricity in the production of coal of any significance was in 1890, when the electric coal cutter was first put in service.

Coincident with the original application to cutting, an electrically driven haulage locomotive was put in service. At that time most of the work about the mine, such as pumping, hoisting, ventilating and tipple work, was done by steam. It is interesting to note the increase in production since the adoption of electrically driven machinery.

Mouth of Mine, Showing Trip of Loads

The Old Steam-Power Plant, Since Replaced

In 1890 the entire production of coal in the United States was 160 million tons. In 1914 it reached the highest mark, 570 million tons. This production would never have been possible without electrical machinery.

For a very long time coal producers, particularly the small operators, kept little or no record of their costs for power. The trend of thought seemed to be that the coal is here ready for use and it costs so much per ton to mine, therefore power costs and cost of coal used are the same. The machinery was inefficient, the cost of maintenance high and the cost of labor both for power-house attendants and miners had an upward tendency, while at the same time the market price for coal had a more or less downward trend.

Consolidations Have Been Beneficial

Conditions have changed very materially in the last few years. A number of smaller companies have consolidated, forming large combinations, the production and operations of which are so great as to make it possible for them to effect many economies not open to the small producer. For example, the use of a large central plant concentrates the total power in use by a dozen or more mines, and as a result produces power at about 60 per cent. of the total cost of that produced by individual plants.

This condition made it a difficult matter for the small operator to compete in the open market and live, and naturally he began to look for the answer. I have made many tests on small individual plants operating on the basis of 100-kw. to 200-kw. demand and, due to various causes, have found power costs varying from 5c. to 15c. per kw.-hr. There were many cases worse even than this, but the most unfortunate part of the whole situation was the fact that the operators were not keeping any records of cost on their power plants. There was no depreciation account, and worn-out plants 10 to 15 years old were placed on the books as assets valued at purchase price paid 15 years before.

The coal used in boilers by small companies was charged against power cost, not at the price for which it could be sold in the market, but at the *mining cost.* One of the first things to do was to prove the fallacy of this system of accounting. The work that the central station has done along this line is well known.

When the question of changing over to purchased power was brought up, the question of cost of attendance was always vital. It is a difficult matter to get high-class electrical help to stay at a mine unless well paid; on the other hand, the small mine cannot afford to pay for this class of help. As a consequence machinery was required which would operate continuously with a minimum amount of attention and repairs.

One of the most expensive commodities today is skilled labor. The machinery designed and built to operate without attendance saves just the amount of the attendant's wages, and usually is so built that little or no repairs are needed.

The Logansport Coal Co., located on the Buffalo & Allegheny division of the Pennsylvania R.R., at Logansport, Penn., has a capacity of 500 tons per day. Formerly it was operated entirely by compressed-air cutting machines and mule haulage. This system cost on an average 7c. per ton for power, not including upkeep.

In addition to this the air machines and steam engines being of the reciprocating type had many wearing parts, and it was necessary to be constantly repairing them and nursing the equipment along.

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*Engineer with Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn.

About a year ago this company signed a contract for electric power with the West Penn Electric Co., and alternating current now is delivered to the plant at 2200 volts, 3-phase, 60-cycles. The mine has been completely equipped with electrical apparatus. The trolley and feeder construction and the rail bonding were given careful attention.

To digress briefly, this brings out a point in favor of central-station power for the smaller operator. When he makes an improvement in trolley construction or feeder system and bonding, the results are shown directly on the power bill.

Details of Operation

The cutting machines and locomotives operate at 250 volts direct current, and to get this voltage a converting station was placed about 200 ft. from the drift mouth. This station contains one 150-kw., self-starting synchronous motor-generator set—3-phase, 60-cycle, 2200-volt on the alternating-current end, and 250-volt no-load, 275-volt full-load on the direct-current end.

The fields of the synchronous motor are wound for 250 volts, and the exciting current is taken from the direct-current end of the set, thus eliminating the 3½- to 4-kw. exciter used on other types. The exciters on small sets have been responsible for a large percentage of the trouble which made attendance necessary.

There is a two-panel switchboard consisting of a synchronous motor panel, with a double-throw starting switch equipped with no-voltage and overload release. This acts as a circuit-breaker against both overload and failure of current supply. There is an overspeed device on the motor-generator set which will open this breaker should the set, for any reason, exceed a safe speed. In addition, the panel is equipped with a power-factor meter and an ammeter. The direct-current generator panel is equipped with a voltmeter, ammeter, circuit-breaker and switches.

This class of substation was designed especially for coal-mining work, is simple in construction and operation and needs very little care and attention. The locomotive motorman has started the particular set described every day for a year at 7 o'clock in the morning and left it to run without attention. A unique arrangement used at this mine is a lamp shunted across the trolley and ground where it can be plainly seen from the blacksmith shop, which is about 100 ft. from the substation. If the circuit-breaker goes out while the locomotive is inside the mine, the blacksmith or his helper resets it. This set has operated without shutdown for repairs for a year. At the time of my visit the commutator had not been cleaned since the installation, and commutation was perfect.

The locomotive shown in the accompanying illustration is a 10-ton Barsteel type, with two 50-hp. commutating-pole motors, steel-tired wheels and arc headlight. This machine has hauled coal from the day it was received until the visit mentioned without having lost one minute's time. The motors are equipped with bronze-sleeve bearings for oil and waste lubrication. They have never been inspected. This locomotive was guaranteed to haul 34-car trips; it has often hauled 50- and 52-car trips without the least effort.

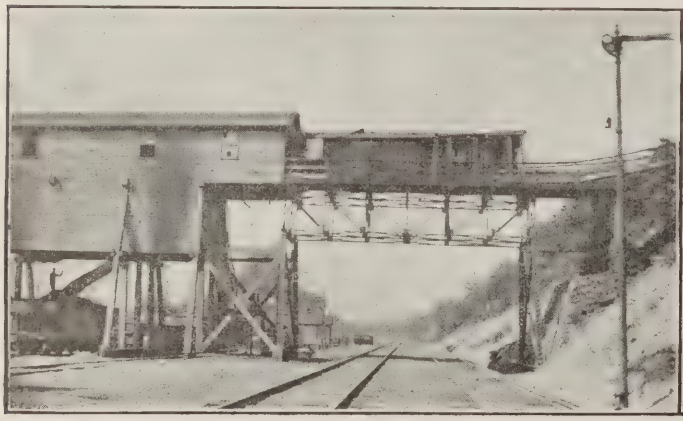
The fan is driven by a 50-hp., 3-phase, 60-cycle, 2200-volt squirrel-cage induction motor, equipped with hand starter.

Benefits of Central-Station Power

There are many other applications of smaller size that have shown up just as well as the larger equipment. This installation and many others like it spell success for the mine owner because they are absolutely trustworthy. They can be started and left to do their work. The worry and care of power supply are taken out of the coal operator's hands by using central-station power. The worry and care of plant operation are removed by using properly designed electrical machinery, and he is left free to attend to his own business, which is the mining of coal at a cost that spells profit.

The mine, the plant and the men at Logansport all bear the same mark, "on the job." Mr. Turner, superintendent of the mine, is justly proud of his model plant, and this pride is reflected by his men, who all work to get the most out of their machines and to keep them in good shape. The plant is well laid out and installed and will give good service for many years to come.

This plant—what it is and what it has done—is an excellent example of successful engineering, because the primary object of the engineer is to accomplish results in the most economical way. By making the installation above described, the power cost was reduced from 7c. to 3c. per ton; there are also low maintenance charges and almost a complete elimination of attendants. The company may well be proud of results such as these.



Logansport Coal Co.'s Tipple

10-Ton Westinghouse "Barsteel" Locomotive

Deep Undercutting with Mining Machines

By R. A. Lowry*

SYNOPSIS—The substitution of 10 ft. 4 in. cutter bars on coal undercutters in place of the 5½-ft. to 6½-ft. bars ordinarily employed results, under the conditions prevailing in southern West Virginia and western Virginia, in many advantages.

The use of mining machines as a substitute for the pick in undercutting coal or, in later days, as an alternative to "shooting off the solid," will be acknowledged by all readers as one of the most important improvements in coal-mining processes.

The compressed-air "puncher," the chain breast machine and now the continuous-cutting chain type of undercutter electrically or air driven have rendered mining more successful in safety, in rapidity of production and in economy. Another step in advance, made with the Ironclad cutter, is the employment of cutter bars longer than was formerly considered practical.

It used to be an accepted theory that coal of average height could not be shot successfully to the back of the cut when this exceeded one and one-third times the height of the face; or, in the case of thick seams, when cut to a depth greater than the height of the face. A standard maximum length for the chain-machine cutter bar has been, for several years past, 6½ ft.

About two years ago, Edward O'Toole, general superintendent of the United States Coal & Coke Co. at Gary, W. Va., came to the conclusion that with clean coal, free from sulphur and other impurities that hinder shooting, with strong roof and even bottom, coal could be undercut and shot successfully to considerably greater depths.

At his request, the Sullivan Machinery Co. made up Ironclad coal cutters with bars 8 ft. 6 in. long and then, as these proved successful, machines with 10-ft. 4-in. bars.

The performance of these machines at Gary was watched by the management with great interest. After a thorough test, the following results were evident. Comparing the 10-ft. 4-in. bar with the 6-ft. 6-in. bar, the longer bar cut 64 per cent. more coal in the same places, cost only about one-third more for labor and power, required fewer repairs per ton, produced a larger percentage of lump coal, and required less powder per ton in shooting.

Moreover, the progress of development is materially increased by the long-bar machines. An average advance of 160 ft. was made with 6-ft. 6-in. bars per month working single shift, while 250 ft. is an average for the 10-ft. bar during the same period.

The long cutter bar Ironclad machine is also used at the mines of the Clinchfield Coal & Land Corporation, at Dante, Va., mining the "Upper Banner" and "Lower Banner" seams, in Virginia correlation.

The "Upper Banner" is a woody, friable coal with comparatively well pronounced faces and butts, averaging 5 ft. in thickness. The top is sand rock and the bottom comparatively hard fireclay. The "Lower Banner" seam will average not over 3 ft. 6 in. high, and is more blocky, with a slate top and fireclay bottom.

Unloading Machine from Truck

Ready to Start Sumping Cut

These mines had been equipped with machines of several makes; but Mr. Lee Long, the general superintendent, became convinced that deep undercutting was adapted to his coal. He gave the Sullivan machine with 10-ft. 4-in. bar a thorough trial and was so pleased with the increase in over-all efficiency and economy shown that he later replaced many of his older machines with these long-bar Ironclads.

Deep undercutting at Dante has proved a decided success from several points of view. The machine runners were formerly paid per face-foot of undercut, but with the installation of the long-bar machines they were paid a stated price per place, a difference in the rate being made for wide and narrow work. This resulted in an increase in the earning capacity of the runners and a decrease in the cutting cost.

Actual performance in these mines shows that runners familiar with handling the long-bar machine get approximately the same face footage per shift as with the 6-ft. bar machine. Each machine has an assigned territory of 22 to 25 rooms. Since more coal is secured per cut than formerly, it is necessary to cut each place only every other night. In the 5-ft. or 5½-ft. coal, one cutting provides a loader with two full shifts' work, so that with an adequate car supply he may work continuously at his greatest efficiency. This efficiency is seldom attained in coal of any height with shorter cutter bars.

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*841 Court St., Huntington, W. Va.

The Kerf Is Thoroughly Cleaned

When the undercut is finished, the loader takes care that his kerf, which is 5½ in. high, is thoroughly clean. A 7-ft. auger is then used to drill two holes (in rooms) 6 ft. deep and about 3 ft. from each rib. A center hole, 7 ft. deep, is also drilled, all three straight in from the face. Twenty-two inches of black powder is loaded at the back of the center hole, and 18 in. in each rib hole. The center is fired first as a pull or break-down shot, and breaks clear to the heel of the cut. The rib shots break 6 to 7 ft., so when the coal has been loaded out after the first shooting, about three feet of coal is left standing on each rib, with the center clean. One light shot at each rib then turns the standing coal over and squares up the place.

Coal Shot Down Ready to Load out

The "Lower Banner" seam has lent itself to deep undercutting with even better results, although it is only 3 ft. 6 in. thick on an average. There is a pronounced cleavage plane about 18 in. from the bottom in this coal, and when undercut to a depth of 10 ft., the lower part of the seam drops down over the kerf, thus enabling the loader to pull the remaining 2 ft. of coal with very light charges of powder. At present, all coal from these machines is loaded as "screened run-of-mine" and "slack," but the management estimates that the long bars give them an increase of 12 to 15 per cent. of lump that will go over a 4-in. screen. A modern three-track tipple with shaker screens is now under construction.

The Ironclad machines, equipped with these 8½-ft. and 10-ft. 4-in. cutter bars, differ from standard machines using 5½-ft. or 6½-ft. bars in no other particulars. The motors, gearing, friction feed mechanism, etc., are identical. These machines will cut either from right to left or left to right. They are furnished with a reversible cutter chain composed of drop-forged, high-carbon steel links with substantial blocks arranged to give the bit 9 positions in the chain and with setscrews in both sides of the links.

The conclusion reached from studying the results of several installations, particularly those of the United States Coal & Coke Co. and the Clinchfield Coal & Land Corporation, is that deep undercutting is a decided success, and where consistent with the mining conditions, nature of coal, etc., should be recommended since it reduces (1) first cost of machine installation, (2) powder consumption, (3) cutting cost per ton. Moreover, where a certain output is expected, deep undercutting should reduce the territory under development. This is an important feature when the maintenance of roads, ventilation, and supply of timber are taken into consideration. Furthermore, it should increase the percentage of lump and give the loader a more definite or dependable quantity of coal down, thus increasing his efficiency, and thereby raising that of the entire plant.

A Successful Roller-Bearing Mine-Car Wheel

Prior to 1908 there were no successful roller-bearing mine-car wheels on the market commercially. Many such wheels had been tried, but had proven unsuccessful. During that year the Sanford-Day Iron Works, of Knoxville, Tenn., placed on the market its roller-bearing mine truck, which was built with a floating axle and various other improvements differing radically from its predecessors.

During 1913 another step was made. After five years of experience, the above named company was able to produce an improved design of roller-bearing wheel, which was called the "Whitney Wonder." On this wheel the manufacturers are willing to place a five-year written guarantee, not only covering the wheel itself, but also the roller bearing. This wheel is fool proof and requires no attention other than greasing at intervals of from 6 to 18 months.

Upon actual test, this wheel has doubled the speed of motor haulage and saved 58 per cent. of the electric power consumed, in comparison with a solid-hub wheel working under similar conditions. This test was made by the engineer of the Virginia Iron, Coal & Coke Co., at Tom's Creek, Va.

The condition of test and results were as follows: Twenty-car trips, one equipped with "Whitney Wonder" wheels and one with solid-hub wheels, were moved by one motor three times over a distance of 3250 ft. and return. Each car held $3\frac{1}{10}$ tons of coal, and the best time possible was made for each trip. An average of 36 electrical readings was made during each trip, and the voltmeter and ammeter readings were checked with a wattmeter. With the solid-hub wheels, sand was necessary for the track, but was not required with the roller bearings.

AVERAGE FOR THREE TRIPS

	Solid Hub	"Whitney Wonder" Wheels
Time	14.9 min.	7.5 min.
Average amperes	178	154
Average volts	470	465
Average kilowatts	83.78	71.81
Average kilowatt-hours	21.0	8.8

The above test shows a consumption of 21 kw.-hr. per trip for the solid-hub wheel, and 8.8 kw.-hr. for the roller-bearing wheel. This is equivalent to a saving of 58 per cent. in haulage power. Combined with it is a saving of 50 per cent. in the time of haulage. What these savings may mean in the daily output of a mine will be at once appreciated by those who have had experience in mine operation.

Standard Coal Preparation

By Raymond G. Lawry*

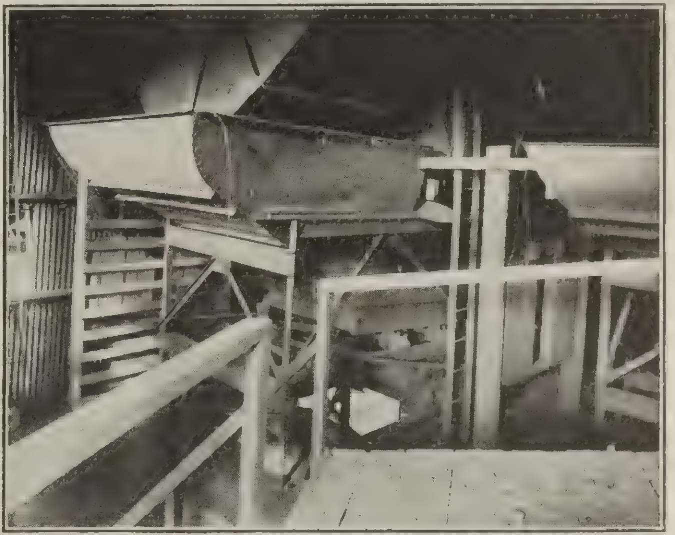
SYNOPSIS—In most localities in the Middle West the grading of coal into four sizes is sufficient for all commercial requirements. Simple and effective means may be employed to secure this preparation.

In opening a new mine, the kind and amount of preparation to be given the coal is undoubtedly the most important single item to be considered. The operator usually knows in advance the principal characteristics of the coal which he intends to work and sell. He knows whether it is hard or soft, the nature of its fracture, whether it contains impurities, their kind and amount, and he also has a fair idea of how these impurities occur in the measure, and the process involved in their elimination so as to obtain the most satisfactory product. An experienced coal man is also well aware of market conditions at the time of opening a new mine and knows how to meet them in selling the coal.

A Roberts & Schaefer Loading Boom at a Mine of the Milburn Coal Co., Keeferton, W. Va.

Planning for the future to meet new conditions and demands is more of a problem, to solve which with reasonable certainty and without unnecessary expenditure necessitates a close study of the necessary operations in screening and cleaning.

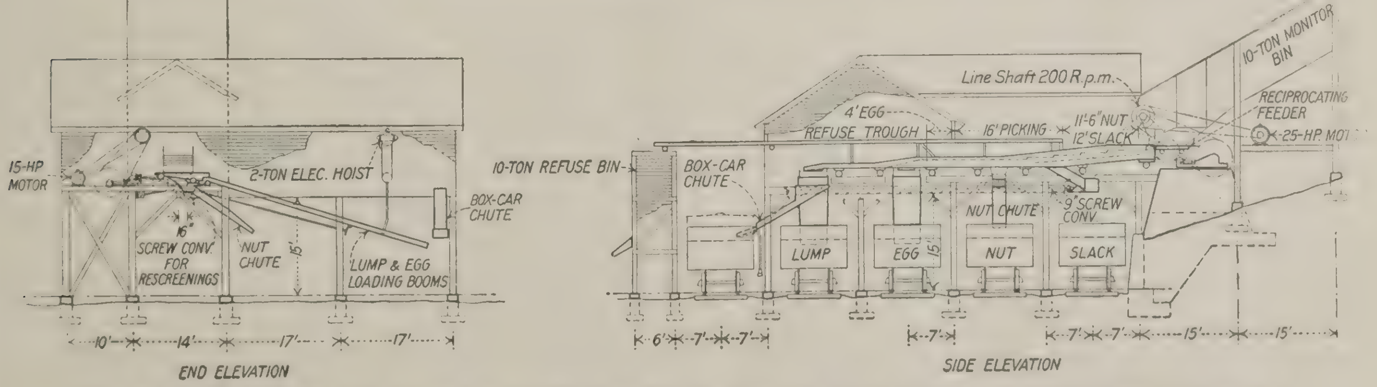
In considering coal preparation in the Central West, it should be observed that vastly different results are obtained at different mines and in different fields. One result secured is the careful sizing and handling of the coal in order to obtain a clean and uniform product. This is usually brought about by letting tonnage come secondary to quality. Most mines are so equipped that forcing the screening equipment results in the deterioration of the product.



Receiving Hopper and Reciprocating Feeder, Marianna Mine, Pittsburgh-Buffalo Co.

The opposite idea is represented by mines making few sizes, but depending on small margins and large sales for their profit. Here a large capacity and one that can easily be increased is essential. It would appear that to produce a high tonnage and give it care in both cleaning and picking would require an extensive and complicated installation. This is not always true as many mines are so equipped as to embody both features with a comparatively simple arrangement of machinery.

Coal separated into four sizes or a combination of these four will practically fulfill conditions of any use whatever; that is, coal suitable for almost any requirement can be selected from the lump, egg, nut or screenings, or a combination of two or more of these sizes. An outfit of



Side and End Views of Four-Track Tipple Using Marcus Picking Table Screen and Shaking Loading Booms mechanical equipment, then, that will screen coal, weigh it, provide for cleaning, careful loading and other matters can be outlined so that by changing one or two parts and making allowance for capacity, it will provide a standard equipment that can be employed at any mine. The style of such equipment is not changed by a variation in the size of the different grades, but if these sizes could be made standard, it would work to the advantage of both producer and consumer.

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*Assistant engineer, Roberts & Schaefer Co., Chicago., Ill.

The various mechanical units in which coal is treated after hoisting and before leaving the tipple have gradually developed from the simple bar screen to the modern tipple with automatic weighing devices, feeders for regulating the flow of coal, reciprocating screens and picking tables, loading booms, recleaners and various devices for handling the fuel, pickings and rock from the mine as well as equipment for the easy manipulation of railroad and mine cars.

The development of this equipment is not due to any one man or set of men, but has come from every corner of the coal-mining industry. The type of equipment under consideration does not embrace any means for mechanical cleaning or storing, as these are regarded as special cases.

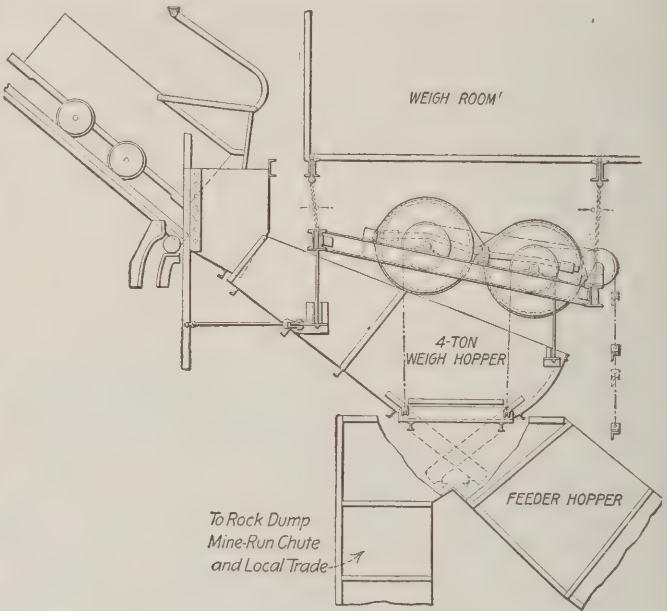
Looking up the Shaking Loading Boom

After the coal is dumped and weighed, the most important consideration is to feed it regularly to the screen or picking table. The feeder is therefore an indispensable device. The reciprocating feeder is a horizontal plate placed at the bottom of the hopper and pushes the coal forward in a solid mass with each forward impulse. It has a short stroke and slow movement and handles the material without breakage.

Another popular form of feeder is the apron conveyor type which is practically a steel belt. This will feed the coal at any rate depending upon its speed. It cleans itself after each charge and also if it be made of sufficient length forms a ready means of inspecting each car of coal.

From the feeder, the coal is discharged to the screen. Until recently these screens were usually set at an inclination of about 3 in. in 12 in. The Marcus patent picking table screen, as now made by the Roberts & Schaefer Co., of Chicago, is set horizontally, and may be used as a picking table as well as a screening surface. In common with the older shaking screen, it has a screening deck composed of perforated plates, and a lower deck to receive and carry forward the coal which passes through the upper. Valves in this lower deck deliver any size of coal to its particular track or other destination. Whenever such a valve is closed, the product is carried forward, making it possible to mix any size with the other sizes below it.

After screening, it is important to load the larger sizes into railroad cars without undue breakage. Loading booms may be used for this purpose. Steel aprons and rubber conveying belts have in the past been largely used for loading. A new type of this device known as the Roberts & Schaefer shaking loader, recently introduced, consists of two shaking chutes, the forward one being raised and lowered by an electric hoist similar to the conveyor type of boom. The advantages claimed for this device are easy delivery at the extremity and the possibility of rescreening by means of small perforations after the coal leaves the shaker screen.



Arrangement of Chutes below Weigh Hopper

Coal may be picked on the upper or horizontal part of the boom or upon the horizontal screen as noted above. In preparing lump, egg and nut coal for the domestic market, it is often desirable to rescreen them as they pass over the chute just before dropping into the car. This is especially true of the softer coal. Enough breakage and chipping occur when the fuel drops from the screen to the chute leading to the cars to justify the placing of a section with round or slotted holes which will remove this dust and breakage. A small conveyor spanning the tracks under these small screen sections delivers the screenings to the car on the slack track or beyond it to a bin for boiler fuel.

It is essential that any mine of large capacity be able to dump coal directly after weighing to railroad cars. One method of accomplishing this is to place a valve in the chute or hopper below the weighing unit, which when open diverts the coal through a chute to the car. Another method is the installation of a double-dump weigh hopper which may be dumped forward to the shaker screen or backward to the mine-run chute by the operation of different levers. As the weighing point is comparatively high above the railroad track, it is easy to insert a valve or bypass to send coal to a chute for local consumption, and perhaps another bypass for rock when it is desired to hoist it from the mine.

Modern market demands make it necessary to pick and screen many fuels which were formerly only imperfectly sized. The pickings are apt to contain bony coal or coal combined with small impurities as well as slate and rock. The former may often be used for boiler fuel while the latter is of course sent to a rock dump. To handle this refuse and semi-refuse, a double cross conveyor may be employed which delivers to two compartments in a small bin. The slate side of this bin delivers to a small dump car which runs to the rock dump. The other side contains the boiler coal which may be delivered to a car running to the bunkers in front of the boilers.

The foregoing illustrates how all of the special functions of the tipple may be obtained as well as the regular ones preparing all sizes of coal and any combination thereof, without interruption to hoisting or dumping.

As may be seen from the accompanying photographs all of the elements entering into the "standard" preparation plant above described are in successful everyday operation at many mines throughout the entire country.

* *

A Successful Man

By Pennsylvania Mine Manager

For some years I have wanted to see written in the "Who's Who" column of Coal Age something of the most successful mining man I know. No one who knows him well enough to furnish the facts for such an article will ever send them to a publisher during his lifetime, I think, because he is so strongly opposed to being "written up" that there is danger of losing his friendship, and this is something so well worth having that his friends are not apt to risk estrangement for the sake of the pleasure of seeing him in print. So far as I know he has never been photographed, and I am going to try to tell about him in such a way that he will not recognize himself.

I can not resist the temptation, however, to give the state the honor of his citizenship, so will mention Pennsylvania, which I think is large enough to hide from public view several successful coal men. I am at a loss for a fictitious name. He looms up so big that no one thinks of calling him "mister." He has reached that enviable stage when he goes by his first name.

Karl Smith, or "Big Karl," was a pick miner in the days when a pick miner found something to do whether cars came or not—back in the days when coal was handled twice, if the car was not close enough, and piled back along the ribs for rods, awaiting a chance to load. So when we start Big Karl as a pick miner, don't picture a fellow who drops in from nowhere, begs a pick and shovel from the company and goes in to make coal while his empty car is waiting.

When union labor came along and held out the usual emancipation from work, Big Karl was "some agitator," but as he was "some miner" he soon found that the fraternal spirit which requires both ant and sluggard to share and share alike was not conducive to success. Not that he renounced the principles of brotherhood; but he was too big to serve blindly a system making no allowance for individual merit. His first promotion came after a mine fire. No one knew just how it came about, but he was telling how to stop it and leading the work without any further authority than just being the only one who seemed to know what to do. Probably the officials who were in charge got the direct credit for the good work; but as he was soon afterward made "pit-boss" it may be supposed that there were some people looking on who were judges of men.

Although Karl could scarcely read or write—as was not infrequently the case among the old pick miners—he handled his mine with such good judgment that he was given an adjoining mine to look after also. As the company had numerous interests and many mines, he was soon used as an inspector to hunt down and eliminate various kinds of inside inefficiency. It being necessary to make reports and do some letter writing, Big Karl "met the situation." By the way, that is his pet phrase, the watchword of his success and the only thing about this sketch which might identify him.

As he gradually built up a position all his own by meeting the various mining situations confronting the company, he studied the language of the educated men with whom he associated, and studied the spelling and punctuation of the letters he received. He has read the best journals and kept up with the best mining practice. He has not been fooled by the froth and is by no means a wide reader, but seems to have a knack of picking out what he wants.

Because of his horror of "rushing into print" he has rarely been induced to contribute to the coal journals; but of late years the public has benefited by having from him some of the best papers ever delivered before mining men. In the meantime several of our most widely known experts have built up reputations, not consciously perhaps, by publishing mining methods and experimental practice taken first hand from Old Karl's fund of practical wisdom. He is a man you cannot associate with without taking on a lot of information so vivid that you are apt to consider that you have made an original discovery.

A man of such attainments must necessarily be aware of the "virtue gone out of him" when he recognizes it in print under the name of another; but Old Karl is "some philosopher," too, and "meets the situation" by a kind of jovial cynicism all his own, and remarks on the value of education, with the usual exaggerated idea of its value so common among those who have never been under a conventional schoolmaster.

I really wonder, after all, if he has lost much. He has met the situation, anyway. I once knew a boy with one leg. He played at all the games and excelled in many. I have looked at him stripped for a swim and examined that one good leg. I am sure no one could develop two like it, and he got it by meeting situations.

I have been prompted to write of Old Karl—and he is not an old man—because I think I owe most of what mining sense I may have to him. And I pick him out as an example of success because he seems to have made the best use of his opportunities—has met the situation.

Mine Timbering in Steel

By R. B. Woodworth*

SYNOPSIS—Some facts and figures dealing with the introduction and growth in the use of steel mine timbering in the United States.

My dear ————:

We had in stock at our ——— works several sets of standard steel mine timbers and collars. In building some overcasts, they took the liberty of using up some of the collars for these sets, and the same has caused quite a little flareup between this office and the works.

The superintendent states that he needs either 6-in. collars or 6-in. I-beams nearly every week, etc.

Yours very truly,

————————,

Purchasing Agent.

This letter is typical; it represents a condition which obtains at most mines where steel mine timbers are in use, and is beyond question the result of a careful adaptation of a steel section to an unquestioned need.

Steel-Timbered Pump House and Gangway

In the year 1907, the Carnegie Steel Co. detailed the writer to make certain investigations into mine timbering conditions in the anthracite region, as a result of which it began to roll sections particularly suitable for mine-timbering purposes and to devote special attention to the use of steel in ordinary operations underground.

Previous to that date, sporadic attempts had been made by several of the mining companies to use steel, largely on account of the enormous loads which had to be carried, and without much reference to the fundamental principles of economic use which at present underlie the commercial exploitation of the use of steel.

The Susquehanna Coal Co. installed its first lot at the Stearns Shaft, Nanticoke, Penn., in 1897. The Lehigh Valley Coal Co. had in like manner installed a steel-framed pump house in the same year at Hazleton Shaft Colliery, No. 40 Slope. These two installations were followed by a few others, so that in the year 1907 there was probabily a mile of steel-timbered gangway in the anthracite coal fields.

In the bituminous coal fields, little had been done owing to the lighter loads to be sustained, and the general availability of good wood for mine-timbering purposes. A fire, however, had caused the Spring Valley Coal Co. to timber the shaft bottom at Shaft No. 1, Spring Valley, Ill., with 15-in. beams in 1896, some 400 ft. being in place. In the United States, however, for obvious reasons, the use of steel within the mine was not nearly so far developed as it was in Europe, and when the writer began to look into the literature on the subject, he had to draw largely on transatlantic publications, and found little dealing with installations in this country.

At the present writing, there is increasing reference to the use of steel in the mining papers of the country and in the reports of the mine inspectors, and representative installations of steel mine timbers are to be found in all coal-mining districts. It is, of course, impracticable to trace the total quantity of steel so used since many manufacturers are actively competing in this as in other fields, but in the year 1914 the Carnegie Steel Co. alone furnished to the mines sufficient plain and fabricated beams for inside mine work to timber permanently 14 miles of main headings, in addition to 700 props.

The growth of the use of steel in the mine is borne out by the sales record of that company. It is sufficient here only to set down as an indication the number of three-piece sets:

1907	190	1911	2530
1908	252	1912	4183
1909	750	1913	3681
1910	1194	1914	3845

The success in the introduction of steel within the mines is due in the first place to the rolling of sections particularly fitted for inside mine work; in the second instance, to the furnishing of such sections in simple forms suitable for immediate erection, and in the third instance, to intelligent education of mine officials and operators along the line of an ultimate economy in expenditure, based not on first cost, but on service.

While the 5x4-in. beam was introduced for mine work in England in 1885 by the Darlington Iron & Steel Co., and while a similar section was rolled in the United States previous to 1907 for use as car stanchions and similar structural purposes, the rolling of the H-beam in 1907 gave an impetus to the use of steel in the mines of the United States, for the reason that these shapes were made in convenient sizes and were exact equivalents both for strength and for weight to the ordinary forms of wooden mine timbers.

H-beams were originally designed to be used as legs in the three-piece set. In addition to that purpose, they have been used for the legs of headframes, for chords of steel trusses, for buntons in concrete-lined shafts, for hoisting guides in hoisting compartments, and for use as light columns in inside mine construction. Their use in this direction has been so appreciated by the structural-steel trade generally that they have taken a field of their own outside that for which they were originally designed. The use of the H-beam has practically displaced the earlier forms of leg sections, such as double channels used in the first installations. The range of sizes rolled is commensurate to all the ordinary needs of the mine, and there are a simplicity and a strength in their use not possible with any other form of rolled steel.

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*Engineer, Carnegie Steel Co., Pittsburgh, Penn.

Suitable as these sections were for use as single props in the working places, it was not until 1912 that records begin to show their appearance in quantities in the mines. Since that date numbers of them came into use in the anthracite coal fields and with simple cap and base have proved a coming factor in the support of large areas under severe loading conditions.

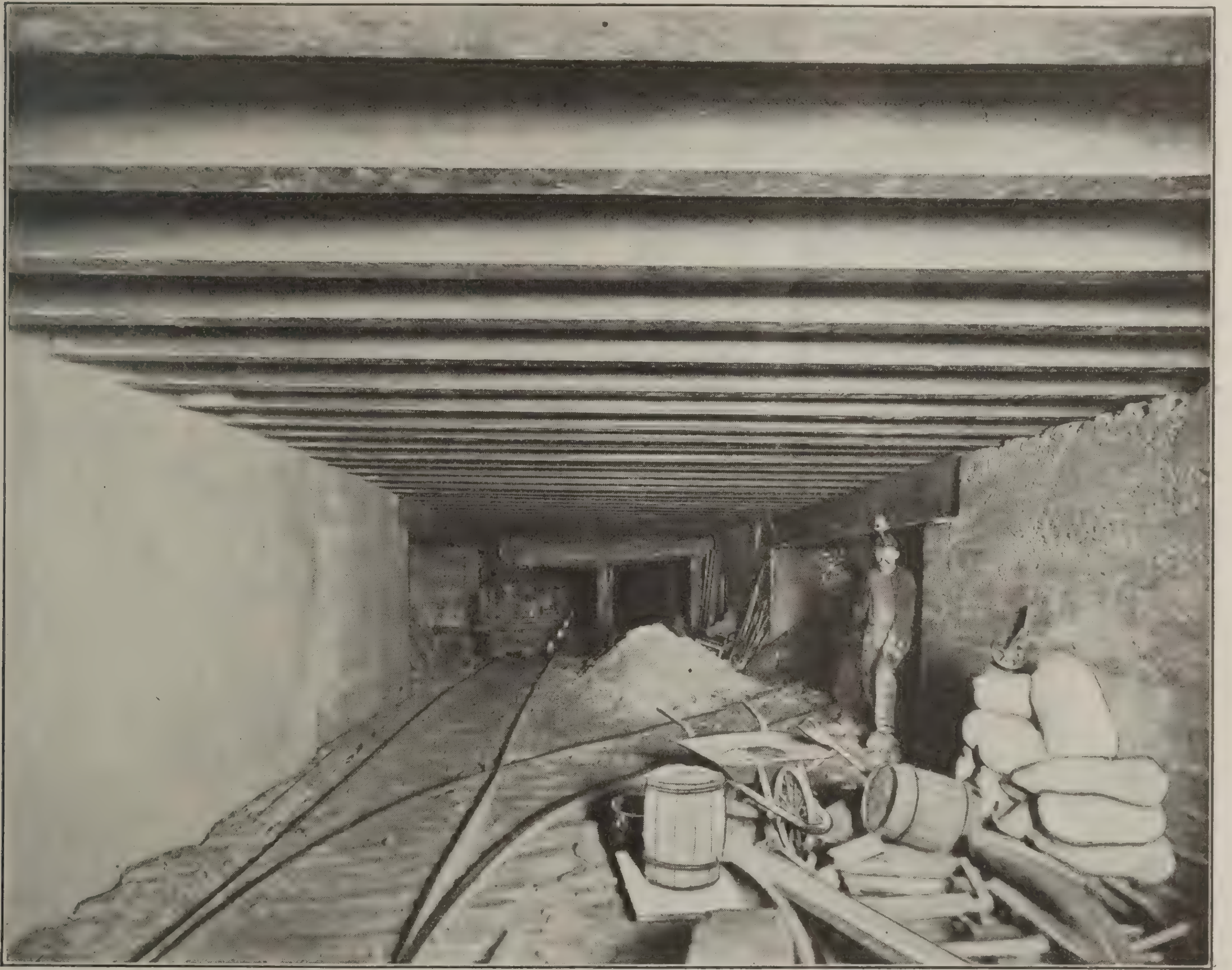
In the anthracite regions, the three-piece mine-timber set, consisting of two H-beam legs and an I-beam collar, is the standard form of modern construction, with the H-beam prop in sporadic use. Some beams are doubtless employed supported on brick or stone side-walls, or even directly on the coal.

In the bituminous regions of Pennsylvania, while there are many installations of three-piece sets, the ordinary practice is to use plain beams on brick, stone or concrete walls. In southeastern Ohio, Kentucky and Illinois, it is usual to support plain beams directly on the coal, or on short timber sprags, although there are representative installations in these mines also of the three-piece steel timber set.

The introduction of steel in place of wood in the United States has beyond question led to a decreased cost of production just as it has done in England and on the Continent of Europe. Average experience, therefore, runs parallel to statements made in the 35th Annual Report of the Chief Inspector of Mines for the State of Ohio, who, in discussing the retimbering of large areas in southeastern districts, comments on this work:

> Even with all this retimbering which has been done in the last two or three years, the management informs me that the cost of production is a great deal less than when they attempted to operate without properly timbering the haulways and taking the risk of anyone being there when the fall occurred. This demonstrates that in keeping the mine up to a high standard of safety, efficiency is increased and cost of production decreased.

Modern underground practice is summarily shown by the exhibit of the Carnegie Steel Co. at the Panama-Pacific International Exposition, San Francisco, Calif. The modern mine in its permanent headings at least is timbered with steel, lagged with poles, plank, concrete slabs or steel plates. Its haulage is electrical, power being transmitted on overhead copper wires, suspended from steel beams by simple hangers. The product is hauled in steel cars, supported on steel axles and solid rolled steel wheels. These wheels traverse steel rails, carried on steel cross ties. The exhibit represents many an actual installation, successful by reason of the intelligent coöperation of the manufacturer with the operator desiring the very lowest maintenance cost.

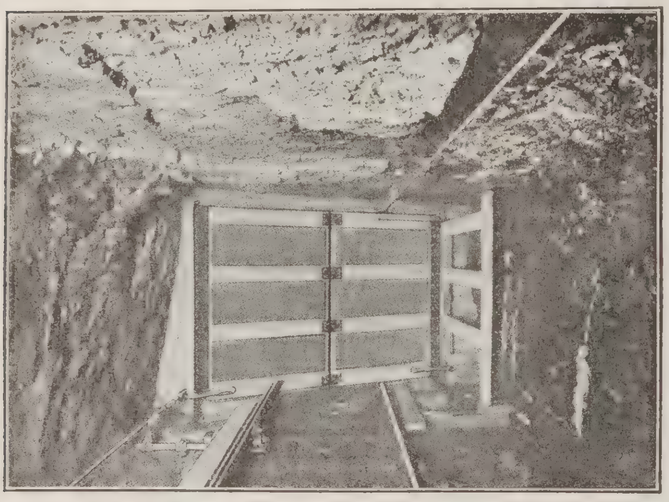


Steel Timbers at Maryland Coal Co.'s Mine, St. Michaels, Penn.

Mine Doors for Coal Mines

An automatic mine door is now in operation in the No. 2 mine of the Madison Coal Corporation at Glen Carbon, Ill. It was installed on Aug. 22, 1912, by C. L. Bowman, representing the American Mine Door Co., of Canton, Ohio. Upon the successful installation and operation of this and several similar machines the Madison Coal Corporation ordered 74 additional doors of the same pattern.

Briefly, the construction and method of operation of this device are as follows: The door extends diagonally across the track and consists of two sections swinging in unison in opposite directions by means of a connecting bar extending beneath the tracks. Steel channels extend either way about 32 ft. from the door, one leg of the channel being in alignment with the inner edge of the track rail. Each of these channels is in two sections hinged at a point 14 ft. from the farther end so as to permit of a vertical movement of the channel through a distance of about 5 in.



Mine Door in Mine No. 2, Madison Coal Corporation, Glen Carbon, Ill.

At three points on the underside of each channel toggle joints connect with levers which are secured to a rocker shaft. Other levers attached to the outer end of these rocker shafts are connected directly to each other and to each door by a system of links and rods. The arrangement is such that the channels are in an elevated position when the door is closed.

When a car or motor passes over the track it engages one of these channels, forcing it down, which movement communicated to the toggle joints turns the rocker shaft, which in turn actuates the rods and opens one wing of the door directly and the other indirectly through the connecting bar. To the middle rocker shaft on either side of the door is fixed a lever upon which an adjusting weight is placed. This is so arranged as to give sufficient power to close the door after the wheels have passed off the channel.

The construction of doors and door frames is such as to afford great rigidity with a minimum of weight. The panels themselves are covered with sheet metal and the joints at the top and sides are made airtight by specially treated cotton duck.

There are several reasons for placing the doors slantwise across the track. When so placed each half of the door moves through an arc of only 60°, whereas if placed squarely across the track it must of necessity swing through 90°. It is obvious that this position renders the operation of the door more rapid and positive. Since the two wings forming the door open in opposite directions, the air pressure is equalized, and this pressure tends to close one wing with as much force as it opens the other. The doors are thus capable of operating successfully under heavy pressure, while the air current may be reversed in direction without blowing the door open.

Such a door does not open until the trip gets to it, and closes as soon as the trip gets past. It is continually on the job—days, nights, Sundays and holidays, when trappers may be absent. It saves a considerable quantity of air, since it usually remains open for only a fraction of a minute. It reduces the liability to explosion because it remains closed when not in use. By its use the human element is eliminated, and with it the great danger to life and limb of trappers. On account of its economy it allows the placing of certain sections of large mines on a continuous air current, thus increasing the volume of air to each place and eliminating the necessity for expensive overcasts.

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A Question

By A. M. Iner

I have been told the life story of a miner who is now well past the meridian of life; who would undoubtedly be regarded by expert mining men as being well versed in the principles and practice of his profession; sober, persevering and industrious, but who has never attained to any position of prominence in the industrial or social world.

He entered the coal mines before he was 12 years old. As time passed, he observed that those who occupied positions of trust and influence in the industry possessed or were supposed to possess educational advantages superior to the common coal miner. Naturally inferring that education was the keynote to advancement, his ambition was aroused to secure the possession of these powers. The time devoted to this was pilfered from his hours of recreation and recuperation. He learned the full truth and importance of the poet's expression as applicable to his own case:

The heights by others reached and kept
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upward in the night.

During the process of acquisition, he learned of the existence of a great moral truth; namely, that all men are spiritually equal, and by virtue of this equality they have rights that must be respected, and that he who infringes upon these rights, through the accident of position or power, is guilty of a crime against his Creator. Basing his rule of life upon this principle, he exerted his utmost endeavors to put it into practical application.

Three Characteristic Elements

In studying the biographies of great men he perceived that three characteristic elements were emphasized as forming the prime factors in the realization of an ideal; namely, honesty, industry and perseverance. Honesty he construed to mean the invariable practice of truth and justice as based upon the great moral law; industry, as being the honest employment of all the energies of body and mind in the performance of his duties; perseverance, as being the practice of honesty and industry in face of all discouraging opposition.

Actuated by these motives, he studied, practiced and observed, and succeeded, while yet young, in securing the necessary legal recognition of ability to fill any position in or about a coal mine. Not satisfied with this attainment, he continued his studies and practical work with the object of acquiring, as far as possible, a complete mastery of the subject, believing that he could thus become of more value to his employers and a source of greater good to his fellowmen. He secured an inferior position and discharged his duties faithfully and well, being able to bring to his assistance new and practical ideas of economy and efficiency. After several years, he was promoted to a slightly higher position, the duties of which he discharged in an equally commendable manner.

This, however, was the summit of his advancement. Since then he has been filling minor positions, almost invariably under men who are his inferiors so far as ability is concerned. In all this time he has faithfully adhered to his ideals of what is right. He treated the men over whom he had charge with invariable courtesy and kindness, enforcing obedience with firmness, and discipline without harshness. His men trusted him for his integrity and respected him for his justness. His intercourse with his superiors in position was marked with courtesy, respect and a degree of deference commensurate with dignity, but never with cringing or servility. He has availed himself of every opportunity and means for an honorable advancement.

The foregoing is no melodramatic character created from imaginary moral virtues. It is a human recital of an actual case. The story is not brought forward to point a moral, but rather to question the truth of an accepted fact. Is this man a success or failure? If success be the inevitable result of the practice of the principles stated, then he is most assuredly a success, but he is not so accepted. He possesses neither wealth, influence nor high position—three essentials dominantly characteristic of success as the term is generally accepted.

If there be some other element indispensable to a successful life, it has not been emphasized in the portrayal. Why? If it be honorable it should be known, or is it possible that what we so generally accept as success is simply the attainment of an end irrespective of the means or the demands of the great moral law?

The above cartoon illustrates a thought that bears more directly and more forcibly on the question of individual success than any other idea that might be advanced. Even unusual ability is impotent if it is not backed by the vigor and energy of healthy manhood. Mr. McCay, in his drawing, shows plainly how the great obstacles in the way of the man climbing toward success are pushed aside by health. When we are overworked or are distressed by sickness or debt, it follows that the degree of personal efficiency we attain in our work must be very low. Man might as well try to reach the moon as to hope for success while sickness and disease are sapping his vitality and strength. If we would be successful, we must first be healthy.

Coal Preparation at New Mine of Old Ben Mining Corporation

By L. S. Richards

SYNOPSIS—The Old Ben Mining Corporation, of West Frankfort, Ill., has installed a large spiral coal-cleaning plant at its new No. 9 mine, as its use of the spiral at the No. 8 mine proved the value of that device for removing bone and slate. A picking table and screens for the cleaned coal make the delivery of a high-grade product certain.

One of the most successful plants in operation today for preparing bituminous coal for market is at No. 9 mine of the old Ben Mining Corporation at West Frankfort, Ill. It is of especial interest, first, because the method of cleaning the coal is new to the bituminous field; second, because of the flexibility of the arrangement of the tipple and the thoroughness with which each step in the operation has been worked out and, third, because of the attention which has been given in design to selecting machinery of the greatest durability.

Development of Needs Shown in Earlier Plant

D. W. Buchanan, of the Old Ben company, has given the preparation of coal much study. This plant is the outcome of this careful consideration and was designed along the general lines of the equipment at their No. 8 mine after that plant had been in operation about three years and had proven that the method installed there would clean the coal in that vicinity both completely and economically. A great saving, both in loss of time and expense of upkeep, can be effected where both design and material are well selected. This is proved by both of these plants, for it is unusual to hear of either mine being idle because of a breakdown.

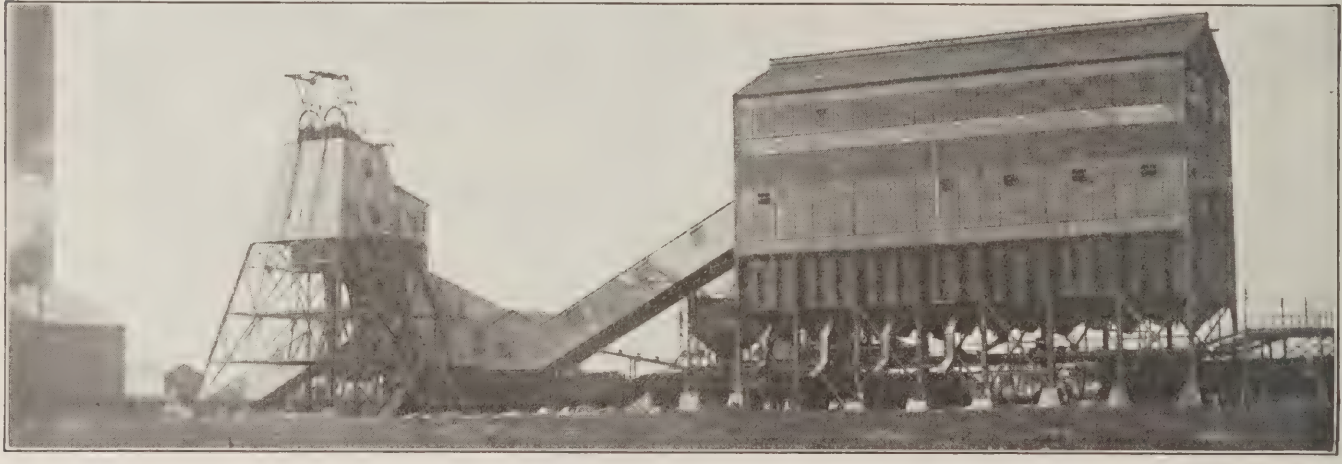
The tipple and rescreening plant are built entirely of steel and are of substantial design. The greatest care has been taken to provide ample clearances and ready access to all machinery. The floors are of concrete, and plenty of windows for light and air have been provided, thereby making the task of the workman easier to perform and his work consequently more efficient. By noting the windows in the lantern of the sizing plant, as seen in the illustration, an idea of the excellent lighting provided will be gained.

The coal is hoisted from the shaft in 4-ton mine cars and dumped directly into a weigh-box. The elimination of the usual dump chute lessens the drop of the coal into the weigh-box, thus saving in the breakage of coal. The weigh-box in turn discharges directly onto a pair of 10-ft. shaking screens. These are of ample width for the screening so that any necessity for a feed hopper at this point is removed. This also makes a big saving in the breakage of coal.

The shaking screens are supported by heavy 14-in. chilled-tread rollers, and the roller races on the screens are heavy castings provided with removable wearing strips of machine steel.

The Manager Can Deliver Coal to Satisfy Almost Any Size Specifications

On the screens the coal is separated into 3-in. slack, 3-in. to 6-in. egg and 6-in. lump, and by means of a flop-gate at the upper end of the upper screen the run-of-mine coal may be loaded directly into railroad cars on the slack track if desired. The 3-in. slack may be loaded directly into railroad cars or may be passed to a conveyor for delivery to the sizing plant. The egg coal may likewise be loaded directly into railroad cars or may be passed to the sizing-plant conveyor with the 3-in. slack, or it may be reduced in a 36x48-in. two-roll spring-relief coal crusher located under the screens to 3-in. slack and then passed to the sizing-plant conveyor.



General View of Tipple and Sizing Plant at No. 9 Colliery of the Old Ben Mining Corporation at West Frankfort, Ill.

The lump coal may be passed through a flop-gate in the lower shaking screen to the crusher and thence to the sizing-plant conveyor, it being reduced to 3 in. or 6 in., or it may be discharged over the end of the lower shaking screen to a flat-top apron-conveyor picking table and loading boom.

The loading boom is operated by a 4½-ton self-contained direct-current electric hoist, which permits of the boom being handled quickly and easily by the operative, thus lessening the chance of his neglecting to keep the end of the boom in position to give the minimum fall of coal into the car.

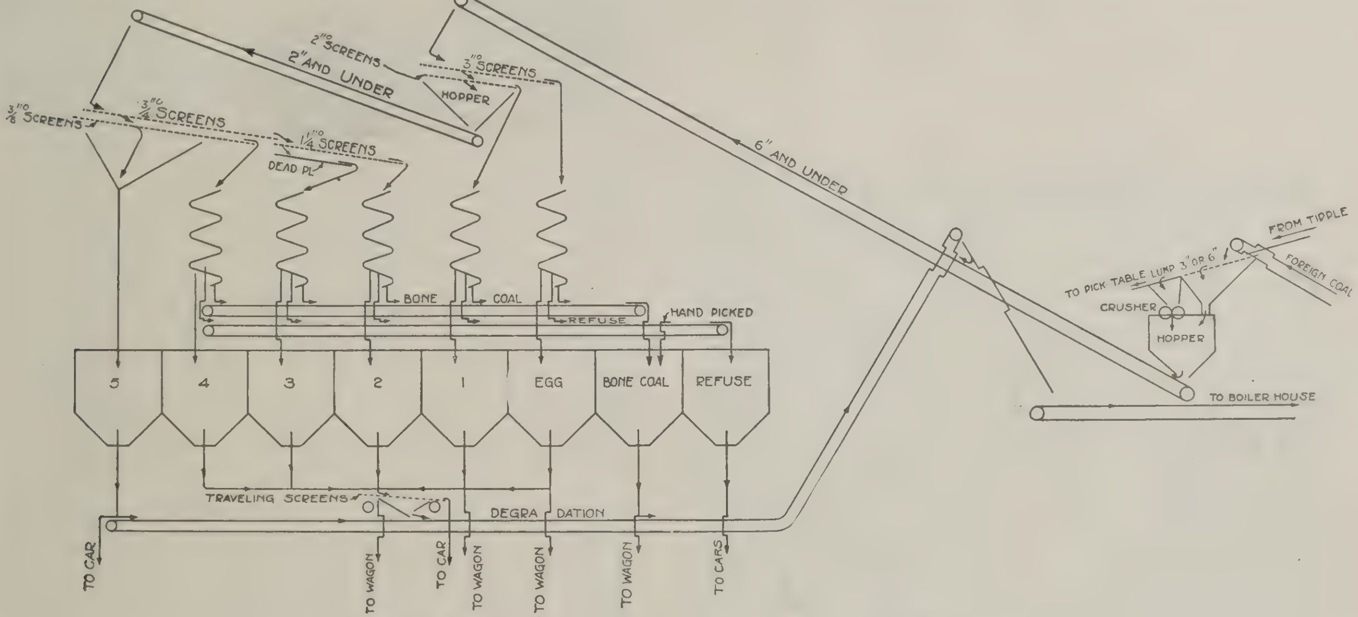
PICKING TABLE AND ROCK AND BONE-COAL HANDLING DEVICES

The horizontal length for picking is about 20 ft. and at the end of this level portion a hinged plow has been provided so that the coal may be discharged from the conveyor at this point into a telescoping box-car chute serving cars on a track outside of the lump track.

The rock from the picking table is passed by the pickers into a 24-in. apron conveyor located directly alongside the picking table. This conveyor elevates the rock to a rock bin over the lump track. This bin has a capacity of about one car. The bone coal picked from the lump is passed by the pickers to a 24-in. belt conveyor and delivered to the crusher and thence to the sizing-plant conveyor.

"FOREIGN" COAL WILL ALSO BE CLEANED

Provision has been made for bringing "foreign" coal to the plant and sending it to the sizing plant in the following manner: Under the egg track on the side of the tipple opposite the sizing plant is a track hopper for unloading railroad cars. From this hopper the coal is elevated by a 60-in. inclined apron conveyor and discharged onto the shaking screens, into the crusher or direct to the sizing-plant conveyor.



FLOW SHEET OF SIZING PLANT AT OLD BEN NO. 9

The conveyor to the sizing plant is a 60-in. inclined apron conveyor of the same type as that for the foreign coal. These conveyors are made of 60-in. steel overlapping pans with malleable ends mounted on a double strand of 18-in. pitch-bushed bar-link rolling chain with 8-in. inclosed oiling rollers. The sizing-plant conveyor elevates the coal to the top floor of the sizing plant, where it is delivered by means of a bifurcated chute to two sets of shaking screens, each set being made up of two screens, one 6 ft. wide with 3-in. perforations and the other 7 ft. with 2-in. perforations. These screens make a 3- to 6-in. egg, a 2- to 3-in. nut and a 2-in. slack.

The 2-in. slack is delivered to a 48-in. apron conveyor of the same type as the main conveyor and elevated and delivered by means of a four-way chute into four sets of two shaking screens each. One screen of each set is 4 ft. 6 in. wide with two decks, the perforations in the upper deck being 3/4 in. in diameter and in the lower 3/8 in. The other screen is 3 ft. 6 in. wide and has a single deck with 1 1/4-in. perforations. These screens separate the 2-in. slack into 1 1/4- to 2-in., 3/4- to 1 1/4-in., 3/8- to 3/4-in. and 3/8-in. slack.

SCREENS OF A NEW TYPE

The type of screen used is patented by Mr. Buchanan and is made with 3x6-in. pine side timbers and supported by 1-in. ash boards. These boards are rigidly attached to the screens and to the building structure, the movement of the screen being taken by the spring of the boards. The connecting-rods driving the screens are also of ash of 3x6-in. section. These are rigidly bolted to the screen side timbers and to the eccentric straps and are necked to a 3x3-in. section in the middle portion so as to allow them to spring sufficiently to take care of the vertical movement of the eccentrics. This type of screen has been used in a number of installations during the past few years and has proven satisfactory for the sizing of small coal.

THE SPIRAL SEPARATORS

Each size of coal except the slack is delivered by the screens to a set of spiral separators, there being six spirals for each size of coal on each side of the building, making twelve in all for each size. The spirals take out the bone coal and refuse, and each size of cleaned coal is delivered by means of conveyor spirals to two bins, one on each side of the building. The bone coal and refuse on each side pass to separate 18-in. belt conveyors, and by means of two 18-in. belt conveyors running across the building the bone coal is delivered to a bin on one side of the building and the refuse to a bin on the other side. The refuse is hand-picked on the cross-belt conveyor before it is discharged into the bin. The pickings are thrown over to the bone-coal belt.

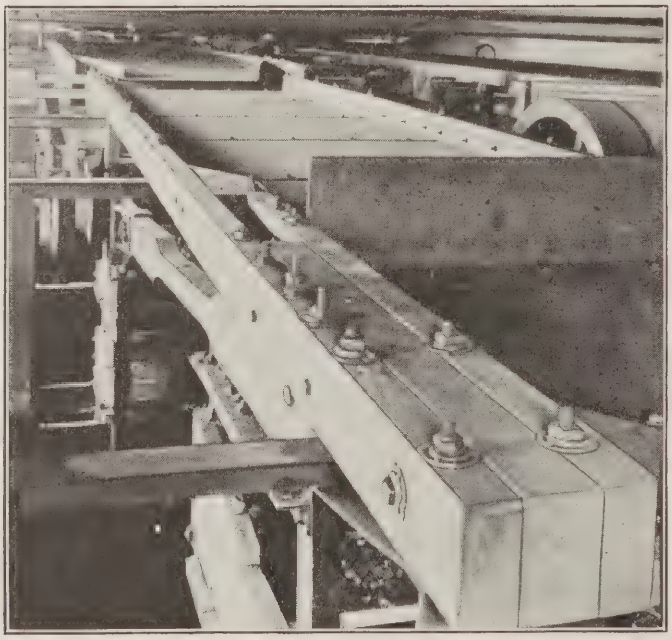
The spiral separators were furnished by the Anthracite Separator Co., of Hazleton, Penn., and they have proven very successful on this coal. The total storage for each size of coal in the rescreening plant is 250 tons and 125 tons each for the bone coal and refuse.

After Cleaning and Conveying the Fuel, Fine Coal Is again Screened Out

The cleaned coal is drawn from the bins by means of special rack-and-pinion gates and delivered to railroad cars, the five larger sizes passing over a traveling lip shaking screen, which insures the coal being loaded without undersize or dust. One of these screens is located over each track. These screens are also patented by Mr. Buchanan and are of the same type as those in the rescreening plant. Each screen is mounted on a structural-steel carriage with heavy double-flanged rollers running on a pair of rails carried from the bin columns on each side of the track. Two independent motors are mounted on the carriage, one for driving the screen and the other for the travel mechanism.

Boilers Are Fed by the Bone Coal, the Dust from the Cleaned Coal and Some Slack

The bins on one side for the three larger sizes of coal as well as the bone-coal bin are provided with chutes with undercut gates for supplying the wagon trade. The degradation from the traveling lip screens is collected by a 20-in. apron conveyor midway between the tracks and discharged onto a 20-in. belt conveyor, which carries it either to a conveyor for delivery to the boiler house or to the main sizing-plant conveyor and back to the sizing plant. Chutes are also arranged for delivering slack and bone coal to the degradation conveyor, and thence to the conveyor leading to the boiler house.



Buchanan's Patented Screens

The boiler-house conveying system consists of a 20-in. belt conveyor running alongside the slack track and inclined for about two-thirds of its length. This conveyor discharges onto a 12x5-in. horizontal double-strand flight conveyor, the whole system having a capacity of 40 tons per hour. The flight conveyor distributes the coal over a steel bunker in front of the boilers, from which it is drawn by spouts.

Spiral Separators

The various units throughout the plant are driven by individual motors, avoiding the necessity of long drives and a multiplicity of line shafting. The plant is designed for a capacity of 5000 tons a day and it is probable that this capacity will be reached in the near future.

The complete machinery equipment was designed, manufactured and erected by the Link-Belt Co., of Chicago, and the building structure was designed and built by the Wisconsin Bridge & Iron Co., of North Milwaukee, Wis.

Mr. Buchanan has every reason for feeling proud of this plant as it is without doubt one of the most uptodate in the bituminous coal fields today.

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A Failure

By Pennsylvania Engineer

Yesterday a man moved from our camp who is a failure. Since the first of July he has been out of work and has now secured a job at $2 a day.

Two years ago he was recognized as the best master mechanic in our region and drew a salary accordingly. Today he is down and out, and yet he is in the prime of life. The reason is that he became a "knocker." Success turned his head, and he wanted everything his own way. The general manager, superintendent, mine foreman, all were classed as "know-nothings" and fools if they did not agree with him. Not content with his disparaging remarks concerning them at our own plant, he carried his unjust comments to the surrounding plants, and his reputation as a master mechanic gradually became nil. Regardless of all our efforts to aid him and break him of this habit, he became worse and worse, and it was at last necessary to let him go.

Two years ago nearly every plant in the region would have been glad to secure his services; today no one wants him at any price. He is the most capable man I ever saw around machinery, and yet today he is down and out—a complete failure.

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Success with Steel Mine Ties

By J. C. Evans*

Many steel mine ties have been patented. The majority of these have never been placed on the market, as the patentees were unable to interest practical men in their manufacture, since the ties were either too costly or were impractical from the mining man's standpoint. Others have reached the market at considerable expense, only to meet with failure. After considerable experimenting, J. J. Ross, a practical mining engineer and at the time general superintendent of the Hutchinson Coal Co. at Fairmont, W. Va., on Apr. 6, 1909, received a patent covering the channel tie which he had developed and tried out. This device is now known as the Fairmont tie.

Top-Cutting Machine Operating on Track Laid with Fairmont Ties

Mr. Ross then organized the Standard Tie & Manufacturing Co., of which he is the president. After making distribution of several thousand ties during the year 1909, this company, after considerable investigation, made arrangements with the Fairmont Mining Machinery Co. whereby the latter was given the exclusive right to manufacture and sell this tie.

During the year 1910 about 50,000 of these ties were placed in the mines, mostly in small trial lots ranging from 100 to 1000 ties, with the understanding that they could be returned at no expense to the mine owner if they were not a success. The same policy has been carried out each succeeding year, with the result that 99 per cent. of the trial consignments have been retained, and an increase in the size of individual orders as well as the total number of ties sold has been experienced.

The accompanying illustration shows a top-cutting mining machine in actual operation in Mine No. 303 of the Elkhorn Mining Corp., and operating upon tracks laid with Fairmont mine ties. This machine has a sweep of 21 ft. and weighs 7 tons, which will give some idea of the pressure placed upon these ties.

This steel mine tie has been successful at many other operations. There are over 200 mines that have in use this tie in quantities ranging from 500 to 50,000, while 300 other mines have these ties in lots of less than 500, in most of which cases they are being tried out. Four large coal companies have 180,000 Fairmont ties in use, or an average of 45,000 ties each, none falling below 41,000. Ten other firms have 115,000, or an average of 11,500 ties each.

Considering the short period since the Fairmont tie was placed on the market and the unsatisfactory conditions in the coal business during the last two or three years, this record spells success.

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Hard Work, the Great Essential to Success

By E. H. Weitzel*

A great many qualities contribute to any man's success. Some have qualities which others lack. Some qualities which contribute to one man's success might not be helpful to another. The one great essential to success in any line of endeavor is hard work, and the measure of success of most people is in direct ratio to the application they are capable of giving to their business.

Natural ability, education, personality and opportunity are the chief contributing causes in the order named, but none of these, no matter how liberally they may be bestowed, will be productive of success without the added essential of consistent, conscientious effort.

In reviewing the history of the men who have achieved the greatest success in the present generation in our own country, we cannot fail to be impressed with the thought that the experience of almost extreme poverty in their early youth was a factor which contributed to their later success by teaching them early the lessons of economy and thrift and by requiring a habit of work which in most cases amounted to drudgery. Lack of early education does not seem to have hindered these men, and their success should lend encouragement to the youth of the land today, when there is so much being said on the subject of early education and lack of opportunity for those born in poverty and with so few of the advantages that are supposed to be necessary for their future well-being.

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On Selling Coal

Count that day lost
Whose low descending sun
Sees coal sold at a loss
And business done for fun.

—The Dealers Fuel Co., St. Louis, Mo.

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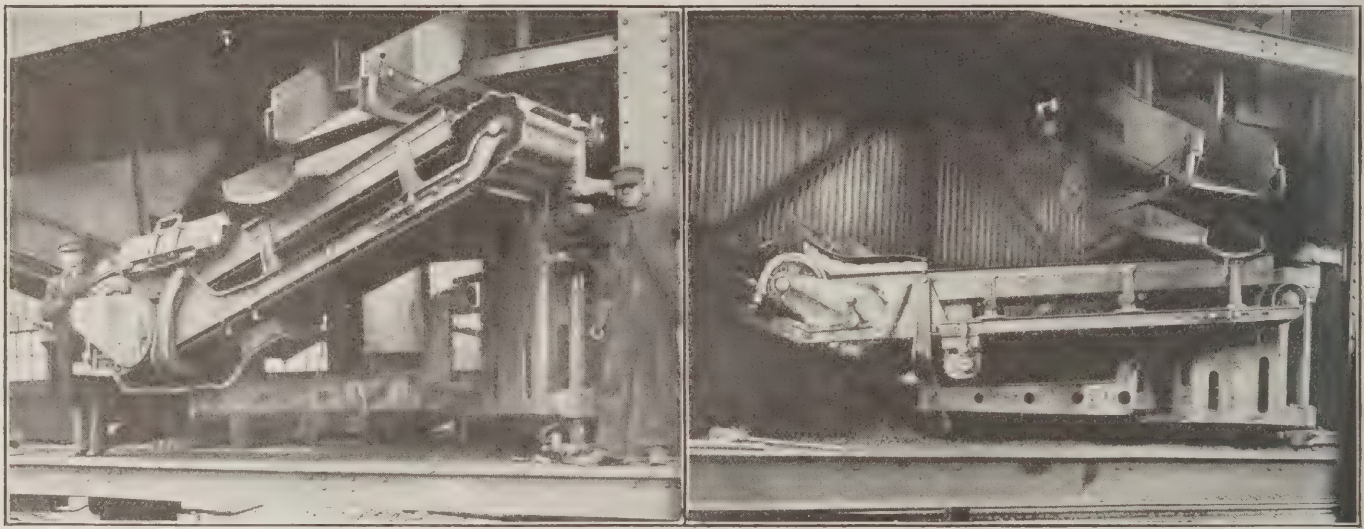
*Fairmont Mining Machinery Co., Fairmont, W. Va.

*Manager, coal mines, Colorado Fuel & Iron Co., Pueblo, Colo.

A Successful Box-Car Loader

Successful devices for loading coal into box-cars without breakage have been slow in development. Coal was first loaded into this type of car by hand with shovels, and the first machine devised for this purpose attempted to duplicate hand work. Improvements were introduced from time to time, the constant trend of which was in the line of a conveyor which would deposit the coal gently instead of throwing it into place.

The general type of loader of which this article treats is a conveyor. The idea was first applied in the loading of coke, the product being carried on a rubber belt. This conveyor was supported on hinged arms, which allowed it to be pushed well into the box-car. Operated electrically, it took 66 per cent. of the coke or coal from the chute, carried it on a belt to its resting place and allowed it only a short drop. The remainder of the material was tossed a short distance so as to roll off the pile into the end of the car. This was the basic idea of the original Manierre box-car loader, and has been retained in succeeding machines.



Steel-Apron and Belt Manierre Box-Car Loaders on Dock of the Berwind Fuel Co., Superior, Wis.

In July, 1914, the Berwind Fuel Co., at Superior, Wis., was having trouble loading coal into box-cars. It was believed that the most modern equipment obtainable was being employed. Three different makes of loaders of the throwing type for lump coal and a Manierre belt loader for sized fuel were being employed. Each was the latest product of its respective company. But the lump coal gave trouble, the big pieces falling apart when thrown against the ends of the box-car. Complaints had been numerous the previous winter and were already beginning to trickle in on the new season.

Then came George Manierre with his new loader, built to convey lump coal rather than throw it. This particular machine had a steel apron and was designed especially for large-sized fuel. The Berwind people were skeptical. They considered that a new type of loader was merely another means of breaking coal. But the Manierre machine which they then had in use worked fairly satisfactorily on coke and sized fuel, but for lump coal was not altogether desirable.

Mr. Manierre had, however, installed several steel-apron loaders and knew what they would do. The dock manager was interested, but felt that the new type of conveyor was still in the experimental stage, and he did not care, as he stated, to engage in costly experiments. It was suggested that steel-apron loaders already in use be inspected; and since the belt loader was admirably performing the work for which it was designed, the steel-apron machine seemed to deserve the courtesy of this inspection.

Mr. Manierre then proposed to write a guarantee on the performance of his machine, as he had confidence in it and the work which it would perform. The inspection of steel loaders in operation followed immediately, and as a result a steel-apron box-car loader designed to handle lump coal was installed. At the present time this loader is satisfactorily performing the work which up to its installation had been accomplished only imperfectly. Lump coal is now delivered to the cars as lump, not slack.

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It is better to be a success as a coal miner than a failure as a schoolmaster. In the one case you are adding to the world's goods; in the other you are likely to be misguiding the rising generation.

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The Man Who Wins

By Harry N. Taylor*

The old-time mine manager or pitboss, with his hit-and-miss methods, is a thing of the past. With the swing of the pendulum, the mining engineer depending entirely on theory and technical practice has had his inning and has passed into the discard. The man who has attained his knowledge by long training has taken the places once filled by the promoted coal-digger and the ultra-technical office engineer.

The really successful mine manager of today is a combination of the two. He must be a hard-working, practical underground man, with enough education along technical lines so that he can apply both theory and practical knowledge to his daily work. Such a man gets results. When a man can be found who can add to these two most necessary qualifications horse sense and an ability to deal with his men fairly but firmly, he is sure to make his mark and attain full and lasting success.

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*Vice-president, Central Coal & Coke Co., Kansas City, Mo.

Such men are sought far and wide in the coal-mining industry and will always be first choice when the management of any large operation is in want of a mine manager. Being successful, their positions are always secure. Success attained by methods approved by all men is success worth while and will bring a far greater reward than success (so called) when the method of attainment is questionable. Hard work, good education, common sense, loyalty and firmness all point the way to the goal.

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Economical Pipe Covering

The success here recorded is not by any means new. That, perhaps, is in its favor rather than the reverse, for in the 13 years intervening there has been time to show whether the success was temporary or permanent. In that length of time the ownership of the colliery has changed, but the pipe and its covering still continue their work. The covering was placed by the Parrish Coal Co., of Plymouth, Penn., but the mine is now owned by the Lehigh & Wilkes-Barre Coal Co.

The steam line to be covered was 14 in. in diameter and 1600 ft. long. The immediate coat placed over the pipe was J.-M. Asbestos-Sponge felted sectional pipe covering wrapped with wire, then a layer of rosin sized paper wrapped with twine, and another layer of hair felt 1-in. thick and also wrapped with twine. Over this was a layer of rosin sized paper held in place by twine and over all a jacket of asbestos roofing wrapped with galvanized wire.

Showing Covered Pipes at a Colliery of the Lehigh & Wilkes-Barre Coal Co., Plymouth, Penn.

According to tests made in the anthracite coal fields, it has been determined that an uncovered 14-in. steam line carrying live steam at 100-lb. pressure would waste 0.54 lb. of boiler fuel for every linear foot per hour. This waste of fuel would in a year amount to 3784 tons, and in the 13 yr. would total to no less than 49,192 tons. It is estimated that 91 per cent. of the loss is avoided by the use of this covering. Thus 344 tons of coal were saved every year, or 44,765 tons in the whole life of the coating to the present date.

Nearly a Cent and a Half per Ton Mined Saved by Pipe Covering

Thus calculated, the losses of inefficiently or uncovered steam lines are made quite clear, but yet there are coal-mine managers who apparently cannot see them. The plant of the Elkins Coal & Coke Co., at Bretz, W. Va., near Morgantown, used in December and January 4.4c. worth of fuel per ton of coal mined. On Feb. 1 the pipes were covered with Asbestos-Sponge felted pipe covering, and the manager, J. B. Hanford, states that the cost in the two months following was 3.1c. per ton of coal produced. The gain in that length of time was $307.20. As the total cost of the covering was about $800, it is clear that it will pay for itself in the first six months.

At the plant of the Phoenix Electric Co., in Butte, Mont., this same covering has been in use on 3500 ft. of pipe for five years in the steam tunnels. According to James E. Davidson, the superintendent, the condensation meters on these mains show approximately 11 per cent. less condensation per square foot of radiation surface than where the coating is 85 per cent. magnesia. The coverings mentioned are manufactured by the H. W. Johns-Manville Co., of New York City.

*

Saving in Kerf and in Blacksmithing Labor

In sections of the country where timber stumpage was cheap the circular saw had its great advantage in lumbering, but the band-saw is fast driving it out of use because the kerf of such a saw is far thinner and the saving of timber in cutting a stick into planks by such an economical machine is considerable. Sawdust is an unsalable product, and in fact in many cases it actually takes power and costs money to burn it. As soon as the surrounding country becomes populated it is no longer permissible to wash the sawdust into the streams. As a result the wide kerf-making circular saw has been largely driven from the mill.

Similarly the wide-awake colliery manager is striving to reduce the kerf in coal mining, not perhaps so much to save valuable coal as to avoid paying for mining, hauling and handling a fuel for which the market is not willing to pay a fair price. The ideal of the mine manager is to get all lump coal, just as the ideal of the saw-mill owner is to convert his standing timber into planks, boards or veneers without any unnecessary loss.

It was to gain this end that the Wasson Coal Co., at Wasson, Salem County, Ill., installed chains which made a kerf of 3½ in. instead of 4½ in., thus reducing by 22 per cent. the "bug-dust" made by the machine cutting and lowering the current used per machine from 60 to 39 amperes, or about 40 per cent. Concurrently the strain on the machine was reduced, more coal was cut and less bits used.

The cutterhead used in connection with this chain is one having all wearing parts renewable, and grease lubrication for idle sprockets is supplied by a compression cup built into the stud.

The problem solved at Kincaid, Ill., by the Peabody Coal Co. was the rapid sharpening of bits for 20 electric chain mining machines. To keep such a large number of machines in sharp bits required two power hammers and four men, and even then they had difficulty in keeping up with the work. So the Peabody Coal Co. installed a Morris automatic bit machine for test. The other mines of the company have now been equipped with these machines. The result has been uniformity in the bits, greater capacity, reduced necessity for repair of mining machines, less consumption of power, fewer bits to sharpen and reduction in the cost of sharpening.

The reduction in slack, increased speed of cutting and decreased use of power foreshadow changes in our present methods of working if slack coal continues to be a drug on the market. The chains and bit machine described were supplied by the Lott Mine Equipment Co., of 538 South Clark St., Chicago, Ill.

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If a man but discovers an improved way of handling a pick he has achieved success of importance to the world.

⁂

Successfully Draining a Flooded Mine

By J. J. O'Connell*

SYNOPSIS—Through the bursting of a canal the lower levels of a mine were flooded. New steam pumps were procured and after three months of continuous operation the submerged workings were recovered.

In many coal regions the pumping problem is an ever present one, the successful solution of which requires much skill and the selection of capable equipment.

A pump to successfully cope with the severe conditions encountered in coal mining must be simple, compact, rugged, and sufficiently heavy to stand considerable rough handling and also meet emergencies demanding excess capacity. Water enters the mine from all sides. So long as its flow is uniform or nearly so, the pump can usually eject it and keep the mine in good working condition, but there is always the danger of drowning out the workings by a sudden flood from some unforeseen source.

Just such an accident as this occurred in the coal mine of the G. B. Markle Co. at Jeddo, Penn. This firm operates several mines covering a considerable area in the neighborhood of Hazleton. A number of widely separated shafts are connected on the surface by steam railroads.

About 3 o'clock one December morning several years ago, the night pump man at Mine No. 5 noticed an unusually large volume of water rushing into the tunnel a short distance from where he stood. By hurrying out of the mine he narrowly escaped with his life.

An investigation showed that this sudden influx of water was caused by a break in a canal on the side of a hill above the mine. The escaping water had forced its way through a manway down to the lowest level of the mine about 500 ft. below the surface. As quickly as possible the steam pumps on the upper level were put to work and efforts made to check the flood. It had gained considerable headway, however, and in a comparatively short time the entire lower level with all the machinery and equipment was completely submerged, and it was promptly decided that in view of the seriousness of the situation more pumps of larger capacity should be installed at once.

John Markle hurried to New York, and had a conference with the engineering staff of the A. S. Cameron Steam Pump Works, he knowing from past experience that the Cameron pump in emergencies was capable of working far in excess of its rated capacity for a considerable length of time, even when submerged with water. He accordingly ordered two of the largest steam pumps in stock, a 20x12x20-in. piston pump, with a normal capacity of 42,000 gal. per hour, and a 22x14x20 piston pump, with a capacity of 48,000 gal. per hour. In the course of a few hours these pumps were on their way to Jeddo by express. They were installed immediately.

In the meantime the steam pumps on the upper level were kept operating 24 hr. per day. So great was the influx of water, however, that even when the larger pumps had been installed, it required six weeks of pumping with the entire equipment to force the water low enough to permit of the installation of the large Cameron steam pumps nearer to the lower level. Then it required another six weeks to recover the pumps and equipment installed in the flooded level. These pumps, after they had been cleaned and oiled, started up promptly and worked as well as ever, even though they had long been submerged owing to the break in the canal.

The foregoing can give but a slight conception of the tremendous work involved in recovering this mine. Some idea of the enormous quantity of water that had to be pumped may be gained from the fact that the two large Cameron pumps mentioned above had a combined normal capacity of 2,160,000 gal. per day. It required the constant operation of these two pumps and a number of others for three months to reduce the level of the water to a point where operations could be resumed.

This was an unusually difficult pumping problem, and in no small measure its successful solution may be ascribed to the remarkable performance of the pumps employed. In spite of the severe service conditions then encountered, these pumps have been operated more or less continuously for the last 14 years in the various mines of the Markle company. They are now installed in mine No. 6 and are giving good service.

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The U. S. Geological Survey

By George Otis Smith*

Success finds its best expression in the wonderful growth of the coal industry in this country. Yet those annual increments, measured by tens of millions of tons, have been only the aggregate of small increases in output countrywide in distribution. In a similar fashion, any success the U. S. Geological Survey may claim in service rendered the coal-mining industry must be simply the sum of several items extended over three decades.

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*A. S. Cameron Steam Pump Works.

*Director, U. S. Geol. Survey, Washington, D. C.

First of all, our knowledge of the nation's fuel resources is naturally largely the work of federal geologists. When in May, 1908, President Roosevelt assembled the first National Conference on the Conservation of National Resources, a national coal inventory was submitted by the U. S. Geological Survey. Between the issuance of the call late in December, 1907, and the time of the meeting, these estimates of the coal resources of the United States were prepared by M. R. Campbell, and a map of the coal fields of the United States engraved ready for distribution. For the Twelfth International Geological Congress, which met at Toronto in 1913, the estimates were revised and the map redrawn. In the later report, published in the "Coal Resources of the World," the estimates are increased by 1,289,300 millions of tons for the coals below the bituminous rank, and by 342,000 millions of tons for the bituminous and semibituminous ranks, the aggregate being an increase of 1,631,300 millions of tons. These increases largely represent the added knowledge due to five years' intensive field surveys in the West.

The field methods developed by this Survey in the course of its examinations of undeveloped coal regions are now adopted by mining geologists for such surveys in different parts of the world. The Geological Survey was, I believe, the first to use the contour method for showing the underground topography of coal beds and to publish convergence sheets for use in determining the depth of beds diverging at a low angle to the exposed strata.

Since 1902 this field service has surveyed all the accessible coal fields in Alaska, has examined the high-grade Matanuska and Bering River fields, has outlined the coal-bearing areas and the attitude of the beds and has determined the physical and chemical characters of the coals so far as the exposures permitted.

The greatest body of standardized analytical data accompanied by efficiency determinations, and the results of coking, briquetting tests, etc. ever built up by any governmental or other organization to show the qualities of the coals of a country was begun by this survey, whose Technologic Branch was later reorganized by Congress as the Bureau of Mines.

The statistical work of the Division of Mineral Resources, which was inaugurated in 1882, has been conspicuously successful. In presenting the annual statistics of the production of coal and coke, the Survey has not only accurately recorded the progress of these industries, but has kept the public informed of trade conditions and the influences which have affected prosperity or depression. The value of the Survey's statistical reports to the trade has been recognized, not only by the various industries at home, but also by foreign students of economy, who have testified to the superiority of the statistical work of the U. S. Geological Survey.

The Sturdiest Youngsters You'll Ever See.

Success

Written
Expressly
for
COAL AGE
By
BERTON BRALEY

* * *

Watching the Bank Account Grow Fat.

SAID THE MINER, "I've worked as a
fellow should,
And honestly labored for livelihood;
I've toiled deep down like a human mole
And mined my share of the good black coal;
In working hours I have kept awake
And taken no chances I shouldn't take;
I've seen my duty and done it—pat—
And I guess I've made a success of that.

"I married a girl who was square and true
(And that was a sensible thing to do),
For she's made our cottage a cozy nest
And borne me five of the finest, best
And sturdiest youngsters you'll ever see,
And so, as the head of a family,
I feel some natural pride thereat—
And I guess I've made a success of that.

"I never was strong for the doubtful joys
Of batting around with the other boys
And coming home drunk with my cash all spent
That should have been kept for the grub and rent.
No, I've tried instead to put away
A pretty good share of my hard-earned pay,
And—watching the bank account grow fat—
I guess I've made a success of that.

"I'm doing my labor the best I know,
And I may be a boss in a year or so,
And I'm happy at home with the kids and wife
And playing my part in the game of life,
For I've got my health and a bit put by
And I look at the world with a fearless eye.
So, thinking it over the best I can—
I guess I'm a pretty successful man!"

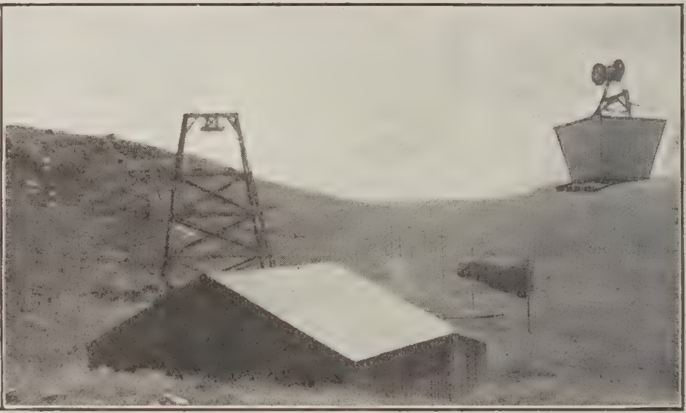
Waste Coal Disposal by Means of an Aerial Tramway

At the mine of the Montana Coal & Iron Co., Washoe, Mont., it is necessary to dispose of many tons of waste daily. This waste is really fine coal, for which there is no market in that locality. As within a short time this slack catches fire from spontaneous combustion, it is necessary to dump it somewhere where it will cause no damage to property. Until a few years ago, it was loaded into railroad cars and dumped at a convenient siding. This was quite expensive, and the company began to look around for a more economical method of disposing this material.

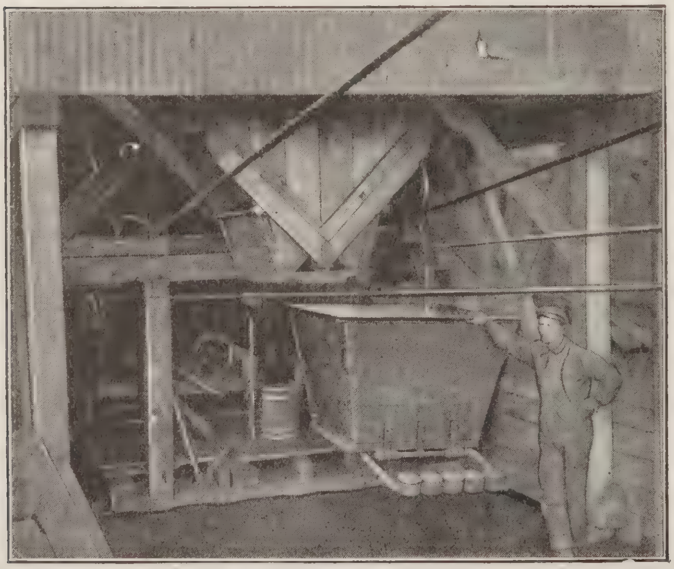
After considerable investigation, an aërial tramway was installed. This is of the two-bucket or "jig-back" type, and was built by the Broderick & Bascom Rope Co., of St. Louis, Mo. The tramway is 1200 ft. long, spanning a gulch to a high point on an adjacent hill. The maximum dumping space is thus secured. The capacity is 25 tons per hour.

The buckets have a capacity of 40 cu.ft. and are self-dumping and self-locking. They are propelled by means of a 5/8-in. endless rope, making two half laps around rubber-lined driving sheaves. A 15-hp. motor furnishes the power required. Only one attendant located at the loading station and controlling the gates for filling the buckets as well as the power to and speed of the line is required. Dumping is accomplished by means of aërial trips fastened to the track cables. These may be moved from time to time as may be desirable. This tramway has been in successful operation for several years, and has proved an economical solution of the waste-disposal problem.

Bucket Discharging Contents



General View of Tramroad



The Loading Station

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Money and Position Are Not Always Success

By George N. Lantz*

There was a man who had the faculty for making money. Midas-like, whatever he touched turned to gold. His wealth increased with every effort, every investment. He was very rich and possessed all the money he desired, but the man knew he was a failure.

After a time he decided that he would spend his money for things that could be seen and known. He bought property; he bought fine houses, and in them he placed beautiful furniture, pictures, tapestries, sculpture. He endowed schools and colleges, and he became known as a liberal man. But all the time he knew he was a failure.

Partly because he was wealthy, partly because he was young and handsome, and partly because he was educated and refined, the man became an idol of society. The doors of the most exclusive homes were opened to him; he joined clubs, was found at parties and at dinners. He was very popular, but he knew he was a failure.

One day he sat down and took a careful inventory of himself. He said: "I have money, property, position, yet I do not measure up to my own idea of success. Some men possess all these, and yet are successful. Other men are successful, and possess none of them. Why am I a failure?"

"Because," he answered himself, "I have forgotten that self-preservation is class-preservation; that self-success is class-success. I have forgotten that when my gain means another's loss we both lose, and that when my gain means another's gain we both gain. Every man can be successful if he helps others to succeed; no man can be successful at another's expense."

"Then," said he, "I will follow this rule: I will acquire nothing tangible at the expense of my fellowman."

The man is now a success.

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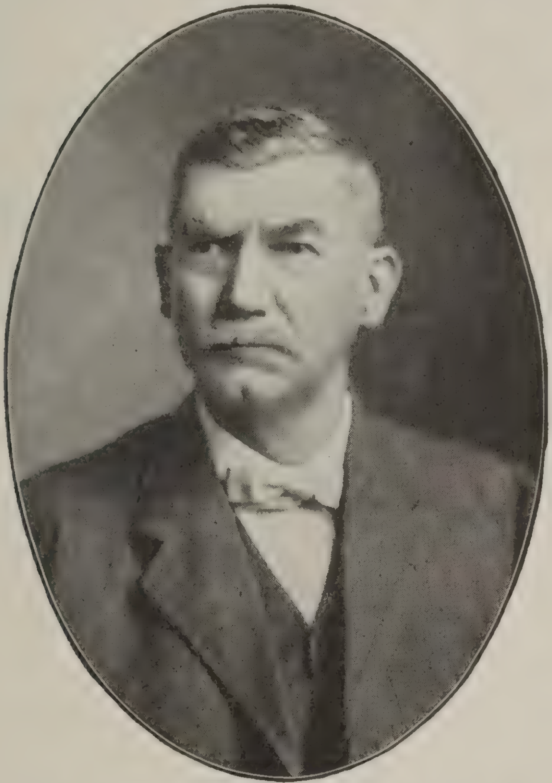
*New Straightsville, Ohio.

P. J. Rogers

It is an axiom of business that the man who is able to manage his own affairs well will be successful in directing and handling the affairs of others. Such men are always in demand and generally at the helm.

Down in Alabama the coal-mining business has produced a good many men of this type. Recognized among the foremost of these for his ability and sterling worth is P. J. Rogers, of Ensley, at present associate superintendent of the Wylam Division of Coal Mines for the Tennessee Coal, Iron & R.R. Co.

Mr. Rogers is one of the few men whose service with the Tennessee company is as old as the company itself, so far as its operations in Alabama are concerned. Born in Elmore County, Alabama, Nov. 22, 1856, his entry into the mining industry began in 1878, when he entered the employ of the Eureka Mining Co. at its coal-mining plant near Helena, Ala. This concern, by the way, at one time owned and operated the old Oxmoor Furnaces, near Birmingham, famous in the industrial history of Alabama. Fortunately for the mining industry Mr. Rogers stuck to this end of the business, and in 1882 transferred his allegiance to the Pratt Coal & Iron Co., then developing the famous Pratt seam near Pratt City, Ala. About that time the Pratt company began the leasing of convicts from the state for the operation of one or two of its new mines, and Mr. Rogers was made warden and given the management of these people.



P. J. Rogers of the T. C., I. & R.R. Co.

In 1886, the Tennessee Coal, Iron & R.R. Co. entering Alabama and acquiring the ownership of several companies in the district, among them the Pratt Coal & Iron Co., assumed charge of Pratt mines. The plan of leasing convicts being continued, Mr. Rogers was made manager of prisons. From that time until 1912, when the company voluntarily relinquished the employment of convicts, he remained in charge of this department, handling it so successfully as to earn the distinction of being the best posted man in Alabama on convict affairs. To him is due the credit for inaugurating the task system adopted by the State Convict Board early in his régime, by which the men were classified according to physical ability, and the amount of work or number of tons the various classes were required to mine was fixed.

The wisdom of his judgment in fixing the task on a correct basis has been fully demonstrated by the fact that this has never been changed or deemed excessive and remains the standard to this day. Mr. Rogers' opinion on convict matters was always sought by the state officials. It is a high testimonial to his successful administration of this department that the working and welfare of convicts on the part of the Tennessee company were always considered a model for other concerns in the same business. In other words, his management of this difficult task stood every test for a period of over 25 years.

In November, 1895, Mr. Rogers was appointed superintendent of the Pratt Mines Division, embracing 8 or 10 mines and several coke-oven plants and coal washeries. In this position he succeeded Erskine Ramsay, who became at that time chief engineer and assistant general manager for the Tennessee company. With the exception of a few minor changes in the division arrangement and name, Mr. Rogers has remained in charge of that department until the present time.

During the period covered by his service with the company, Mr. Rogers passed through several changes in management as the result of various interests assuming control of the old Tennessee Coal, Iron & R.R. Co., which, prior to its purchase by the Steel Corporation in 1908, was known as the "Football of Wall Street." Without doubt it could be said in absolute truth that in all these changes no executive head ever thought of trying to do without "P. J.," as he became known to his more intimate associates, for he was so quietly and unobtrusively successful in performing his work, and his solid reputation for character and integrity made him virtually indispensable to the enterprises with which he was connected.

Two dominant factors have contributed to his success—character and hard work. As for work, it was often said of him that he could nearly always be found on the job before starting and after quitting time. His character is of the cast-iron kind, solid and enduring. In his long service he has formed the acquaintance of thousands of individual mine workers, many of whom in the past have been out on strikes, but all of these men are now nevertheless his loyal friends and supporters.

He has always taken an active interest in public affairs, having served at one time as alderman of the Greater City of Birmingham. He is the kind of a man whose word is absolutely as good as his bond, and his bond would be worth a good deal, for as we said in the beginning, he has managed his own affairs as well as he has those of his employers. Such men are always in demand and will always be a definition of Success.

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Hate never made a success of anything but war—and that is a kind of success of which the world is growing very weary.

Some Successes in Rock Drilling

By Charles C. Phelps

SYNOPSIS—The Jackhamer drill is of recent introduction in the coal-mining industry; but as it had been serving a long apprenticeship in metal mines, it proved its adaptability to coal-mine work without any further change, and its adoption as an adjunct to colliery work is rapidly spreading.

Three years ago the Jackhamer was unknown to the American coal miner. Today thousands of these little tools are in use in all branches of the coal industry—development work, shaft-sinking, stripping, driving gangways and cutting out seams of coal. They are also performing a multitude of other operations requiring the drilling of rock or coal. In this brief interval the Jackhamer has established for itself an enviable reputation in both the anthracite and bituminous fields as a mining tool of exceptional utility and efficiency.

Houston Collieries Co.'s Shaft at Carswell, W. Va.

It is probable that the miner first came to appreciate the value of the Jackhamer in connection with shaft-sinking. Some of its best records have been made in work of this character, and it is now looked upon as almost a necessity for this purpose. It works close up to the walls, keeping the shaft true to the required dimensions. It starts to operate without delay, whereas, in a crowded shaft, the mounted type of drill probably requires as much time to set up and adjust as is needed for the actual cutting. The steady rotation of the steel, the rapid blows on the drill and the constant blowing of the exhaust through the hollow steel, which keeps the drill hole free of cuttings, all tend to produce rapid penetration and to avoid troublesome delays.

Sunk 61 Feet of Shaft in 17 Days

The records of performance best illustrate the successful achievements of the Jackhamer. A few typical cases follow. At the Bellevue Mines of the Delaware, Lackawanna & Western R.R. Co. coal department, Mike Hoban, a contractor, sunk 61 ft. of shaft of dimensions 12x14 ft. in hard sandstone rock in 17 days, working three 8-hr. shifts daily and using only one Jackhamer. This machine was in almost continuous operation, averaging 280 ft. of hole drilled per shift.

Dolan Bros. recently sunk a shaft 15x16 ft. at the mine of the Lytle Coal Co., near Minersville, employing two Jackhamers for that purpose. In four months' time, working through ground varying from very hard material to slate, they sunk 359 ft. of completed shaft, including timbering. There were three 8-hr. shifts per day and six days' work per week. These contractors say: "We have sunk many shafts of this approximate size with mounted piston drills, but never made the progress we have made in this one." The progress in the case cited figures to about 90 ft. per month. Their best previous record, using other types of drills, was about 61 ft. per month. They evidently entertain hopes of exceeding even this figure, for they state further: "If we had installed a sharpener at this job when we started it, instead of sharpening by hand, we believe we would have exceeded this footage."

Shaft Completed in Three Months and One Week

Another interesting report is from Walter F. Patterson, Jr., of Pittsburgh, Penn. He sunk a shaft at the Houston Collieries Co.'s operation at Carswell, W. Va. The size of the shaft for the first 18 ft. was 30 ft. 4 in. by 22 ft. 4 in. Below that level it narrowed to 24 ft. 4 in. by 16 ft. 4 in., and continued with those dimensions till it reached the bottom at 253 ft. The monthly progress was as follows:

March, 1914	96 ft. excavation, 58 ft. timbering
April, 1914	86 ft. excavation, 53 ft. timbering, 1 water ring
May, 1914	54 ft. excavation, 109 ft. timbering, 1 water ring, 270 cu.yd. concrete
June (8 days), 1914	17 ft. excavation, 33 ft. timbering, 4 strings, guides, brattice and stairs

Three Jackhamers were employed per shift on an average. The weekly average was 18 ft. of completed shaft.

In Stripping Work Steam Can Be Used as Furnished by Shovel

In all of the work previously referred to, the Jackhamers were operated by compressed air. They work almost equally as well on steam. This feature is particularly desirable in coal stripping, as the Jackhamers can be run by steam furnished by the steam shovel used in stripping. During some observations on the use of steam-operated Jackhamers for coal stripping in Kansas the operator drilled 14 one-foot holes in the sandstone cap rock in 20 min. In the coal bed, which is 4 ft. thick, several 4-ft.

blast holes were drilled, the average time for completion being 3 min. each, whereas it required an average of 20 to 30 min. to accomplish the same result by hand. The exhaust steam kept the hole as clean of cuttings as if compressed air had been employed.

USING THE HAMMER DRILL IN AN ELECTRICALLY OPERATED MINE

The development of the electrically driven mine-car compressor has greatly broadened the field of usefulness of pneumatic coal-mining machines for underground operations and this applies especially to the Jackhamer. The mine-car compressor was described somewhat at length in the Dec. 12, 1914, issue of COAL AGE.

DRIVING GANGWAY WITH JACKHAMER DRILL, HOLLENBACH COLLIERY, L. & W.-B. C. CO.

Several other electrically equipped mines are adopting the same method for drilling blast holes in both rock and coal. It is a simple matter to move such units from place to place in a mine wherever they may be needed. They are run over the regular mine tracks, derailed wherever desired and placed to one side. It is a simple matter to connect them up electrically, and they require little attention to operate, being self-regulating, self-lubricating and having a hopper type of water-jacket that requires refilling only at intervals of several hours. The compressed air leaves the compressor in a somewhat heated state, which is a source of economy and avoids all necessity for a reheater.

SERVES WELL FOR DRILLING COAL

There is scarcely a substance known that the Jackhamer will not penetrate with ease—from the hardest granite to the softest coal. The same steel may be used for penetrating different materials, although larger-diameter steels are usually employed in drilling coal. "The Jackhamer is capable of drilling in either coal or rock, which makes it a much handier tool around a mine than the ordinary coal auger," writes W. B. Earnest, of Cordova, Ala., who has been using the Jackhamer in the Indian Head Mines.

He continues: "It is so far ahead of the coal auger as to make the odds ten to one. In using this Jackhamer drill you do not know when you strike a sulphur ball, whereas with the coal augers you readily know it, as you will have to replace your auger because the points break when the sulphur ball is encountered." In boring coal for blasting Mr. Earnest uses a 6-ft. steel with a bit of large diameter and runs it straight in without changing steels and without any support for the Jackhamer other than the hands of the operator.

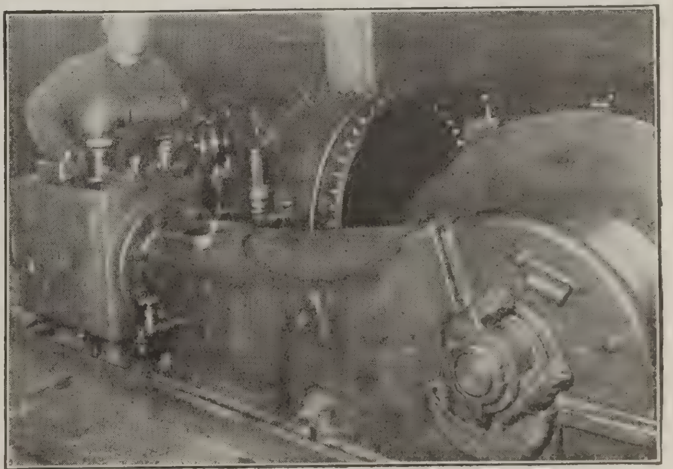
TWO FEET OF HOLE PER MINUTE IN HARD COAL

In the St. Clair Division of the Philadelphia & Reading Coal & Iron Co. the Jackhamer was observed to drill very hard coal at the rate of 2 ft. of 2-in. hole per minute, using twisted steel and a $1\frac{3}{4}$-in. sheep-nose bit. This type of bit worked without raising any dust, which was particularly appreciated by the drill runners.

In telling of its experiences with the Jackhamer the Rex Coal Co., of Kitts, Ky., states: "We have a hard sandstone top and with this drill we can put up a 6-ft. hole in from 15 to 18 min. Before we got this drill we were paying $4 per yard for entry work; now we pay $1.75 and drill the rock, which makes a total cost of less than $2 per yard. The Jackhamer is the finest thing we have ever seen in the way of a drill. One man operates it and doesn't use any support for it at all."

DRILLS WITHOUT MOUNTING

The few cases cited in the foregoing paragraphs will enable one to appreciate the reasons for the success which the Jackhamer has achieved in coal mining. The ordinary mounted drill would be quite out of the question for drilling blast holes in coal, for more time would be wasted in setting it up than in drilling. The Jackhamer, on the contrary, can be kept cutting nearly one hundred per cent. of the time if desired. For the same reason it has supplanted the mounted type of drill for cutting rock and is used for this purpose in many coal mines.



AN INGERSOLL-ROGLER ELECTRICALLY DRIVEN COMPRESSOR

It strikes many hundred blows per minute, which is the principal reason for its great cutting speed. It is a popular tool with the miners not only because it enables them to increase their production but also because it is an easy matter to manipulate it. Weighing only 40 lb., it is as easy to use in drilling a "flat" as in sinking a "down" hole; and in fact it is occasionally used for drilling "up" holes. The Jackhamer requires little physical effort on the part of the runner, as it is merely necessary to apply it to the desired spot and guide it as it cuts. The Jackhamer drill is manufactured by the Ingersoll-Rand Co., of New York City.

The Stonega Coal & Coke Co.'s Operations in Virginia

By Martin Prehn

SYNOPSIS—The story of a 20-year-old success. This is only another instance of the value of considerate treatment on the part of the company for its men.

The operations of the Stonega Coal & Coke Co. are mainly in Wise and Lee Counties, southwestern Virginia, and in Harlan County, eastern Kentucky, and include the communities of Stonega, Roda, Arno, Osaka, Imboden and Keeokee, in Virginia, and of Clover Fork, in Kentucky. Eighteen coal mines, with an average annual production of 5,000,000 tons, and four coking plants—at Stonega, Imboden, Osaka and Keeokee—the production of which is controlled to fit the market, are operated at these seven points and are in direct rail communication with the big coal centers via the Louisville & Nashville R.R., the Virginia & Southwestern Ry., the Norfolk & Western Ry. and the Carolina, Clinchfield & Ohio Ry.

This is one of the coal-mining companies that has given material form to the realization that the physical and social welfare of its employees may have a direct effect on its organization for good or evil. Embraced in this was the erection of attractive four-room dwellings for workmen. One of the photographs reveals the reasons for their popularity. They are neatly fenced in, with their complements of cow-barns, coalhouses and outhouses. The general welfare of each community is safeguarded by careful considerations of sanitation and water supply and through the establishment of schools and churches. The water service is handled directly by the coal company, and since every drop is pumped from deep wells there is little question as to its purity.

A modern, well-equipped hospital has also been erected, but on account of the general good health of the inhabitants its usefulness is confined almost entirely to unavoidable accident cases.

Welfare Work Pays

Can there be much doubt that the spirit of workmen and their families—their attitude toward their employers and company property—is elevated to a high level of loyalty when so much of the purely business side of the question of employment is transferred to the account of physical and mental wellbeing?

The value—the actual money value—of intelligent welfare work along such lines is demonstrated by the entire absence of strikes or other disaffection in the history of the Stonega Coal & Coke Co.

It requires a progressive spirit, an up-to-the-times organization, to foresee the great return that indirect investments of this nature are sure to create. And where this tendency is evident it generally extends to mechanical equipment also. Therefore, despite the 20 years of healthy existence that the Stonega company has enjoyed, the entire mechanical plant bears the stamp of modernity.

A Model Town of the Stonega Coal & Coke Co.

Coal is taken from two beds—the Taggart seam, which averages 6 ft. 6 in. in height, and the Imboden seam, which runs about 7 ft. Virtually all coal is undercut by electric mining machines before being "shot down," and is then moved to the mouth by electric gathering and main-line locomotives. It may be seen from the photograph of a room that the thick beds release a clean, lumpy product. This simplifies production immeasurably, and the larger part of the process resolves itself into a question of transportation. It follows then that the largest item of electrical expense is in haulage cost.

The progressive spirit of the Stonega company was attested recently by the announcement in the trade journals of the closing of a contract with the Electric Transmission Co., of Pocket, Va., for the supply of all electric current for every one of the 18 plants of the company. So drastic a change, fostered by a company whose farsightedness and engineering ability are widely known,

A Row of Miners' Houses

Loading Coal at Room Face

will arouse much general interest among mining men; and therefore one phase of economic management, which involves the consumption of much electrical energy, will probably prove especially interesting.

Experience, covering a period of many years, long ago led to an appreciation of the advantages of roller-bearing wheels for mine cars. Severe competitive tests revealed conclusively the economies obtainable with the best of such equipment. It was found that a given locomotive could haul a train equipped with roller-bearing wheels over a given piece of track in one-half the time and with half the power consumed in hauling an identical train equipped with plain bearing wheels. In addition thereto the enormous savings in lubricant effected by enforced economical lubrication and the fact that additions of fresh lubricant were found necessary only once or twice a year pointed toward operating economies of great magnitude from such wheels.

This naturally led to a series of competitive tests of a great variety of roller-bearing wheels, from among which the Enterprise wheel, of the Enterprise Foundry & Machine Co., of Bristol, Va.-Tenn., was finally chosen. That was three years ago. Since then all new cars, and old ones as fast as they went through the shops for repairs, were fitted with these wheels.

Other "home" activities that impress one with the progressiveness and initiative of this company are to be seen at every hand. A unique device designed and built in the company's shops enables one man at the tipples to run 2000 tons of coal through a rotary dump in 10 hours. A "barney-block" has been perfected for use on inclined planes which utilizes the same track as the mine cars—this is another evidence of intensively progressive and profitable use of equipment.

The coal produced by the Stonega Coal & Coke Co. is extensively known for its uniform heat value and freedom from excessive ash, and the coke made in its ovens—Wise County coke—is used in great quantities by foundries and furnaces in convenient rail communication with the company's mines.

This is the brief story of a 20-year-old coal-mining success; and the greatness of this success is attributed to progressiveness and fellow-feeling.

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Water Hyacinth Briquettes

The director of the prison at Pnompenh, who has made a careful and thorough study of the subject, is authority for the statement that since April, 1911, the water hyacinth, which grows in such profusion in many streams as to seriously impede navigation, has been dried, compressed into briquettes, and used as fuel at Khartum and other points on the Upper Nile. These briquettes can be put on the market there at $6 (gold) per ton, and it is said that tests made on a steamer on the White Nile have demonstrated that their efficiency as a fuel is exactly equivalent to that of an equal amount of the best coal.

A View of Ovens and Coke Yard

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There are plenty of recipes for success, but the only ones that are any good contain work as the principal ingredient.

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In plastering a brattice or overcast use nine parts yellow clay and one part mule manure. Examination of the brattice months afterward will show that it is still moist and will not crack open.

A Real Success in the Pocahontas Field

By Flat Top Engineer

SYNOPSIS—The story of how modern ideas converted a positive mine failure into a successful operation. This case shows the beneficial effect of decent surroundings on the efficiency of company employees.

The line of demarcation between success and failure is often indiscernible. Sometimes it happens that the policy which, to everyone but the man who is behind it, looks as if it would precipitate the concern into a quagmire of bankruptcy and financial disgrace will, if carried to its logical conclusion, result in a colossal success.

I have observed many instances of this, but the one which has left upon my mind the most vivid impression occurred at a mine in the Pocahontas field.

For many years after the mines adjacent to this one had been shipping coal it stood untouched. Expert engineers had reported unfavorably concerning its development. The coal was low and dirty and the royalty high.

Finally an adventurous spirit, the success of whose sales agency had inspired him with the desire of conquering in the producing realms of mining, undertook its development. He visited all the nearby mines, took in the details of their general construction and layout and installed a plant true to the best traditions and practice, as he had gathered them from his tour of observation and from his advisory engineers.

In due time a satisfactory output was obtained, but here the mine vindicated the opinion of the examining engineers and refused to pay. The cost of production was high because of the thinness of the seam, and the price obtainable was low because of its dirty quality.

A Long Struggle

But the owner was game. For five years he devoted the profits of his sales agency to taking care of the deficit of the mine, which was accomplished with the assistance of an occasional mortgage on the property itself. But during the dull times of 1908 the sales agency, which had been hard hit by the panic of the preceding year, found itself unable longer to bear the financial burden of keeping the mine in operation, so it was sold to its creditors. They did not want it; but as it was the only tangible thing their money represented, they had to take it.

The man whom they appointed as manager was in many respects unusually well qualified for the position. He had a well-grounded knowledge of the technical details of both mining and plant construction, and—what was of vastly more importance—he had a thorough understanding of human nature and was a positive genius when it came to grasping the underlying elementary principles of a problem. If a man, a machine or a method did not function, he possessed to an unusually high degree the knack of divining just what was fundamentally wrong.

The purchasers of the mine had little or no confidence in the object of their purchase, but they had perfect confidence in the manager; so after he had studied the situation and asked for a large appropriation to be expended in improvements it was ungrudgingly granted. The first problem that he had to solve was to improve the quality of his product. This he did by the installation of a tipple and washer constructed along modern scientific lines, the first of its kind to be installed in the Pocahontas field. The product obtained set a new standard of excellence in Pocahontas coal and was such as to satisfy the demands of the most fastidious.

The first problem was solved; the second, and clearly the more difficult one, awaited his attention. This was the reduction of the cost figure.

Reducing the Mining Cost

As all mining men who have ever attempted it know, any change to more progressive methods is vigorously combated by adherents to the old order. This was especially true in the instance under discussion, but eventually in the face of bitter opposition from the miners the most uptodate electrical and mechanical equipment was installed throughout the mine. The pick was discarded for the mining machine, the mule was replaced with the electric gathering locomotive, and the trapper-boy abdicated in favor of the automatic door. Wherever it was possible for machinery to take the place of manual labor this was effected.

But this alone did not solve the problem. To have an efficient machine one must have an efficient man to operate it. How, then, must he attract to his plant, or develop and keep there as part of his permanent organization, men of good habits and sufficient intelligence to take care of and to operate on an efficient scale this large amount of machinery?

The personnel of his organization was at that time of as high an order as that of any of the neighboring operations, but this did not suffice. He realized, as did Henry Ford, that if one would excel in the production of an article he must have super-average producers, and here his knowledge of the fundamentals of human nature asserted itself. He knew that if given the same men the other fellow had, he could, with the aid of better living conditions, more generous treatment and more attractive surroundings, develop them into more efficient workmen.

With this in mind he set out to build a mining town so radically different from any of its neighbors and so entirely out of keeping with the building traditions of the Pocahontas field as to be a continual source of surprise and astonishment to the occasional visitor from other camps.

All of the buildings that had been previously erected were either torn down or remodeled; the building ground was laid out in broad streets and generously sized lots. Conveniently planned, neat-appearing and well-constructed houses were erected, well back from the street lines so as to afford a good sized front yard, which was grassed and set with ornamental trees and shrubs. In the rear of each house was a vegetable garden, usually 100x50 ft., the whole inclosed with a neat, substantial fence. Pure spring water was furnished to each dwelling, and poultry houses and cow stables were provided for the use of the tenants. Rent was reduced out of all proportion to the prices charged by neighboring operations, and prices in the company store were reduced to a competitive basis with independent merchants, and uniformly courteous treatment was accorded all customers.

The reader who may detect nothing unusual in these things must remember that this was some years ago; that it was in fact, though never advertised as such, pioneer welfare work in the Pocahontas coal fields. Other operations have been and are following rapidly in its lead. The reason they are doing so is because this instance has proved beyond a doubt that it pays good dividends in dollars and cents.

Yet there were those—and they were not in the minority—who held that the management was simply throwing good money after bad and that the result would be another forced sale. But time has demonstnated that each step was absolutely essential to the concern's financial success and that had the policy of improvement stopped short of its final perfection these pessimistic prophecies would have been fulfilled.

All this leads me back to my opening remark—that the difference between a successful and a ruinous policy is not always apparent to the onlooker, but that in this instance a judicious investment in human welfare spelled success.

Success in Rail Bonding

By G. H. Burge*

SYNOPSIS—Constant inconvenience and expense due to poorly bonded mine track led to the invention of a rail bond that required no drilling in the rail web, no pressing-in of terminals and no driving of pins.

Some four years ago, through the aid of a large electrical manufacturing company of Chicago, I secured a position as electrician with the Northern Central Coal Co., of Huntsville, Mo. At that time this firm was operating two mines, known as No. 2 and No. 12. These were about three-quarters of a mile apart and were supplied with power from the No. 2 Mine. Direct current was employed, this being furnished by one 250-kw. Ridgway generator and one Goodman 100-kw. generator.

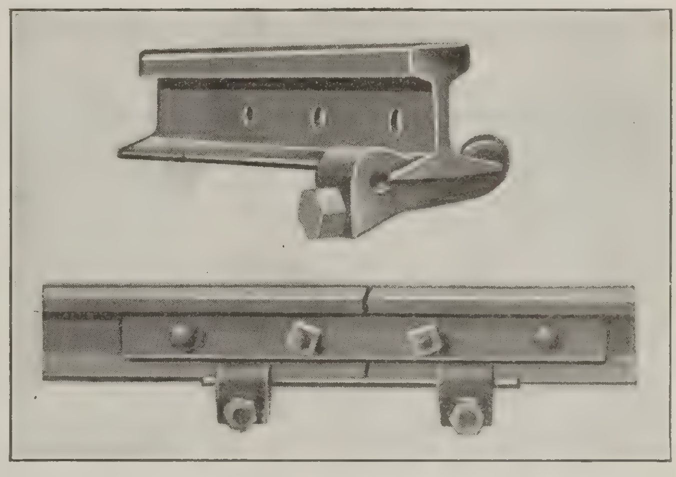
The grades in these mines were excessive, ranging from 1½ to 6 per cent., and not long after I went with this company it purchased a new combination rackrail locomotive in addition to the three 7-ton Goodman machines then employed.

The track in these mines was a fair specimen of mining practice, and the resistance of the track due to bad bonds caused an enormous current to pass through the motors, this being of course accompanied by a considerable drop in voltage.

On numerous occasions I have been called into the mine to a motor that had been stalled, and after going over the track and repairing the bonding or putting in new bonds succeeded in getting the motor to take its load to the shaft bottom. Almost every day motor troubles of one sort or another were experienced. These mostly took the form of burnouts of armatures, resistance coils or leads. I thought over the question of rail-bonding until I came to the conclusion that surely there should be some means of eliminating a part, and probably a large part, of the troubles to which we were subjected.

After considerable study I evolved what is now called the Economy rail bond shown in the accompanying illustration and had a few of these made up. Some of these bonds were put on the rails in wet localities and others where the road was dry. One was purposely attached to the track near the shaft bottom and so arranged that the whole amount of the current used in the mine had to pass through it on the return. These trial bonds proved so successful that I showed one of them to the general superintendent and told him of the results that they had attained. He examined it carefuly and assured me that it looked good, among its strongest points being the fact that no holes had to be drilled in the rail web and that scrap wire might be employed.

When motors were placed in No. 12 Mine the track was bonded with these bonds, a considerable number having been made up. The initial installation proved so successful that whenever the motor road was extended the bonding was done with Economy bonds, and they are today in use on over a mile of haulage road, giving excellent results and little trouble. They are inspected periodically about every four to five weeks.



The New Economy Rail Bond

Two years ago the track at No. 2 Mine was taken up and regraded, some of the low places being raised. It was relaid in part with new rail, all joints being bonded with Economy bonds. After this was done one motor was laid off, and the 100-kw. generator furnished abundant power where before it required the 250-kw. machine, which was then frequently overloaded.

As may be seen from the illustration, the Economy rail bond is extremely simple; since it requires no drilling of the rail and no pressing-in of terminals, it may be readily applied to either old or new track. The bonding element—which, as explained above, may be old or scrap copper wire—is down close to the base of the rail where it is out of the way of the wheel flanges and cannot be cut or otherwise injured even in case of derailment.

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To carry hot babbitt metal in a mine, heat some small pieces of iron red-hot and drop them in the metal, which will keep it in a condition to pour for some time.

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*Economy Rail Bond Co., Huntsville, Mo.

A Mine with a Haulage Schedule

By A. R. Anderson*

SYNOPSIS—In the mine of the Sterling Coal Co. the work of haulage is divided into gathering proper, trip making and main hauling, the first being performed by 2½-ton storage-battery locomotives and the other elements by trolley locomotives. To avoid delays the work has been carefully synchronized.

The fluctuating output from any one section of a mine makes it almost impossible to systematize the haulage of coal and the operation of locomotives so that a fixed time schedule may be even approached. Any variation from the old catch-as-catch-can basis of hauling coal is a departure from methods of long standing and a success of great interest.

The separation of coal mining into the several operations of undercutting, shooting and loading, uncertain elements such as water, faults, bad top, etc., the uncertainty of labor and a number of other like causes all militate against a definite labor schedule. Some of the more obvious causes have their source, however, in the fluctuating demand for coal. If the miners work steadily so that places can all be filled with men, if the miners know just when cars will be supplied some elements of fluctuation can certainly be eliminated.

Haulage System Usually Divided into Gathering and Main-Haulage Elements

The system of haulage generally adopted at the present time where the workings are at all extensive can be divided into two parts—the gathering and the main-haulage elements. For gathering, live stock or locomotives of the cable-reel, storage-battery or "crab" type may be employed and the main haulage may be afforded by rope or locomotives. To subdivide the haulage elements further than this has not often been attempted, because mining is not intensive enough as to territory or regular enough as to output to keep more elements than this working up to capacity. In other words added elements would generally mean additional apparatus and more idle time for both the apparatus and its attendants, because of the difficulty in establishing a schedule to which all the elements could conform as before stated.

However, it is obvious that, no matter how many elements are employed, if a system of haulage maintained according to a fixed schedule could be established, the efficiency and reliability of the operation of the mine would be raised to a much higher standard. In some cases it has been found possible to establish such a schedule and adhere closely to it.

In one notable case, which it is the purpose of this paper to describe, it was found advisable to employ, for reasons of economy and reliability, three elements in the haulage system, one element consisting of storage-battery locomotives which handle the cars in the rooms and hauls on the entry in front of the rooms only, the second element consisting of a trolley locomotive which handles the cars from their position in the entry in front of the rooms to a parting on the main entry and a third element consisting of a trolley locomotive which handles the cars between the parting and the tipple. This system is used in the mine of the Sterling Coal Co., Ltd., at Salineville, Ohio.

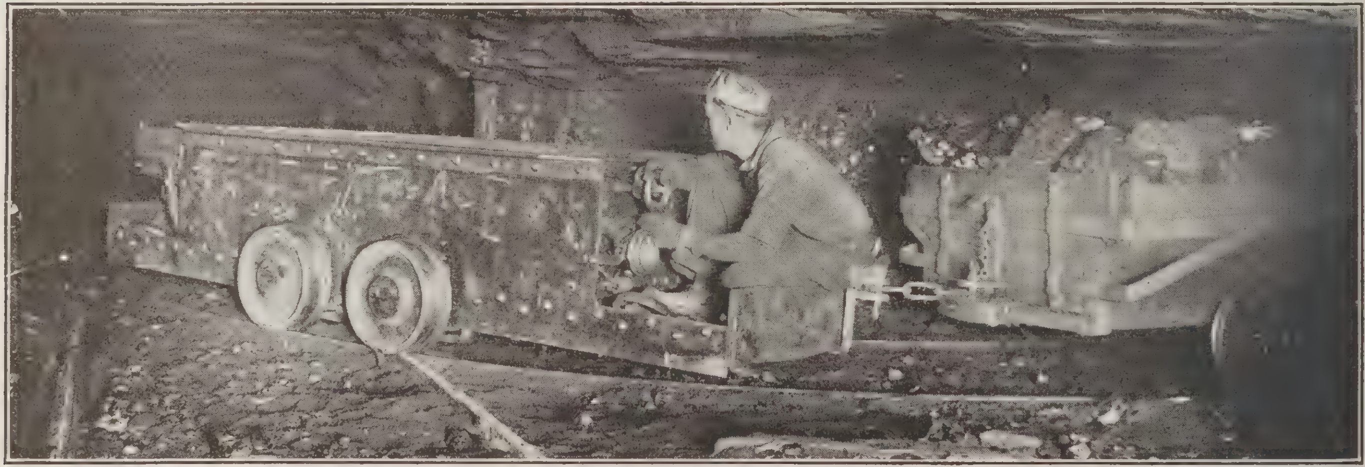

Fig. 1. Storage-Battery Locomotive Bringing Loaded Car Out of Room Neck

The establishment of a systematic haulage schedule at this mine is largely due to the efforts of E. B. McNichols, chief electrician, and the success with which this system has been operated gives it an eminence which cannot be overlooked. The plan of the mine consists of a main entry, off which are driven 11 butt headings and there are from 12 to 15 rooms worked on each butt heading.

Five Trolley Locomotives and Eleven Battery Locomotives

The haulage equipment in use consists of one 8-ton Jeffrey trolley locomotive for the main haul, two 3½-ton, one 4-ton, and one 4½-ton Jeffrey trolley locomotives for the butt-entry hauls, and eleven 2½-ton storage-battery gathering locomotives used for handling the cars in the rooms. One of these was built by the Atlas Car & Manufacturing Co., and ten by the Jeffrey Manufacturing Co. The main haulage locomotive handles 36 cars per trip, taking all the loads from, and placing all the empties at, a sidetrack along the main haul.

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*Engineer with the Jeffrey Mfg. Co., Columbus, Ohio.

The butt-entry locomotives take the empties from the sidetrack in trains of 12 cars and deliver them to one of the 2½-ton storage-battery locomotives. Each butt-entry locomotive takes care of three butt entries.

Making Up a Butt-Entry Trip

When the butt-entry locomotive brings in a trip of 12 empties, this trip together with the 2½-ton storage-battery locomotive is pushed into a room. In the meantime the butt-entry locomotive makes into a train the 12 loaded cars which have been placed on the entry by the storage-battery locomotive. After the loaded trip is coupled up it is pulled down to the room where the empty trip and storage-battery locomotive are waiting and coupled onto them. The empty trip is then pulled with its battery locomotive out on the entry, after which the empty trip is uncoupled, the loaded trip taken to the parting by the butt-entry locomotive, and the storage-battery locomotive then proceeds to distribute the empty cars and push them to the face of the rooms.

The reason for pushing the empty trip into a room and pulling it out again with the trolley locomotive is to save the storage battery from handling the trip of empties while the trolley locomotive is on the entry. The twelve loads together with two other similar trips taken from two other butt entries are taken to the siding to make up a trip of 36 loads for the main-haulage locomotive.

The Schedule Adopted

With this system of haulage, a schedule is maintained approximately as follows: One entry produces 12 cars per hour. This means that the 2½-ton storage-battery locomotive in each hour places 12 empties at the face and takes 12 loads away to the entry leaving them just outside the room neck. When these loads have been placed on the entry, the butt-entry trolley locomotive comes along, leaves 12 empties and picks up the trip of 12 loads, taking it to the sidetrack.

This trolley locomotive comes into each butt entry once every hour, and inasmuch as it has three entries to take care of, there are 20 min. available for taking care of each entry. The main-haulage locomotive, handling 36 cars per trip, must make four round trips per hour, or a round trip every 15 minutes.

The average weight of coal loaded into each car is 2700 lb. and at a rate of production of 12 cars per hour per butt entry for 11 butt entries, the capacity of this haulage system is approximately 178 tons per hour. On this basis, the haulage capacity per day of eight hours, is 1424 tons.

Working Methods

This mine operates in what is known as the No. 7-A, or strip, bed, which has an average thickness of approximately 36 in. at this mine. The average grade in these workings does not exceed one per cent. and the maximum is less than four. The rooms are mined to a depth of 150 ft., spaced on 35-ft. centers and staggered on opposite sides of the butt entry. The distance between the first and last rooms worked does not generally exceed 250 ft.

These data give an idea of the conditions under which the 2½-ton storage-battery locomotives work, handling only one car at a time except when placing the empties. Then it is necessary to move the whole train of empties on the entry in front of the rooms until they are all placed.

The dimensions of the ten storage-battery locomotives built by the Jeffrey Manufacturing Co. are as follows: Track gage, 42 in.; overall width, 47½ in.; length over bumpers, 11 ft. 7 in.; overall height, 30 in.; wheel base, 24 in.; diameter of wheels, 16 in.

Description of Locomotives

The locomotives, one of which is illustrated in Fig. 1, have structural-steel frames and are designed for double-end control. The wheels are outside the frame, which is supported on spring journal boxes. Each locomotive has one motor designed to have a high efficiency for battery work, driving on one axle through a four-lead steel worm and a 34-tooth bronze worm wheel, housed to run in oil. A chain connects the axles. The locomotives are provided with swinging drawbars and band brakes on the armature shaft. The battery consists of 36 Type M. V. 9 Iron Clad Exide cells. A Sangamo ampere-hour meter, operating in conjunction with a shunt trip circuit breaker serves to open the circuit automatically upon completion of the charge.

At night one man takes care of the charging of all these locomotives. A simple charging panel with resistance coils mounted on the back is provided for each locomotive. On this, as seen in Fig. 2 which shows one of the storage-battery locomotives being charged, are mounted fuses, an underload circuit breaker and two switches which are used to vary the charging rate. Fig. 1 shows one of the storage-battery locomotives bringing a loaded car out of a room neck.

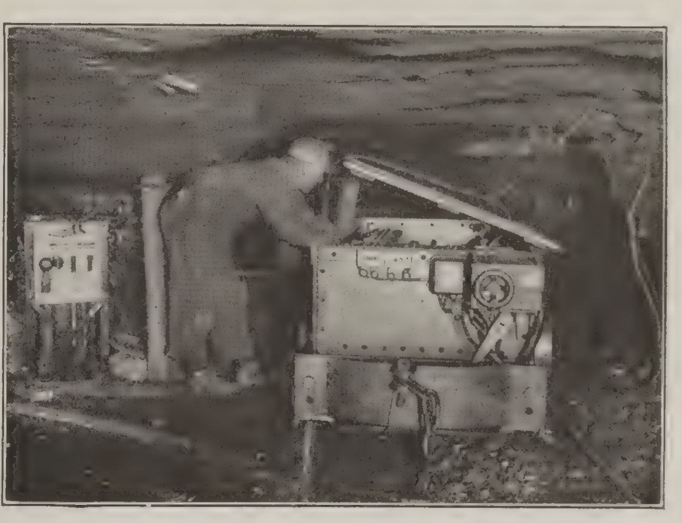

Fig. 2. Storage-Battery Locomotive Being Charged

Formerly Gathered Cars by Man Power

Prior to the installation of these locomotives the cars were handled in rooms by pushers, three being required on each butt entry. Now the motorman on the locomotive is the only man required to handle these cars. It is estimated that the saving thus effected will amount to approximately $15,000 per year.

Locomotives of this kind with an over-all height not to exceed 30 in. and a wheel base and over-all length not too great to interfere with its operation on small-radius curves, are necessarily limited to 42-in. gage and over. Any smaller gage would necessitate increasing the overall height of the locomotive in order to secure proper battery capacity.

Comparison in Favor of "Middleman" Haulage

In conclusion, a comparison between this three-element and a two-element haulage system which might be used in its place, may be of interest. The capacity of each storage-battery locomotive in an 8-hr. day under the present system is 96 cars. If these locomotives were eliminated and the butt-entry locomotives provided with cable reels, to enable them to go up into the rooms to place the empties and pull the loads, a cable-reel locomotive would be required on each entry. The cost of a storage-battery locomotive, such as is used here, and that of a cable-reel locomotive, such as would be required, are practically the same.

With the two-element system, then, only 11 locomotives would be required as compared with 15 under the present system, saving the installation of four locomotives representing an investment of approximately $7200. Assuming depreciation and interest at 25 per cent., this investment costs approximately $1800 per year. On the other hand, with cable-reel locomotives, two men would be required on each locomotive, or a total of 22 men for 11 locomotives.

With the present system, only one man is required on each storage-battery locomotive and two men on each butt-entry locomotive, making a total of 19 men. At $60 per month per man, the present system thus effects a saving of $2160 per year, which more than offsets the interest and depreciation on the added investment. To this should be added the freedom from cable trouble and expense, freedom from the expense of more carefully laid and bonded track in rooms and the possibility of operating on a smaller generator equipment. Thus the economic advantages of this three-element system become evident. No doubt there are many operations where this plan, which has proven its advantages and economy at this mine, can be applied with equal success.

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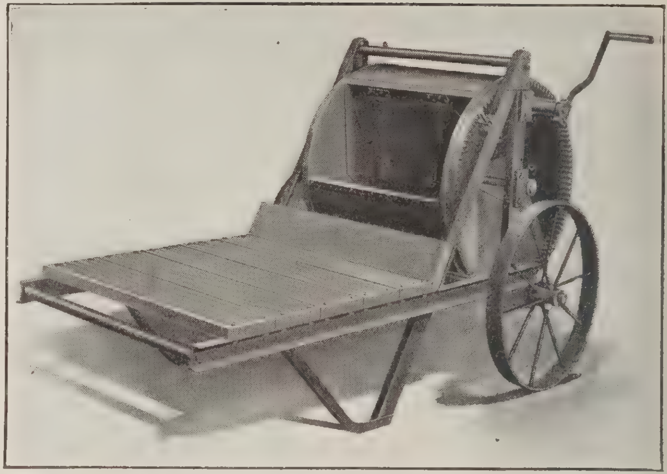
Concreting Underground

The Bunker Hill & Sullivan Mining & Concentrating Co., Stanley A. Easton manager, had about 3100 yd. of concrete to place 2100 ft. below ground and reached by the Kellogg Adit, which is 10,000 ft. long. This work consisted of a concrete lining for the ropeway over a station at the Kellogg shaft.

A job of this kind seemed to justify the purchase of a mixer. In fact, it seemed best to buy one driven by power as there was plenty of compressed air and electricity underground and there would be little difficulty in arranging for connections. But in buying machinery, it is always a mistake to look too closely at the job on hand, even though it may be the biggest to be attempted for a long time. In this case the power mixer would, however, be suitable for work in many places, for electricity and compressed air were available throughout the mine.

Portability of Power Mixers and Mixing Boards



Smith Portable Concrete Mixer

But a power mixer cannot be so easily moved about as a portable hand mixer, which, owing to its lightness, is available in steep as well as in flat places and where there are no roads as well as where the roads are good. The problem of how to get the power mixer into place would usually be a bigger matter for the mining force to solve than the concreting itself whenever a small job had to be performed.

Nor was it reasonable in the Kellogg Adit to plan to do without a mixer, because the work to be done was too large to be handled in that primitive manner. Besides it is hard to perform any kind of a concreting job in the mine by hand. The mixing board has to be made much too small for effective mixing. If used discontinuously it is likely to be always leaking, and even when constantly in service the continued strains of transportation have an equally bad effect on it. Moreover, a mixing board is not a readily portable piece of apparatus. In fact, hardly anything is more ungainly in a narrow and low place, and a mixer of a light pattern like that sold by the T. L. Smith Co., of Milwaukee, Wis., to the B. H. & S. M. & C. Co. is really

Concrete Work in an Idaho Mine

more portable than the outfit that would have to be hauled around the mine if the mixing was to be done by hand.

It is not necessary to emphasize the fact that machine mixing is more thorough than hand work whenever the work is not inspected, as must always be the case in the smaller jobs around the mine. There is no likelihood when a mixer is used that the work will be neglected because of its laboriousness.

Hand Mixer Available in Narrow Places

It was by reason of these advantages that the Smith mixer was purchased, and it mixed the concrete thoroughly and—what was more important in the cramped quarters available—it took up but little space and so made rapid work possible. For portability is not the only virtue needed in a machine when workmen have to perform their labors in narrow passageways. It is equally important to arrange matters so that it is possible to pass around the machine with the utmost facility.

The concrete work done by this Smith machine has stood for two years and has shown no sign of cracking or scaling, and the mixer is doing scattered jobs around the mines and is making money for the company. Had it been a power mixer it would probably have been idle from the time the big job was completed.

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Electric Safety Lamps in Rescue Work

The success in the rescue work at the Mulga mines near Birmingham, Ala., on Oct. 5 of last year, was largely due to the opportune presence of electric safety lamps, which had been only temporarily installed in the mine by the Hirsch Electric Mine Lamp Co. for demonstration purposes. When the explosion occurred it extinguished the open lights and left the men to drift around helplessly in the dark. One old colored man in a heading just inby from the explosion was wearing an electric lamp, one of the eight installed for a demonstration of their value. He was able because he had an electric light to lead out the men in his entry, and also was successful in reaching the seat of the explosion and in bringing out four more men that could not have lived much longer in such air as they were breathing.

Superintendent, Foreman and Rescue Squad at Mulga Mine

The treatment of the lamps during the course of the rescue work, which lasted 60 hr., was not all that could be desired. They were used so as to get the best possible service for the time being rather than with any regard for their future use. Some were used continuously for 16 hr. without recharging, yet only one gave any trouble, and this apparently was tampered with.

Ira C. Dalrymple says that to the use of these lamps he attributes the speedy recovery from the mine of the dead and living persons. The rescuers, he says, were enabled by the lamps' aid to penetrate all portions of the disturbed area of the mine. There were about 300 men working at the time, and all but 17 escaped.

It is impossible to tell how many men lose their lives in an explosion from an inability to find their way out quickly owing to the extinguishment of their lamps. It must add much to the condition of panic and prevent the use of due judgment at a time when such judgment is most imperative. Provided the air contains sufficient oxygen, the lights can usually be reignited. Sometimes, however, the air is so foul that this is impossible; and in some cases this relighting is not safe, for the explosion may have disturbed several brattices, and the gas which collects may be the cause of another explosion. The electric safety lamp stays lit regardless of the pulsation of the air, and it cannot ignite gas even when the air is charged to the most effectual explosive percentage.

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A Case of Inventive Ability

By William Crooks*

In the mining industry, as in all other branches of industrial activity, the man who possesses inventive power and energy is the one who succeeds.

I have in mind several successful mining men who have outdistanced their fellow-workmen and whose success came as a result of exercising originality in their daily work. One of these men, with whom I am personally acquainted and who is a mine superintendent, is forever trying out new schemes. Here are a few of his ideas that are now in practical use: The mine he has charge of has a shaft for hoisting purposes. The men enter the mine by means of a slope, sunk at an angle of 30 deg., through which most of the air enters the mine. The surface arrangements were so constructed that a large steam line passes near the mouth of the slope. This steam line is incased in a concrete culvert, the top of which is level with the surface.

This superintendent conceived the idea of connecting the steam culvert with the intake of the slope. He rightly assumed that he could utilize the radiation of heat in the culvert and increase the temperature of the air entering the mine. This he accomplished, and I am informed that a relative humidity of 94 is now obtained.

Another Practical Suggestion

Here is another of his ideas which increases the efficiency of haulage: Near the shaft bottom, there were several switches operated by trapper boys. He reasoned that the more men or boys there were on haulages the greater was the liability for accidents. To overcome this, he had an old scrapped hand-pump connected to the switch. The pump was operated by water pressure from the main discharge. With this pressure, he successfully operated the switch. Of course, this was crude, but since then he has had special cylinders made which operate from a point 25 ft. distant from the points of the switch, this being done by the motormen as they pass with their trips. Not only did this novel contrivance reduce the cost of coal, but from a viewpoint of "safety first" it was a desirable improvement, since it removed the boys from the haulageways. With these and similar ideas he has embodied in his work it is needless to say that he is a very successful mine superintendent.

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*Ensley, Ala.

One of the secrets—the main secret—of my friend's success is that he keeps in touch with his surroundings. He believes that the mine itself is the best teacher of mining science, and he spends more than half his time in this great school. However, we should not neglect our reading in favor of ten hours per day in the mine, for our view on mining subjects may become very limited should we fail to keep in touch with what is going on in the mining world. There is no royal road to learning, and he who would win success must read, study and observe, to see where improvement can be made, and never let up until something has materialized.

Do not think that because you happen to have a first-class certificate in mining you know it all. The man who can evolve and invent is welcome anywhere, but the fellow who cannot originate and who cannot do anything for the interest of human progress requires a certificate before anyone will listen to his chatter.

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Bit Sharpening

In early practice the power hammer might have been defined as a contrivance by which a heavier blow could be struck than a man could deliver with a sledge. No one seemed to realize that a handy little power hammer would cut out the need for the striker, would deliver more blows per minute and place them with more precision, and that the greater weight of the hammer was only one of its advantages. As has usually been the case with new inventions, ingenuity was devoted to the task of getting out larger and larger hammers with heavier bedplates and with cranes for handling large work, and the need and availability of machine hammers for the lightest work in the smallest shop were too often overlooked.

Speedy Work Eliminates Reheating of Steel

But there is no reason why a hammer run by machinery should not be made at a reasonable figure and be as much an adjunct of a small repair shop as is the drill press. There is a great advantage in speedy work, for the quicker the work is completed the less need is there for frequent reheating of the piece being forged. The speedy hammering not only accelerates the work but eliminates much of it and saves the steel from deterioration.

It was with this in mind that the Mayer Bros. Co. started the manufacture of power hammers in the town of Mankato, Blue Earth County, Minnesota. This village would still be unknown to the mining people of the United States, despite its 11,000 inhabitants, had it not been for its manufacture of hammers which have had a large and general sale wherever mining machines are used.

Description of Mechanism

The hammer is driven by a friction pulley having an adjustable boxing. This is placed on the same shaft as a heavy crank disk to which a pitman is attached, the rapid vertical movements of which provide the reciprocating motion of the hammer.

But if the hammer blows were taken up directly by the crank and shafting the result would be disastrous. In the Bradley hammer this strain was absorbed by a heavy spring of the carriage-spring type but almost semicircular in form. The Dienelt & Eisenhardt hammer, made in Philadelphia, had a similar attachment. In the Mayer Little Giant Power Hammer the blow is cushioned by a spiral spring, thus securing a like result.

The downward movement of the pitman causes the lower ends of two arms to approach each other, for these lower ends are attached to rods connecting to a wristpin which is raised when the hammer strikes the block. This approach is opposed by the spiral spring mentioned. Thus, without much motion the force of the blow is cushioned.

Every portion of the mechanism subject to wear is adjustable, and all the parts are of the best material. The foot treadle that causes the clutch on the friction pulley to operate passes entirely round the base of the anvil block and can be put in operation by the toe of the blacksmith while his heel rests on the floor. As soon as he releases the pressure of his foot on the ring, a spiral spring lifts the treadle and so releases the clutch on the friction pulley, thus shutting off the power.

Speed of Operation

The hammer is made in three sizes, 25, 50 and 100 lb., requiring motors of 1½, 2 and 3 hp. respectively. The rapidity with which the machine will rain blows on a piece of steel stock may be easily comprehended from a recital of the number of revolutions per minute, each complete revolution involving a blow on the anvil. The small-sized hammer makes 400 r.p.m. and the others 325 and 250 respectively. Consequently, it is not surprising that the company asserts that 2000 chisel-point bits can be turned out in a day or that 2500 old bits can be repointed in the same time. This is claimed in connection with the special bit die for the manufacturing of pick points for mining machines, which has been designed for use with the 50-lb. hammer.

The Monon Coal Co. of Cass, Ind., has no less than four of these power hammers and the Shawmut interests in Pennsylvania have an equal number at their coal mines.

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Another Definition of Success

By Carl Scholz*

The definition of success is about as uncertain as our conception of electricity. Mathematically expressed, success is the result of ambition multiplied by degrees, which vary with the different individuals. What may appear as complete success to one may be regarded as utter failure by the other. By the poor, the rich are usually considered successful, and to the worker of the rank and file the higher officials and managers may appear symbols of success; and yet these parties may have aims and ambitions of a very different character and are totally dissatisfied with their accomplishments. In the strict sense of the word, success has been attained by those who have the feeling that they are doing their work to the best of their ability, striving always to do better, and are fair to the interests of their employees and employers, as the case may be.

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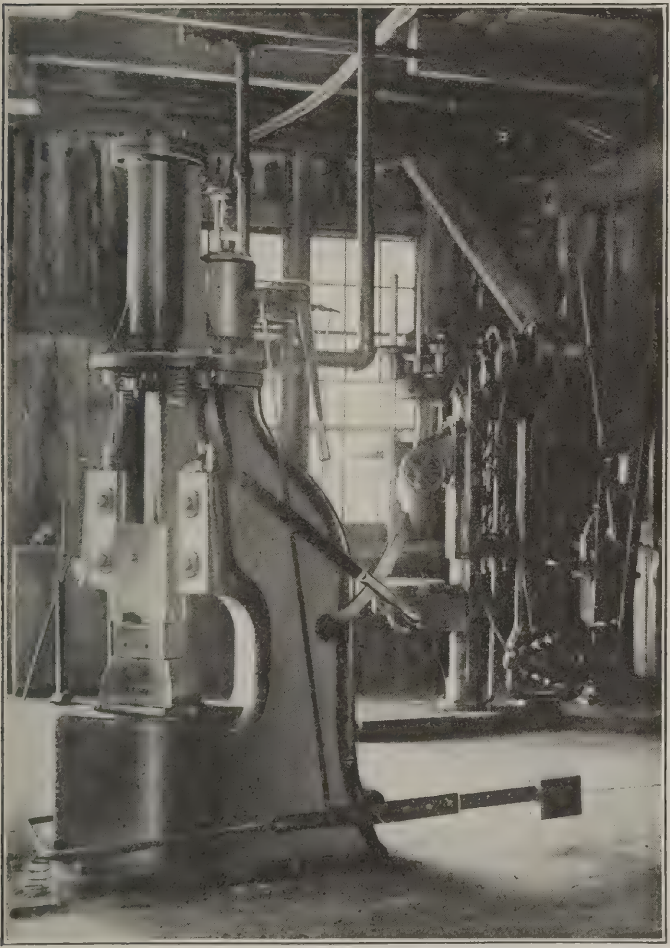
*President, Coal Valley Mining Co. and the Rock Island Coal Mining Co., also vice-president, Consolidated Indiana Coal Co., Chicago, Ill.

Ambition to advance and progress is the foundation of civilization, and to it is due the progress of this age. It is fortunate, however, that not all of us aim for success in the same direction, and many consider themselves successful without having attained riches or powerful positions.

In a practical way ambition usually receives its reward without this reward being the main aim in life. Men who apply themselves to their work in the proper spirit are usually advanced over those who are diffident. The two principal characteristics that always serve to procure advancement, and at the same time secure happiness and peace of mind, are loyalty and integrity; and employers value these two qualities more than anything else in their subordinates.

A Quick Repair

For those whose mines are not located handily to an adequate machine shop some form of steam hammer is an essential. The uncertainties—or should it not rather be the certainties—of inadequate service demand work on the spot. For if the repair job cannot be completed "between trains" there is a possibility that it may have to wait over for another day, and in some cases during the winter months the delay may be even more considerable, for exit and ingress are alike blocked for days.



A Bell Hammer at Hammond Colliery of P. & R. Coal & Iron Co.

A repair successfully accomplished was made, however, where the advantages are not so evident because the breakage occurred at a mine in the anthracite region where there are machine shops a-plenty. A piston-rod of a three-stage Norwalk high-pressure air compressor broke at the key connection to the crosshead. Onto this rod, turned to a diameter of $2\frac{1}{16}$ in., the blacksmith at the colliery with the aid of a Bell steam hammer welded a new end. There was a modern 16-in. lathe at the same mine, and so the rod was turned and finished in a couple of hours. It was placed in the compressor and is running satisfactorily.

Those who know what a delay is caused by an accident of this kind will realize how great an assistance is such a speedy means of repair. The breakage occurred at the Hammond mine of the Philadelphia & Reading Coal & Iron Co., which has ten 300-lb. steel-frame Bell combined steam hammers at its various collieries. These are used for welding pieces of circular section up to 2½ and 3 in. in diameter and those of rectangular section up to ⅞x3½ in. They also straighten axles 2½ in. to 3 in. in diameter.

The Bell hammer was originally designed for making the wrought-iron forgings to be used in the first coal-burning steamboat on the Great Lakes. It has been in active use and under continuous development for 50 years and so has proved its merits. The Oliver Iron Mining Co., for instance, has nine of these hammers of various sizes at its many operations. The Bell hammer is made by the Buffalo Foundry & Machine Co., of Buffalo, N. Y.

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Nobody could make a success out of filling bottles with booze if nobody would empty those bottles.

The Labor Situation

SYNOPSIS—The Elk Coal Co., of Columbus, Ohio, has brought suit against its miners for violation of contract, and the miners have sued the company. The year-long strike in eastern Ohio continues. The Rockefeller Foundation has agreed to give relief to destitute miners in Colorado to the extent of $100,000. The act relating to minors in Alabama and the Workmen's Compensation Bill in Pennsylvania are discussed.

The Elk Coal Co., of Columbus, Ohio, which operates a mine in the Crooksville district near Roseville, Muskingum County, Ohio, has brought suit against its 154 miners individually to collect damages to the sum of $25,000 for the alleged failure of their employees to carry out the wage agreement made Apr. 1, 1914.

On Mar. 17 three men were discharged by the mine boss for insubordination. Thereupon all the miners stopped work and demanded the reinstatement of the discharged employees. The company refused to allow them to work, and the officials of the United Mine Workers of America in Ohio were notified. These state officials ordered the strikers to return to work, and the Roseville local charter was revoked. By a vote of 67 to 28 the Roseville local asked for the renewal of their charter, but the state officials require that their demands be granted before the charter is returned.

In its suit the Elk Coal Co. called attention to a clause in the wage agreement providing that all disputes are to be referred to the district mine officials for arbitration. This part of the agreement was violated; hence the filing of the suit.

Miners Endeavor to Offset Action of Elk Coal Co.

John Moore, president of the Elk Coal Co., is authority for the statement that about a dozen of the miners, practically all of whom are Americans, have transferred their properties to their families.

As no settlement had been made by the evening of Mar. 27 between the striking miners and the company, 50 of the employees filed suit against the Elk Coal Co. for their unpaid wages. It is expected that 90 others will file their claims. The coal company was holding back about $4000 due in wages to pay the expected judgment of $25,000.

Apparently there is some hope of a settlement in the Coshocton field. The operators and the union arrived at a settlement some months ago, but the miners were obdurate when the matter was submitted to a referendum. As the operators are willing to pay more than 47c., there is no reason for the delay in settlement. The district is small, having only about 1000 miners.

The eastern Ohio strike situation is unchanged. Only small operations are working in the eastern Ohio and Coshocton districts. There is no chance of a settlement in the former district, though the strike has now lasted a year. President Wilson seems to be waiting for the passage or rejection of the Gallagher amendment to the Green Antiscreen Bill before taking action.

Nick Mausreck, a striking miner of East Liverpool, was shot recently while he and two other strikers were trying to persuade nonunion men to quit work at the small mine of the Island Run Coal Co.

Rockefeller Foundation in Colorado

The Rockefeller Foundation, through its president, John D. Rockefeller, Jr., has consented to assist the State Committee on Unemployment and Relief in Colorado to the amount of $100,000 if necessary, during the next three months. It is hoped that by that time work may be found for the unemployed on farms and in mines or elsewhere. W. L. Mackenzie King is the director of the Industrial Relations Department of the foundation.

Seeing that many of these men who are thus cast on the generosity of the Rockefeller Foundation are men who since they drifted into Colorado have done nothing but make trouble for Mr. Rockefeller and the corporation in which he is interested, and seeing further that Mr. Rockefeller has not made anything but the most meager returns on his Colorado investment, we cannot but admire the liberality with which he overlooks the past and sees only the need of the men, disregarding their crimes and their folly.

We have heard much of the packed juries in Colorado, but however unfairly they may be selected, they seem to be little disposed to convict the men brought before them. Perhaps the men are not guilty, but someone is, and it is much to be regretted that no one is to suffer for the terrible crimes by which Colorado has been disgraced. The citizens of that state should make every endeavor to see that none escape.

Child Labor in Alabama

A law was approved on Feb. 24 in Alabama requiring that "no child under the age of 16 years shall be employed, permitted or suffered to work in any capacity in, about or in connection with any mine, coal breaker, coke oven or quarry." The act provides that after Sept. 1 of this year no child under 13 years old, and after the same date next year no child under 14 years, shall be employed in any gainful occupation, except agriculture or domestic service. Children under 16 years must not be employed at any hazardous occupation, and employment certificates are required before they can engage in such work, except in connection with agriculture or domestic service.

Compensation in Pennsylvania

The joint House Judiciary General Committee and the Senate Corporations Committee of the State of Pennsylvania have been giving hearings on the Brumbaugh Workmen's Compensation Law. The principal objections were to the exemption of farm labor and domestic servants, the granting of compensation to aliens in larger sums than they would get in their own countries, the judgment liens, the removal of the common-law defense for corporations and the state insurance features, which mutual- and stock-insurance heads claim remove competition.

The exclusion of farm laborers and domestic servants is merely a means of conciliating a large vote. The employees of a farmer or of a householder need compensation just as much as a man who works for a corporation. The miners want the compensation raised to 66⅔ per cent. of the wage. Van Bittner, of Pittsburgh, and Frances Feehan, of Hazleton, spoke in favor of this percentage.

Edgar W. Tate, of the Pittsburgh, Shawmut & Northern R.R. and the Shawmut coal interests, said that a death after 300 weeks should not be compensable, as the cause of death would be hard to determine and might not be due to the accident causing disability. He desired the time reduced to 100 weeks.

The Secret of Success*

By Thomas Dreier

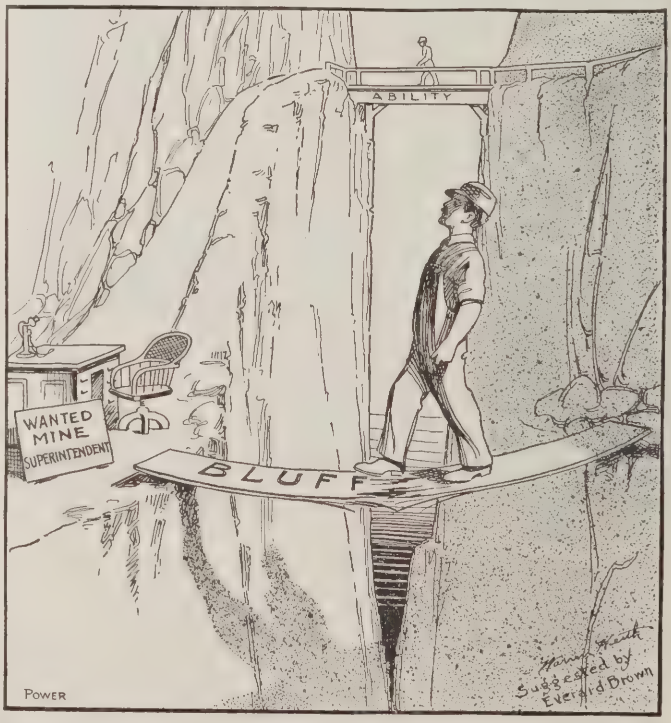
The secret of success is not a secret. Nor is it something new. Nor is it something hard to secure. To become more successful, become more efficient. Do the little things better. So work that you will require less supervision. The least supervision is needed by the person who makes the fewest mistakes. Do what you can do and what you should do for the institution for which you are working and do it in the right way, and the size of your income will take care of itself.

Let your aim ever be to better the work you are doing. But remember always that you cannot better the work you are doing *without bettering yourself*. The thoughts that you think, the words that you speak and the deeds you perform are making you either better or worse.

You can be what you will to be. Forget yourself in rendering service to others. If an employee, strive to make yourself of greater value to your employer. Look upon yourself as a manufacturer. Think of yourself as being in business for yourself. Regard yourself as a maker and seller of service, and ever bend your thought and your energies toward *the improvement of your product*.

The wise manufacturer never injures his machinery willfully. Your body, your mind, your soul serve as your plant. Eat and drink only that which will nourish your body; entertain only thoughts that will enrich your mind.

The world is hungry for quality service. It wants to pay for it. It is paying for all it can get. The market is not crowded. There is a chance for you right now. There is a chance for you right where you are. The time to start is now.



The Longest Way Around Is Often the Shortest Way Home

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*This article was submitted for our Success Number by J. G. Puterbaugh, president of the McAlester Fuel Co., McAlester, Okla.

Editorials

The Mining Engineer and Publicity

The mining engineer has certainly failed completely to place himself before the public in the right light. We hear about the "wonderful" advances in bridgework and railroading. Even in our schoolbooks we read about the ingenuity of the inventors of the cotton gin, the harvester and the sewing machine. The pictures of these men and machines are associated with our earliest recollections. In fact there was a time when we were divided between a desire to duplicate these inventions and a longing to be a cowboy and kill Indians, so fervent was our hero worship for these pilots of industry.

But the public has no such thoughts about the mining engineer. Only his mistakes have refused to stay buried. His triumphs have failed to impress themselves on the public. The only epithet the average man deems fitting in connection with the mines is "awful." He has used that word so much that usually it has no meaning, but when he says those "awe-full mines" he breaks the word up with a hyphen and seems to be dwelling on its significant derivatives.

He does not admire the system with which mines are worked. He does not pay tribute to the marvelous successes of the mining-machine makers who have discovered a means of cutting coal like cheese. He overlooks the fact that the coal operator gets out the coal for a fifth or tenth part of the money which is actually paid for its delivery to the cellar. He does not marvel at the system of ventilation which delivers a steady breeze through miles of airways. There is no interest for him in the fact that the water pumped from our mines is in places ten times as heavy as the coal extracted.

The wonders of the mines have been overlooked, partly because the mines are far from the big cities, and partly because the mining engineer has not sought the requisite publicity, and partly also because we are no longer an appreciative people.

When institutes meet, the local spellbinders rise and tell the guests at the banquet table how important is the mining industry. All they know about the mines is the total tonnage produced and the number of men employed. Their rhapsodies fall entirely flat because no one has really acquainted these orators or the public with what constitutes the real wonder of mining—its ingenuity and its problems.

Recently a doctor was overheard to say that engineering was an easy subject to master, because once learned no more study was needed. The professional stock-in-trade required no replenishment. It was not like medicine, where new discoveries were being made every day.

It is needless to point out that mining is progressing as fast if not faster than medicine. And the retort discourteous, which we also overheard, was also true. It was that medicine was largely expending its energy in chasing its own tail and frequently heralded its revivals of old principles as if they were new inventions.

The trouble with the mining profession is that it lacks advertising. It should have its right place in the public prints. The articles read at the institutes should be carefully briefed for the public consumption and should be given a proper place in the press. Space for politics is conceded by the yard; space for mining and engineering—even in such mining and manufacturing centers as Pittsburgh—is granted grudgingly by the inch.

That is not the condition of things in England. The British Association for the Advancement of Science, when in session, receives in the better class of papers page after page of copy. Scientific lectures are reproduced in the newspapers, briefed it is true, but at what would here be regarded as being at great length.

Once accustom the public to consume such matter, and without question it will soon be in demand. It is the duty of the mining engineer to his profession and to his industry to give the public to understand what marvelous advances are being made by both.

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Canada Desires a Higher Coal Tariff

The competition of foreign coal and fuel oil with local coal has led to efforts being made to induce the Dominion of Canada to protect the coal-mining industry of the western provinces. This desire for protection has probably been accentuated by the depression in business and the impoverishment in Vancouver Island following a long strike. It is also, perhaps, fed by the "Made in Canada" movement which has been fostered so naturally as a response to our own "Made in America" campaign.

This subject was brought before the convention of District 18, United Mine Workers of America, when delegates from the coal-mining districts of Alberta and southeastern British Columbia met at Lethbridge, Alta., about the middle of February. A press dispatch from Lethbridge, dated Feb. 19, stated: "To relieve the abnormal distress prevailing in mining camps the miners will take steps to forcibly impress on the federal and provincial governments the need for adequate relief. At the miners' convention a resolution was submitted urging that a tax be placed on all coal coming in from the United States. It was said that much of the distress was due to the fact that 50 per cent. of the coal used in Alberta and Saskatchewan was admitted to Canada free of duty, that the production of a similar quantity in the district would give employment to 3000 men and at the same time afford the government a revenue from the royalty paid on the increased quantity of coal which would be mined in the district."

About the same time a deputation from the coal-mining districts of Vancouver Island and of Nicola Valley on the mainland of British Columbia waited on the provincial government at Victoria and urged that it endeavor to induce the federal government to impose a customs duty of one cent a gallon on coal oil now admitted into Canada duty free. It was represented that last year there was brought into British Columbia a quantity of fuel oil equivalent to 700,000 tons of coal. Five years ago, it was stated, only 5,000,000 gal. of fuel oil was brought into British Columbia annually from California, but the trade has since grown enormously so that in 1914 the quantity thus imported was not less than 110,000,000 gal. The oil trade was said to be booming while the coal trade is languishing, with several thousands of coal miners working only half-time or less.

On the other hand, an influential deputation, representing some of the larger users of oil, made strong objections before the provincial government, opposing any such action as the coal-mining interests desired. Representatives of railway and steamship companies using much fuel oil and of a local oil-refining company urged that large investments had been made in railway and steamship equipment and plant for the storage and burning of oil and that the cost of substituting coal-burning for oil-burning equipment could not be borne. This deputation, as also that representing the coal-mining industry, was asked to put its case in writing and the provincial government would forward both to the federal authorities at Ottawa.

Western members of the Dominion House of Commons, now in session at Ottawa, have been asked by many of their constituents, through local boards of trade, to do everything possible to secure the imposition of a duty on fuel oil, for the reason, as urged from Nanaimo, that "conditions are not improving and the community's prosperity depends upon the protection of coal against duty-free oil." The representative of Nanaimo in the House of Commons has written in reply:

> We are taking up this matter with the Prime Minister, but I would warn you not to be too optimistic as to the result, for the following reasons: There is a war tax of 7½ per cent. ad valorem placed on crude petroleum, also on the finished product, that is, on the finer oils. There is also an import duty of similar amount placed on bituminous coal. Both these taxes are in favor of the coal-mining industry, especially of the Vancouver Island field. Of course they are essentially war taxes, and will be removed when they have served the purpose for which they were intended. This would leave the coal-mining industry without any protection whatever. We intend suggesting to the Prime Minister the advisability of appointing a small but efficient commission to advise the government as to the best means of encouraging and protecting the coal-mining industry.

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The Consumption of Coal by Miners

In 1913 the mines of the United States sold to the local trade and their employees—principally the latter—15,871,535 tons, or an amount equal to 2.9 per cent. of the coal shipped and converted into coke. Had the miners of the United States produced only the same amount of coal per man per year as those in Great Britain, the tonnage consumed in local trade and for the use of employees would have been 44,282,000 tons. Thus 28,410,000 tons would have been wasted. The tonnage of coal used for local purposes would have been equal to 8.3 per cent. of the aggregate tonnage shipped and coked instead of 2.9 per cent., which, as has been said, was the proportion actually used.

The saving thus made of nearly 30,000,000 tons every year is a considerable conservation, arising partly from methods which are not conservational but which seek mainly a large production per man engaged. It must not be forgotten therefore that, in order to save coal, much coal, as well as much labor, is often wasted. The question for the conservationists is, How can we save coal without a loss greater than the value of the mineral conserved?

Were the miners of the United States everywhere to produce as much as they do in the Pennsylvania bituminous mines the showing in favor of this country's methods would be even better. In Pennsylvania an amount equivalent to 2.5 per cent. of the tonnage shipped and converted into coke was consumed by local trade and for the use of employees. Yet had the employees of Pennsylvania produced only as much as those in Great Britain the equivalent of 9.2 per cent. would have been expended in heating the homes of the employees and in local trade.

In fact, the small percentage of tonnage used locally in Pennsylvania bituminous regions probably arises chiefly from the large output of each man employed, for a miner who mines 3.78 tons per day in Pennsylvania will probably use no more and no less coal directly or indirectly than the man who mines 1.98 tons per day in Michigan.

Just to what extent the local trade in coal consists of trade not directly maintained for the benefit of the mines would be hard to assert. But it is certain that, on the other hand, much coal which is shipped is employed to manufacture what the miner needs. So that, all things considered, the figures labeled "for local trade and miner's use" really represent a sum not very different from that part of the tonnage which is actually used for purposes incidental to mining, excluding that used at the mines for steam and heat.

Some day, it is to be hoped, we shall adopt methods of conservation in which labor, surface conditions and material will all be conserved. It appears that it will soon be possible, by a form of mining slightly different from any now in operation, to make such a perfect consummation of economy. Our present room-and-pillar methods are as badly out of date as the methods of home industry customary in the Middle Ages. Some day we will see a mine run as intensively as a factory, the actual digging operations in which will be spread over an area scarcely larger than that occupied by a big machine shop.

Meantime we can congratulate ourselves that we have a lower loss of life per million tons produced than Germany, France or Japan and a larger output per man employed than any country in the world, while the future gives bright promise that we may yet capture other records. Meanwhile let the conservationists continue their good work, for it is not likely that we shall succeed in saving coal unless we are continually urged to handle it as a patrimony owned equally by our children.

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Our readers will be pleased to be apprised of the following incident which occurred after the Layland explosion. Frederick T. Haskin, a writer for the Pittsburgh *Gazette-Times,* relating the story of the rescue work, says among other matters scarcely less apocryphal: "Staggering toward them were five men, pale as death through their grime, and barely able to walk. One of them had his head wrapped in an improvised helmet made of brattice cloth, so that his nose was covered, while he fanned air into his mouth with the aid of a tin bucket."

Apparently he thought that afterdamp has a peculiarly severe effect on the nose but could be breathed through the mouth with impunity. Or is this one of the many instances in which a newspaper writer has supplemented fact by drawing on a generous imagination?

Discussion By Readers

Success in Educating the Foreigner

The recent discussion on "The Foreigner in Mining" interested me greatly, and I want to relate some of my experience in educating this class of mine-workers. Before doing so, however, I will say that the foreigners, or the great majority of them at least, are not capable of making much headway by themselves. As a class, they require much pushing.

The majority of the foreigners employed in these mines enjoy sitting around the coke ovens, in the evening, after the day's work is done, and recounting the happenings of the day or recalling incidents past and present. Such was the general condition of this class when I first came to the coking plant. I approached several of these men and found a ready response to my inquiries. They said that they would gladly attend a night school if they had a teacher. I offered my services and promised that if more was required than what the superintendent of the plant and I could give them, we would arrange to have a teacher come over from the adjoining township.

The following evening a meeting was held in the little schoolhouse, and five men were present. Everything was arranged that evening for the opening of the night school at once. This was done, the first session of the school being held the next evening. The work began with the study of reading, writing and arithmetic. At the end of a month there were 14 scholars in attendance. Some of these could not read or write, and a few did not know A from B, but they all persevered in their work. The first term lasted six months and at its close each man could read and write and some were so far advanced as to be able to figure in decimals.

It may readily be imagined that it took lots of grit and perseverance to keep this class together and to make it interesting to all. Occasionally the men would stay away by turns, but whenever this happened I would hunt them up and ask them the reason for their absence. Often the reply was, "I can't learn," or "I hate to trouble you so much," or "I am so tired in the evening that I do not feel like studying." Still we persevered. The class was held twice a week, the session opening at 7 o'clock in the evening. Often we would not leave the school until 10 or 10:30 o'clock.

The class has been in session for three months, this term; and we have a few more advantages than we enjoyed last year, owing to the superintendent's taking up the matter with the company. Being a progressive man himself, he succeeded in interesting the company in the men's welfare. As a result the officials gave us the use of one of the company's houses and had it fixed up for a school, including also a "First-Aid room." The men were free to meet in this place every evening, if they desired, and those who wished enjoyed the privilege of smoking.

At the present time many of the men are well advanced in the common rudiments and have commenced the study of mining, including mining laws. Monday night is "First-Aid night." There are 20 men in the First-Aid class, and the mine foreman is the instructor. Indirectly, the sessions of the school are a great benefit in keeping the men occupied and drawing them away from the saloons. I often mention in my talks the evils of gambling and drinking, and this has a good effect.

The work of the school keeps me busy in my spare time, looking over the work of the previous night or preparing questions for the following evening. However, no one but those engaged in the work knows the satisfaction that comes from seeing the improvement of men who were once illiterate, but are now able to read and write. This satisfaction certainly pays well for all the energy expended in keeping the men interested and at work. I can say that the experience gained has been a personal benefit to myself. I am convinced that if more mine officials would interest themselves in the same way for the welfare of their men there would be less booze consumed and less crime committed. The work will produce better men and more skillful workmen in the next generation, if not in this. Its tendency is to make law-abiding citizens.

JOHN T. BRADLEY,
Mine Foreman, Elm Grove Works.

Dunbar, Penn.

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Recognition of Bravery

Letter No. 8—I have been much impressed with the letters that have already been written on this subject and was particularly pleased to note the attitude taken by COAL AGE in response to the same, as appears at the bottom of p. 383, COAL AGE, Feb. 27.

As stated in "Bykem's" Letter No. 1, "Deeds of heroism in and about a mine are, as a rule, given little consideration and quickly forgotten, because it is generally assumed that such acts are a part of a miner's calling, and he is expected to face all dangers without a thought for his own personal safety."

I heartily concur in this judgment of public opinion. Wherever or whenever there is an explosion, or other disaster in a mine, the miner is ever on hand and ready to face any danger, none being too great for him, in an effort to rescue fellow workmen. What is his reward for such heroic sacrifice? The record of the disaster published in the county paper or possibly the daily local may contain a mention of his brave act; but rarely does his name appear in the official report of the disaster, and the fact is soon forgotten that others than members of the regular rescue corps rushed to the scene have taken part. Too often it happens that the names and deeds of the trained official rescuers are emblazoned on the record as being *the ones* to whom all credit is due. The humble miner, whose courage, bravery and prompt action made possible the later work of the regular rescuers, is practically lost to view in the glamor of the occasion. And yet he it was, in many cases, who ably assisted in the actual performance of the work done on the arrival of the official rescuers.

Bykem asks, "Would it be better to bring all worthy acts under one general classification?" and "Should the award be entirely honorary in all cases?" It seems to me better that any award for bravery should be wholly honorary and without partiality. In my opinion there should be an honor roll on which should be placed the names of all mine workers whose brave acts are worthy of mention. It is not that such recognition is necessary to arouse the miner to action; nor that the miner desires that his act should be especially mentioned; but this very fact that he asks nothing is all the more reason why his acts should be recognized in a suitable manner.

No true miner holds back from the work of rescue, in time of peril, fearing that he will not receive due credit for his act or be suitably rewarded for the sacrifice he makes. His first thought is the peril of his fellow workman, and he is actuated by his desire and hope that he can rescue the one in danger. He looks for no reward—he asks for none. For this reason he should be given a generous recognition in a way that will show clearly that his act is appreciated. I hope that this question will appeal to many and that we shall have the benefit of their views. By this means, the broadest and most helpful measures will be developed.

JOHN NEAL.

Dayton, Tenn.

[As an illustration of the fact mentioned in the above letter that the description of many mine disasters and the record of brave acts performed by local men and published in the local papers rarely find a wider publicity, we have abstracted the following from a report of the Belle Valley mine explosion on May 20, 1913, as taken from the *Jeffersonian,* a local paper of Cambridge, Ohio The record speaks for itself. It is, in substance, as follows:

> That there were not more lives lost in the Imperial mine disaster of Saturday night last is due to the cool head of J. B. Morris, superintendent of the Caldwell mine, at Caldwell, who with his able assistants, Harry Rowland, John Smalley and M. S. Moore, was the first to enter the mine and do any effective work following the explosion.
>
> Superintendent Morris is one of the most experienced coal-mining men in this part of the state. He is a quiet, unassuming man, having little to say of his own acts. Mr. Morris was at his home in Caldwell on the fateful Saturday evening when notified of the disaster in the Imperial mine at Belle Valley and asked if he would take charge of a rescue party. He replied that he would if he could get an automobile. Almost before he could equip himself for the journey, two automobiles were at his door and a flying trip was made to the mine.
>
> Arriving on the scene, Mr. Morris learned that a few brave rescuers, under the lead of Henry Fairhurst, were already in the mine attempting a rescue. Having carefully selected a few experienced men from among the many who offered their services, Mr. Morris hurried below with his party. Finding a doctor at the bottom of the shaft, waiting for those in the mine to bring out a man with a broken leg, Mr. Morris sent the physician to the top of the shaft, telling him to wait there for the man, who would be sent up as soon as brought out.
>
> Proceeding then as rapidly as possible along the entry, while making necessary repairs by closing open crosscuts with canvas, the party first picked up J. R. Yeager and sent him to the shaft bottom, badly hurt. Mr. Fairhurst was then found overcome with the afterdamp, and all the remaining members of the first party were more or less affected by the gas and had to be removed, they having advanced too rapidly ahead of the air. Having sent all these men out of the mine, the party in charge of Mr. Morris continued the investigation of the mine for three hours before returning to the top of the shaft. All this was done before the arrival of the special train bringing Superintendent Mathews and Deputy Mine Inspector Elwood, together with some Cambridge surgeons.

The above account taken from a local paper, we believe, found no publicity in any official record and illustrates the point to which correspondent refers and which is certainly worthy of attention.—EDITOR.]

Directors' Visits

In the "Extracts from a Superintendent's Diary" on p. 507 of COAL AGE for Mar. 20, 1915, is incidentally revealed what I believe is one of the greatest idiocies of the ordinary board of directors:

> For two years now we have been looking forward to a visit from our directors, but only today was the great event consummated.
>
> On several occasions during that two-year period word came down the line that we might expect the inspection party in a few weeks, but always before we completed our house cleaning the rumor would be discredited and our improvised whitewash squad would be dismissed. But about two weeks ago positive instructions were issued from our general manager's office to prepare for today's inspection, and the wording of the order made it clear that this time there would be no change of plans.
>
> As a consequence the past two weeks has been a busy time for the floating gangs. All scrap iron has been gathered up and classified, mud holes in our roadways have been filled in, grease and oil spots on engine house floors have been sanded and scrubbed, and two crews with whitewash mixtures have transformed trees, fences and outbuildings into veritable snowdrifts.

I know just the procedure, for the last big plant I worked in had a Boston board of directors that always sent word a week ahead that it was coming to see us, and then there would be the most frantic cleaning up imaginable. If the board had ever gum-shoed down to see us the members would have seen something that would have opened their eyes.

Inasmuch as industrial dirt usually means industrial inefficiency, if a plant were kept reasonably clean all the time, in fear of an unannounced directors' visit, the operating results would probably be better.

Here's hoping that some day there will be more pussy-footed directors whose desire to know the business will outweigh their sense of their own overwhelming importance.

DONALD M. LIDDELL.

Elizabeth, N. J.

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Safety Hints

Letter No. 1—I wish to offer a few comments on two of the statements contained in the letter of Mine Inspector Rose, COAL AGE, Feb. 27, p. 385. First, Mr. Rose states as follows:

> I am not opposed either to safety committees in mining or to the posting of danger signals in and about coal mines as a precautionary means of impressing the idea of safety on all mine workers. However, I greatly fear that the multiplicity of these signs, giving warning of unsafe places or conditions, may engender in the minds of many mine workers the idea that all unsafe places are properly marked and guarded, and that less care and precaution are needed on their part in protecting themselves in their own working places or where such danger signals do not appear.

I agree with Mr. Rose's suggestions that danger signs may be overworked and, as a result, lose part of their significance and usefulness. Where there is a great multiplicity of such signs it is true that miners may grow careless and indifferent to their meaning; and, in the absence of danger signs in certain places, they may naturally assume that if the place was dangerous it would be so marked.

However, from Mr. Rose's reference to the miners' own working places it would seem that he suggests placing such signs at the working face. I do not believe that the erection of danger signs is justified in working places; nor in the inside entries leading to a few rooms only. In such places covering but a small area, the miners working there may be assumed to know the weak places and to be more familiar with the local conditions existing therein than anyone else. In fact, Mr. Rose later remarks, in respect to the mine foreman not being as well acquainted with the conditions in a working place as the miner who works there continually, shows that he is of the same opinion.

Tracklayers and timbermen whose duties call them to work in many such places have learned to look for danger and they do not expect to see danger signs in such places. In general, it is a safe rule that where but a few men are working they may be expected to be thoroughly acquainted with the conditions of the place and the verbal instructions of the foreman warning them occasionally of the need of caution should be sufficient. Moreover, a verbal warning carries with it the human element, and is often more forcible than a printed sign, which is merely mechanical.

On all main entries, haulways, manways and other frequented places I favor the posting of danger signs in every place where danger lurks. However, it is important to remember that the erection of such danger signs does not fulfill *all* the duties of the mine foreman or the men frequenting such places.

I believe the sign "Safety First" has a good general effect as impressing continually on the minds of all persons the need of necessary precaution in their work; but let the management follow this precept by making the mine reasonably safe. It is incumbent on them to see that all entries are well lighted; the floor free from obstructions; the roof well timbered; refuge holes provided at regular intervals where needed and kept whitewashed and well lighted. Indeed everything should be done to promote safety in the mine. In addition to this, all places that cannot be made absolutely safe should be plainly marked with suitable danger signs to warn any who are not acquainted with their condition.

Again, referring to Mr. Rose's statement, "Train and discipline every mine worker to detect dangerous conditions and to know how to avoid or escape them," I want to say that in spite of the best effort in this direction, on the part of both officials and miners, it is unavoidable that many who are employed and permitted to work in the mine do not possess the necessary knowledge and training that will enable them to detect and avoid danger. Their training is inadequate. In many cases, it is the result of the miner's previous association and experience in mines where he has been employed.

For example, it frequently happens that a young miner when first engaging in the work of mining coal at the face finds that his "buddy" takes all the necessary precautions for safety. As a result, he comes to depend too much on the older man rather than on himself. Again, the more frequent visits of the mine foreman to a new man's place has a tendency to relieve the worker of that sense of personal responsibility which is thus shifted to the foreman's shoulders.

The negligence of the average practical miner as a factor in the inadequate training of the beginner was forcibly impressed on me by the words of an old miner, who remarked, "When I took my boys to the mine with me I always went over the roof, sounding it carefully, while the boys went at once to work. In doing this, I made a mistake. I should have made them do the sounding of the roof. As it was, they learned to depend wholly on me instead of on themselves, in this respect. Now I find when I visit the rooms where they are working for another that they follow too much their old habits of going at once to the coal face and beginning to work as soon as they enter their rooms, without knowing whether the place is safe or not."

GEO. N. LANTZ.

New Straitsville, Ohio.

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Mining Laws, Legislation and Mine Regulations

Letter No. 41—I have read with great interest all the letters relating to mining laws and legislation. I consider this discussion a most important one, in which many valuable suggestions have been made. There are, however, two points that I think have been neglected by writers thus far.

Much has been said in regard to the granting of certificates; but I do not remember that the question of requiring a mine superintendent to hold a certificate has been mentioned. I want to ask, Why is a mine foreman required to hold a certificate showing that he is capable of performing the duties of his position, while the mine superintendent, who is his superior, is exempt from such requirement? By what law of reasoning can it be shown that the responsibility for the safe operation of the mine should rest on the mine foreman, who *must* act in accordance with the orders he receives from his superintendent; while the latter is not required by law to pass an examination or to otherwise give evidence that he possesses the same knowledge and is as capable as the foreman who carries out his orders?

The mining laws of Europe are often held up as being examples to follow. If this is true, why should not some of the best features of these laws be incorporated in our own statutes? In England, a mine manager (superintendent) must have a first-grade certificate, while the mine foreman is only required to have a second-grade certificate, in order to hold that position, in any mine.

In England, all mines are considered gaseous; there is no such classification as "gaseous" and "nongaseous." The mine manager (superintendent) there must pass an examination that is about as severe as that required of our mine inspectors. If this is necessary in England where the conditions of labor are much better than in this country I would ask, Why is this matter entirely ignored in the mining laws of Pennsylvania and other states? The condition existing here seems all the more strange when we reflect that the mine foreman can perform the duties of superintendent without any additional examination or certification; but a superintendent cannot perform the duties of a mine foreman until he has passed the examination and taken out a certificate qualifying him for that position.

Another incongruity in our mining laws is in respect to the relative danger due to the presence of gas and lack of sufficient timber. Mine inspectors' reports show that the loss of life due to falls of coal and slate very largely exceed that caused by gas—the former being 62 per cent. as against only 2 per cent. due to the latter cause. Notwithstanding this fact, mines are classified as dangerous or otherwise, according as they do or do not generate *gas*. It is clear that a mine might be perfectly safe as far as gas is concerned and yet, owing to peculiar conditions in the roof, the same mine might be one of the most dangerous class to work.

The mining law generally requires the mine foreman or his assistant, in *gaseous* mines, to visit every working place before the men are permitted to enter the mine for work. Contrast this condition with the fact that, no matter how dangerous the roof conditions in a mine may be, there is nothing in the mining law that compels the same frequent inspection of the working faces. A miner may enter such a mine and proceed to work in a place not visited by any official, until later in the day if at all. I know mines where gas is not reported more than once in six months; but because they are classed as "gaseous" mines, the mine foreman or his assistant must visit each working place three times a day to comply with the law.

In offering these remarks, it is not my purpose to suggest a less frequent inspection of mine workings generating gas. I desire, instead, to emphasize the need of giving the same close attention to the inspection of mines where the conditions are such as to require a better support of the roof and constant watch and care.

Every practical mining man knows that this feature of the mining law imposes a heavy burden and one that is unwarranted on certain mines that are unfortunate enough to be troubled with an occasional pocket of gas; and must therefore be classified as gaseous mines; whereas it is possible that such a mine may be far less dangerous and require less frequent inspection to provide the same degree of safety than another mine close by that has been able to evade such a classification with all its attending evils, such as, for example, the employment of three or four additional firebosses to make the daily inspection demanded by the law.

I would suggest, in this connection, that there would be less incentive for some mine foremen to omit reporting "gas" when such is found occasionally at the face of a room or heading, if the mining law read somewhat as follows: All places where men shall work or pass shall be examined daily by a duly appointed competent person. Such a provision of the law would make the inspection of mines more general and not discriminate in favor of nongaseous mines that are often equally dangerous with those classed as gaseous.

THOMAS HOGARTH.

Burgettstown, Penn.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

CARBON DIOXIDE

This gas, often called "carbonic acid gas" or "chokedamp" is a colorless and odorless gas, having a distinctly acid taste. It is not combustible and will not support combustion in any ordinary form.

How Produced—Carbon dioxide is the product of the complete combustion of carbon or carbonaceous matter in a plentiful supply of air or oxygen. It is produced, in mines, by the breathing of men and animals; burning of lamps; explosion of powder; slow combustion of fine coal and slack in the gob; and other forms of combustion taking place.

Effect on Flame—Carbon dioxide has a similar effect on flame to that caused by an excess of nitrogen; or, what is the same thing, a depletion of oxygen in the air. The presence of carbon dioxide in the air tends to reduce the activity of combustion. It dims the flame of a lamp and extinguishes it when present in sufficient quantity.

The percentage of carbon dioxide that will extinguish flame depends on both the **nature of the flame** and the **amount of oxygen** in the air feeding the flame. A **gas-fed flame,** as the hydrogen flame of the Clowes lamp, or the acetylene flame of a carbide lamp, is less susceptible to extinction from this cause than is an **oil-fed flame.**

The flame of a lamp burning sperm or cottonseed oil is extinguished in an **artificial atmosphere** (which is the usual condition in a mine) containing 14 per cent. of carbon dioxide. But, in a **residual atmosphere** formed by allowing the lamp to burn till extinguished in a closed place, only 3 per cent. of carbon dioxide is required for extinction of the flame.

Effect on Life—Carbon dioxide is not classed as one of the poisonous mine gases, although it exerts a **toxic effect** on the human system. It is irrespirable when unmixed with air and if breathed produces death by suffocation. In smaller quantities, it causes headache, nausea and pains in the back and limbs.

According to Dr. Haldane, no appreciable effect is produced by breathing air containing carbon dioxide, until there is about 3 per cent. of this gas present. Breathing then becomes slightly more difficult; 5 or 6 per cent. of the gas causes decided **panting;** and 18 per cent. **suffocation and death.** The effect of the gas is much increased if the oxygen content of the air is below the normal.

For example, with 18 per cent. carbon dioxide present, there is $0.209\ (100 - 18) = 17.14$ per cent. oxygen and $0.791\ (100 - 18) = 64.86$ per cent. nitrogen, under normal conditions. This is a **fatal atmosphere.**

But, if the oxygen of the air has been depleted so that the ratio oxygen : nitrogen is less than 20.9 : 79.1; then a less percentage of carbon dioxide than that named above (18%) would be **fatal to life.**

Treatment When Overcome—Remove promptly to fresh air; apply alternately cold and lukewarm bandages to the chest; rub the limbs and body briskly to start circulation; and, if necessary, use artificial respiration. When consciousness is restored put the patient to bed and keep him quiet for several days.

The Coal Age Pocket Book

BLACKDAMP

It is a common mistake in mining practice to regard carbon dioxide as another term for "blackdamp," which is found in such quantities in many poorly ventilated mines. The two gases, however, are quite different.

The term **blackdamp** describes a variable mixture of air deficient in oxygen, and carbon dioxide. It consists therefore of carbon dioxide, nitrogen and oxygen, in varying quantities. The percentage of **oxygen** in the mixture will determine its respirable quality. The **nitrogen** is wholly inert and acts only to dilute the mixture and thus reduce the percentage of oxygen present. The **carbon dioxide** not only dilutes the mixture but produces also a toxic effect on the human system, although this effect is not of such a nature as to class carbon dioxide as a poisonous gas.

The **production of blackdamp** in coal mines is due to two chief causes: 1. The absorption of the oxygen of the air by the coal. 2. The generation of carbon dioxide by the various forms of combustion or oxidation continually taking place in the workings of the mine.

The **absorption of oxygen** from the mine air by the freshly exposed surfaces of coal is more rapid than what is generally supposed. Experiment has shown that a certain freshly mined bituminous coal absorbed from one-eighth to one-seventh of its volume of oxygen from the surrounding air, in 24 hr.; while only about one-tenth of this oxygen was converted into carbon dioxide. It is suggested that the remaining nine-tenths of the oxygen absorbed unites chemically with certain unsaturated hydrocarbons in the coal.

The **effect** of this rapid absorption of oxygen, in the still air of badly ventilated places, in coal mines, as can be readily imagined, is to **deplete the oxygen** content of the air. This is especially the case where tons of coal are shot down at night and left to be loaded out the following day and the ventilation during the night is much diminished in the mine.

On the other hand, where the ventilation is adequate and there is still blackdamp produced in quantity, it is the result of the generation of carbon dioxide from some cause—generally a mine fire or the slow combustion of fine coal.

AFTERDAMP

The term "afterdamp," as the word implies, is used to describe the variable mixture of noxious gases that remains after any explosion of gas, dust or powder in a mine.

Composition—It is impossible to give the composition of afterdamp, except in the most general way; because the gases formed depend on so many **varying conditions,** in respect to the character of the gas or dust burned; the relative volume of available oxygen; the size of the workings where the explosion takes place, as determining the temperature and pressure developed; and the condition of the mine with respect to gas, dust and moisture.

Afterdamp may contain variable quantities of nitrogen, carbon dioxide, carbon monoxide, water vapor and, at times, lesser amounts of nitrous oxide gas and possibly some unburned methane. The mixture is extremely dangerous, being fatal to life and often highly explosive.

Inquiries of General Interest

Firing a Boiler with Gas from a Blower

Kindly state if it is advisable to utilize a strong gas blower for heating steam boilers, instead of using coal as fuel. There is a strong gas well within 500 ft. of our boiler plant, at the mine. We think that it is producing sufficient gas to fire two boilers of the return-tubular type and 150-hp. units. If this is feasible, kindly explain the best method of fitting a burner under the boilers in order to burn the gas economically and get the best results.

I should be pleased to have you or some of the readers of Coal Age explain and show by sketch how to equip these boilers for burning the gas, and how to regulate the supply of free air required for the combustion of the gas under the boilers.

Fireman.

———, Penn.

There is always a great saving in fuel accomplished when it is possible to utilize a gas blower for the firing of boilers. Any type of boiler may be fired in this manner, but success depends largely on the proper installation of the burner so as to give the highest efficiency. Different types of boilers need different treatment in this regard.

In the use of gas as fuel, it is necessary to protect the boiler plates above low-water line with firebrick or clay that will stand a high temperature. The furnace must be so arranged as to exclude all air except what is admitted for the proper combustion of the gas. The furnace must be well built and constructed of material that will withstand the high temperature developed in the burning of the gas.

The accompanying diagram shows the general arrangement of the system. The gas is piped to the furnace through the main header *H*. This pipe must be of sufficient capacity to supply the required quantity of gas. Its area should not be less than the combined areas of all the burner connections. As shown in the diagram, the header is carried along the front of the boiler and small pipe connections *C* convey the gas to the burners *B*, under the boiler. There is a large valve *V* in the main header, to control the supply of gas to the furnace, and smaller valves V_1 control the supply to each burner. This is important in order to obtain a uniform distribution of the flame in all parts of the combustion zone referred to later.

The number of burners used under a boiler can only be determined by the size and type of boiler in use. There should be, however, a sufficient number of burners to give a good distribution of flame in the furnace. A baffle-plate *P*, built in checkerboard fashion with openings between the bricks, is placed from 3 to 5 ft. in front of the burners, inside the furnace. The purpose of this is to give a greater diffusion of the gas and render its combustion more complete, besides forming what is termed a "combustion zone" *Z*, between the baffle-plate and the burners where the gas is burned.

The radiation of the heat into this combustion zone facilitates the combustion of the gas. It is important that thorough combustion take place in this zone before the gases come in contact with the cooler surfaces beyond, in order to avoid the deposition of unburned carbon in the tubes and on the furnace walls. As shown in the figure, a layer of firebrick *F* is also made to cover the grate surface in the combustion zone, which adds greatly to the radiation of the heat.

Where it is desired to install the burners in such a manner as not to interfere with the burning of coal in the furnace, at times when desired, the gas burners should be placed above the furnace doors. Otherwise, these doors can be removed and the burners set in their place. As indicated in the diagram, gas enters the burner through the small pipe connections *C*. Air is admitted chiefly through the opening *O* in the ends of the burner closed by an adjustable shutter. By this means, the supply of air is regulated according to need. An annular opening close to where the burner enters the brickwork also permits air to enter at that point continuously, which has the effect to keep the tip of the burner cool and protect it from the intense heat of the furnace. The entry of air at this point is indicated by the small arrows, in the figure. An important feature in the Winner gas burner is the fact that the bore of the burner is rifled in such a manner as to give a rotary motion to the gas and air flowing through it. This greatly facilitates the mixing of the gas with the air and gives a more perfect combustion. The installation shown above was made by removing the furnace doors and building up the opening with brick.

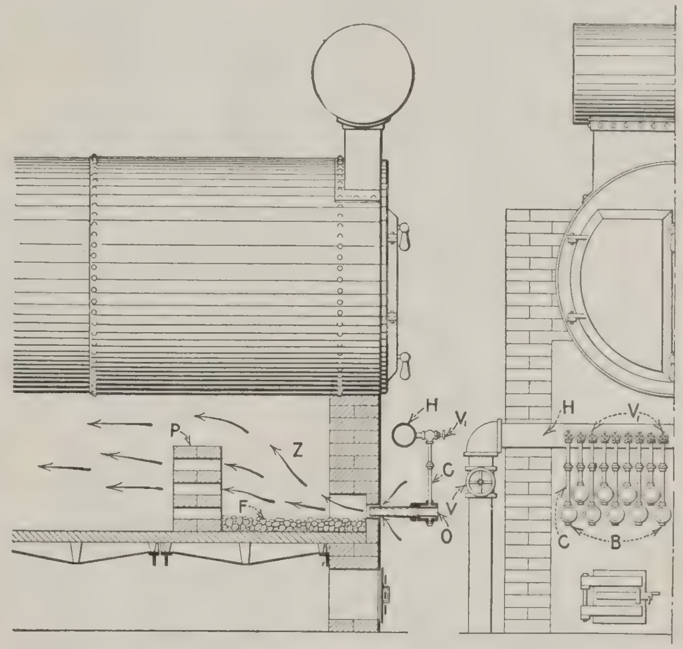


Diagram Showing General Arrangement of Gas Burners under a Return-Tubular Boiler

Examination Questions

Alabama First-Class Mine Foremen's Examination, Held Jan. 25-28, 1915

(Selected Questions)

Ques.—If the ventilation of a mine is insufficient, how may it be increased without increasing the power?

Ans.—Without increasing the power on the air, the circulation in a mine may be increased by cleaning up the air courses; removing all obstructions in crosscuts and breakthroughs; shortening the distance the air must travel; and splitting or dividing the air current wherever this is practicable. It is necessary that the sectional area of all crosscuts in entries and breakthroughs in rooms should be equal to that of the entries and airways.

Ques.—What instruction would you give in reference to the care and preparation of safety lamps before giving them to the workmen; and how would you instruct workmen as to their use?

Ans.—Every lamp should be carefully examined, cleaned and filled immediately after being brought out of the mine. This work should be done in the lamphouse by a competent lampman who is responsible for their safe keeping. Before being given to the workmen, each lamp should be trimmed, lighted and tested so as to reveal any defects in the lamp or any omission in the assembling of its parts.

No workman should be allowed to use a safety lamp in the mine until he has been shown how to handle the same and understands that the lamp is *not safe* when improperly used. He must be taught how to carry his lamp, to keep it in an upright position and shield it from a strong air current and exposure to dust and dirt. He must know how to adjust the flame and understand the importance of not permitting the lamp to smoke. He must be instructed to watch the flame of his lamp and shown how to detect gas by the appearance of the flame cap. He must be taught how to extinguish his lamp in case of necessity and instructed how to proceed in case the lamp fills with flame.

Ques.—In the examination of a mine, if a large territory was found to be filled with explosive gas what steps would you take to remove the same, a continuous air current being used?

Ans.—Place a danger signal at and guard every entrance to the mine, permitting no one to enter except those authorized to perform the work of removing the gas. Assuming that no one is in the mine, in company with competent firebosses equipped with safety lamps proceed to the intake end of the affected section of the mine.

If necessary and practicable, the air current passing into this section should now be increased by sealing the air entering other sections. The work of removing the gas should be conducted wholly from the intake end and should proceed slowly, sweeping the gas from each working place in order and giving time for its complete removal before proceeding to another place.

Much will depend on the character of the workings and the inclination of the seam. It may be necessary to erect special brattices, in order to dislodge the gas accumulated at the face of a pitch or chamber driven ahead of the air. As the work proceeds, careful tests must be made with the safety lamp to note the progress that is being made. In this manner, the work must be carried on until the entire section is free from gas. While performing the work, all safety lamps should be carefully protected against a rush of air that may occur at any moment, caused by a possible fall of roof in the workings.

Ques.—In mines having extremely tender roof, state what precaution you would adopt when introducing the various types of mining machines, in order to insure the safety of employees and economy of operation.

Ans.—It is most important, in mining coal with machines under tender roof, to adopt a systematic method of timbering. Posts should be set in rows not more than 3 or 4 ft. apart and parallel to the face. These posts should be staggered, that is to say, the posts in each row should be set so as to divide the distance between the posts in the preceding row. The distance between the coal face and the first row of timbers should not be greater than what is required for the machine to work freely.

In very bad roof, it may be necessary to set temporary posts close to the face or dividing the distance in which the machine works and to remove these and reset them as the machine is advanced. The coal should be well spragged as the cut is made. In adopting such a method at the face, the rooms should be driven double so that the machine can be taken in on one track and, after cutting across the face, taken out on another track. The width of opening and thickness of pillars will depend on the depth of the seam below the surface.

Ques.—State how the several mine gases may be detected. In what proportion in the air are they fatal to life? In what proportion do they extinguish light?

Ans.—Methane or marsh gas (CH_4) is detected in mine air, by the action and appearance of the flame of a safety lamp. This gas when present in the air causes a faint, pale blue cap to form at the tip and above the flame. The height of the cap increases with the percentage of gas present, until at about 5 per cent. the unbonneted Davy lamp fills with flame.

Carbon monoxide (CO) is best detected in mine air by observing its effect on small birds and mice, which are prostrated in a much shorter time than a person exposed to the same atmosphere. Carbon dioxide (CO_2) is detected by the dim burning or extinction of lamps in its presence. Hydrogen sulphide (H_2S) is detected by its smell.

The percentages of the nonpoisonous gases, methane and nitrogen, fatal to life are such as deplete the oxygen of the air to 7 per cent.; namely, CH_4, 66.5, and nitrogen, 93 per cent. But 18 per cent. of carbon dioxide or 0.5 per cent. of carbon monoxide are fatal, because of their poisonous qualities. An oil flame is extinguished in 14 per cent. of carbon dioxide.

Coal and Coke News

Washington, D. C.

While no official announcements on the subject have been given to the public, it seems to be generally understood that the new Trade Commission is likely to be severely restricted in its operations during the first few months of its existence. Congress was obliged to deal with such a mass of legislation during the last few days of the recent session that it left a good many things in an incomplete and unsatisfactory condition, and the Trade Commission was one of them.

The salaries of the Commissioners were provided for in the legislative, executive and judicial appropriation bill, but for the remainder of its functions, only some $300,000 was furnished while the Commission was obliged to take over the Bureau of Corporations. As the latter concern had been costing from $200,000 to $275,000, all of it for work that is expected to go on, the new appropriation clearly gives only a narrow margin for new undertakings. In particular, it seems out of the question to expect that there will be much available for conducting hearings and investigations.

One subject that the Commission had been expected to take up early in its career was that of existing conditions in the oil industry, it having been desired by various members of Congress that there should be an authoritative official finding as to the extent to which the dissolution of the Standard Oil Co. had resulted in genuine competition.

If this should be dealt with even in a preliminary way, there would be nothing for other work so that this would constitute the practical limit of what would be done. Perception of this situation has disappointed those who had looked for early work on industrial conditions, and has correspondingly pleased those who felt that early activity on the part of the Commission would be dangerous and consequently to be depreciated.

There have been some of both groups of thinkers on this topic in the coal industry, as there had been confident predictions that conditions in that line would be among the first to receive attention. While there has been no official statement on the subject by the Commission and no definite plans so far as learned have as yet been forecast, this proposal (for coal investigation or study) is generally regarded as having been necessarily deferred for a good while, so far as anything save a mere preliminary survey is concerned.

The Report of the Commission on Industrial Relations

Meantime, the Commission on Industrial Relations is expected to report. As is well known, this commission has devoted considerable time and attention to the coal industry and the expectation is that conclusions regarding the business will, therefore, figure largely in what may be stated to Congress as a result of the work done by it.

Apparently, the Commission has of late leaned heavily to the side of extreme radicalism, and as most of its work has been done through "hearings," there is a general expectation that it will not develop much in its report except the familiar facts regarding the Colorado, and other coal situations that have already been made known by witnesses who testified at public sessions.

The Commission will doubtless, like all other bodies of the same sort, leave behind it, for use by others, the papers, data and other information remaining over from its work. The Trade Commission is believed by many to be likely to fall heir to these, so that whatever has been done with regard to the coal industry by the Industrial Relations Commission may in that case afford the basis for such further development as the Trade Commission may choose to give it.

Meanwhile, as already noted in this correspondence, most of the legislative mining and "conservation" program was left suspended when adjournment arrived on Mar. 4, and will have to be reintroduced at the opening of the next session. When that time arrives, the proposed measures will probably be referred to the Commission, just as railroad bills have for a good while been customarily sent to the Interstate Commerce Commission for its report or expression of opinion before action was taken on the floor. In this way, therefore, the Trade Commission may be able, from the very first, to exercise an important, even if indirect, influence upon the direction of Federal policy regarding the mining business.

Probable Revival of Rate Cases

Careful observers of the trend of events in Interstate Commerce Commission affairs are of the opinion that the next few months will be likely to see a revival of the attempt to secure further rate concessions in the interest of the railroads. The express companies have, within the past few days, filed with the Commission a petition for the revision and improvement of the rates granted them and there is more and more reason to fear that the 5 per cent. rate advance already granted the roads will not suffice to put their revenues into satisfactory condition.

It is believed that, should this effort to get better rates be undertaken, a feature of it would be the discussion of an increase on heavy commodities such as coal, which were largely exempted in the 5 per cent. decision. As yet, the matter is purely speculative, there having been no definite announcements as to what may be expected in the matter. The situation is admitted to depend largely on the developments as to railroad revenues in the near future. These will be largely affected by the export situation growing out of the European war.

Alaska Railroad Route Is Undetermined

There has thus far been no announcement of any decision regarding the choice of a route for the new government coal road in Alaska, although one is expected shortly to be forthcoming. Whether, in the present depleted state of the Treasury, anything immediate could now be done on a large scale by way of construction, even if all were ready to proceed, is believed by many to be questionable.

Revenues have not recovered since the beginning of the war, and the war taxes of last autumn are yielding less than had been expected. It cannot yet be stated what the yield of the income tax will be, but unless that is larger than generally expected, there may be a disposition to avoid heavy new expense commitments so far as practicable, in order not to increase the large outlays made inevitable on other accounts by the appropriations of Congress.

PENNSYLVANIA

Anthracite

Pittston—The Lehigh Valley Coal Co. is testing the thickness of the coal under its tract in Moosic Borough and may sink a shaft there. The tract comprises 400 acres and is known as the Bramwell property. Only the Red Ash vein, lowest in the Pittston region, underlies the land. Mining will depend on the thickness of the coal. If a shaft is sunk, the coal would be removed overland to the Heidleberg breaker.

Wilkes-Barre—What was probably the first arrest of its kind in this vicinity occurred Mar. 24, when Stanley Mookimas was arrested upon a warrant, charging him with having worn a button of local No. 1407, United Mine Workers of America, without being entitled to wear it. Mookimas appeared at No. 5 colliery of the Lehigh & Wilkes-Barre Coal Co., it is alleged, wearing the union button in violation of the union's constitution and by-laws and the state law.

The annual mining institute dinner, which is always the largest dinner in the city during the year, will be held in Irem Temple Wednesday May 5. The program committee is now making arrangements. Judge John M. Garman, will be toastmaster.

Bituminous

Uniontown—In the annual examinations for mine foremen and fire bosses certificates in the bituminous region this year, special emphasis will be laid on character. This will count as much as mental ability. No man who is not temperate in his habits can hope to get his papers, is the verdict of the mine inspectors.

Connellsville—Persons living on the North end of 10th St., have received notices from the H. C. Frick Coke Co. that the coal is being removed from under their residences and the ribs are to be pulled. The coal in this branch of the Davidson mine is just about exhausted, at least in the portion under Greenwood. If the surface should sink the gas connections are in danger of being broken.

Traffic in coke continues to show slight gains, the present production being in the vicinity of 280,000 tons per week. While the business being handled is not heavy, the improvement has been steady for some time. Mills are now taking more fuel than was expected in view of the restricted railroad buying of their products.

Marianna—The relief work in behalf of the destitute miners and their families was recently placed on a sound footing when a check for $1000 was received by the committee from the Union Trust Co., of Pittsburgh. This, together with other contributions recently received, amounts to $3000, which it is said will be enough to carry the relief work through until Apr. 1, when it is expected the mines will re-open in part, at least.

Johnstown—Rumors are current that the United Coal Co. mines in Jerome, Boswell and Elklick, in Somerset County, are to be taken back by the Merchant Coal Co., of Baltimore, which sold them to the Kuhn interests of Pittsburgh five years ago. It is believed that this indicates an early resumption of work at the mines and a heavy shipment of coal from Somerset County to Baltimore for export.

WEST VIRGINIA

Williamson—Extensive developments in the Guyan River, Piney and Cow Creek districts are planned by operators from the Pocahontas and Thacker fields, Logan and Wyoming counties being involved. The Pocahontas Co., it is understood, has closed a dozen leases, covering 20,000 acres of virgin coal land on Guyan River, which will be developed during the year, while Col. Wm. Leckie, of Welch, W. Va., has acquired control of about 5000 acres from John W. McCreary. Other operators are also interested. To handle the traffic the Chesapeake & Ohio Ry. Co. will extend its line to the new developments, and will also build a branch on Piney Creek.

Charleston—There continues to be considerable inquiry from persons believed to represent Eastern capital, also some from the Middle West, for West Virginia coal tracts, a large number of which are on the market at prices which are considered bargains because the financial depression in the state has put the original buyers of these tracts in need of cash. Many of these tracts were originally taken up and blocked out.

Miners of the Cabin Creek district have asked their officials to call a meeting to consider whether they will make a demand on the operators for an increase in wages. The miners, it is understood, claim an increase is due them by an agreement entered into at the end of the 1913 strike. The operators, on the other hand, claim they will not consider a change from the present scale.

Wheeling—The summer meeting of the West Virginia Mining Institute will be held here on June 15 and 16. The affair promises to be the largest meeting of coal interests ever held here.

Mullins—A large number of new operations are in process of development around Mullins. Many of the best known coal men in southern West Virginia have become interested in the town, and it is expected that it will shortly spring into prominence as one of the leading coal-field towns of the state.

Crown Hill—A part of the mine equipment and commissary stock of the National Bituminous Coal and Coke Co. will be sold at public auction at the front door of the courthouse on the morning of Apr. 10. The sale is to be made by Constable G. D. Acree in accordance with a warrant issued at the instance of Julian M. Johnson and others.

ALABAMA

Ensley—The work of repairing the Tennessee Coal & Iron Co.'s hospital which was badly injured by fire last month, has been completed and the patients moved back from Muscoga mines near Bessemer, where they have been since the accident.

Birmingham—The Alabama Safety Association, composed of mine officials and coal miners, will hold a Field Day at Richwood Park in Birmingham May 29. The program will comprise first aid drills and other demonstrations made above ground. The next meet of the American Mine Safety Association, this year, will probably be in Birmingham as the Secretary-Treasurer H. M. Wilson favors this place of meeting.

Republic—First Aid Corps from Palos, Warner and Sayreton mines of the Republic Iron & Steel Co. held a general Field Day recently at Republic.

Gadsden—Tom Peters Henley, through his attorneys, has filed suit in the Circuit Court of Walker County to recover 7160 acres of coal and mineral land in Walker County, now held by Gen. E. W. Rucker, a prominent Birmingham capitalist and coal operator. The land is estimated to be worth $200,000. The complaint in the action filed contains only nine lines and does not set forth any of the details under which the claim is made.

KENTUCKY

Harlan—The Wilhoit Coal Co. at Yokum's Creek made an increase of 500 tons of coal per day recently, so that the daily output is now 1000 tons instead of 500. The report is circulating that the coal business is increasing nicely throughout the Cumberland River, or Harlan coal field.

Nolansburg—The Golden Ash Coal Co. announces an increase in mining operations to 7000 tons daily. It also plans other increases from time to time during the year.

Whitesburg—The plants of the Consolidation Coal Co. and the Elk Horn Mining Corporation in the Jenkins-Burdine-Fleming-McRoberts fields are increasing their output. Beginning Apr. 1 it is said that every mine will operate at full capacity. The coal shipments over both the Baltimore & Ohio and the Lexington & Eastern railroads are getting heavy—both lines being practically taxed to the limit.

OHIO

Lisbon—The Lisbon Coal Co., which has recently been reorganized will soon open a new mine near the Erie tracks. The company has been operating a small mine for several years. A switch will be built to the mine.

Crooksville—The announcement has been made that operations at the W. P. Rend mine have been suspended indefinitely throwing 100 miners out of employment.

St. Clairsville—James A. Paisely, of St. Clairsville has sold a tract of coal land in Belmont county to the Valley Camp Coal Co. for $75,000. It is said that the new owners will try to develope the property if labor troubles are straightened out.

INDIANA

Evansville—H. P. Allen, manager of the Deep Water Coal Co. of this city states that his company, within 90 days, will close options on 210,000 acres of coal lands in western and central Kentucky. It is said the price paid exceeds $5,000,000. Eastern capital is interested in the venture. A large coal tipple and dock will be built on the Ohio River, a few miles below this city and barges will be loaded there for Southern markets.

Clinton—Work has been begun at the Hugh Shirkie mine No. 1, near Shirkieville, to uncover the fan, fan engine and the building in which they stood, which were all buried by a cave-in. It was at first proposed to dig a new air shaft but it was finally decided to remove the dirt through the entries at the bottom. The damage is estimated a $15,000.

Oakland City—The Ayrshire mine, No. 1 closed down Apr. 1, it having been found that mines Nos. 5 and 7 could take care of the present volume of trade.

ILLINOIS

Ottawa—The LaSalle shaft was recently closed down on account of slackness in the coal business. This mine employs about 300 men, but the majority will be distributed among other mines, of the LaSalle County Carbon Coal Co. in this vicinity.

Nashville—Local capital is organizing a coal company to sink a mine one quarter of a mile west of here, on a piece of property between the Louisville & Nashville and Illinois Southern railroads. Several hundred acres of coal rights have been acquired, and the movement is well under way.

WYOMING

Cumberland—The Union Pacific Coal Co. has ordered the output of its coal mines here increased 500 tons daily. Fifty additional miners will be employed at once. About 500 men are at present employed.

TEXAS

Sierra Blanca—It has been announced that a large bed of high-grade coal has been discovered near here. Plans are now on foot to develop the property and to construct a railroad from Sierra Blanca to the mines, a distance of about 28 miles. This coal deposit is about 75 miles west of the field which was exploited several years ago by a syndicate of Pittsburgh men.

PERSONALS

George Watkin Evans, consulting mining engineer of Seattle, during the latter part of March, visited southeastern Alaska on professional business.

Charles Dorrance, general manager of the Harwood Coal Co., has resigned to become assistant general manager of the Delaware & Hudson Coal Company.

Edwin Staley, formerly with the U. S. Bureau of Mines, has resigned in order to take charge of the office details of the Mine Safety Appliance Co., Pittsburgh, Penn.

B. R. Lindsay, formerly connected with the mining department of the Cambria Steel Co., as assistant superintendent of the Rolling Mill mine, has accepted a position at the Bowood mine of the Republic Iron & Steel Co.

Captain W. A. May, president of the Pennsylvania and Hillside Coal Co., informed the City Planning Commissioners of Pittston, who conferred with him at Scranton, that the mines of the companies would undoubtedly work steadily until July at least.

Chas. A. Sine, of Royalton, Ill., formerly general manager for John L. Mitchell's mining properties in Illinois, and J. B. Brown, manager of the Royalton mine, have resigned their positions to engage in the coal operating business at Sebree, Ky. They have acquired a mine at that place and are refitting it and expect to start operations shortly.

Alfred Kauffmann is now vice-president of the Link-Belt Co. in charge of operations at Indianapolis. Mr. Kauffmann served in the engineering department at Philadelphia for a number of years, from which he was promoted to take charge of the erection work of the company. He then proceeded to the sales department, looking after the coal mining business in the East, and particularly in the West Virginia field. His many friends in this industry will be glad to learn that in recognition of his competent and able work he has been elected vice-president of the Link-Belt Co.

OBITUARY

Simon Jones, identified for years with the mining interests of Kentucky, died at the age of 74 at his home in Render, Ky., after a long illness. A native of South Wales he came to this country in 1869 and was employed at St. Marys, Ind., Tamara, Ill., and Newburg, Ind. He then went to Earlington, Ky., where he opened the first mine for the St. Bernard Mining Co. in 1871. He became associated with the old Render Coal Co., in 1872 and remained with the Central Coal & Iron Co. when that concern absorbed the Render company.

RECENT COAL AND COKE PATENTS

Stoker. E. P. Stevens, Chicago, Ill. 1,127,940 Feb. 9, 1915. Filed Sept. 25, 1913. Serial No. 791,690.

Furnace Grate. A. Cotton, Newark, N. J. 1,117,795, Nov. 17, 1914. Filed Feb. 18, 1914. Serial No. 819,653.

Boiler Furnace. F. J. Widman, Chicago, Ill. 1,129,825 Feb. 23, 1915. Filed Jan. 7, 1914. Serial No. 810,832.

Coal Shifter. W. L. Marberry, St. Louis, Mo. 1,117,875, Nov. 17, 1914. Filed Apr. 3, 1914. Serial No. 829,391.

Coal Drill. J. G. Huntley, West Pittston, Penn. 1,128,878 Feb. 16, 1915. Filed Aug. 3, 1914. Serial No. 854,759.

Mechanical Stoker. A. G. Elvin, Somerville, N. J. 1,128,428 Feb. 16, 1915. Filed Oct. 21, 1913. Serial No. 796,377.

Smoke Consumer. A. E. Wilson, Indianapolis, Ind. 1,129,151 Feb. 23, 1915. Filed Aug. 14, 1914. Serial No. 856,740.

Rotating Mechanical Stoker. S. H. Dunning, Paterson, N. J. 1,118,748, Nov. 24, 1914. Filed July 16, 1914. Serial No. 851,243.

Coal Loading Device. W. W. Jamison, Greensburg, Penn. 1,128,880. Feb. 16,1915. Filed July 2, 1913. Serial No. 776,930.

Grate Construction for Furnaces. C. L. Davidson, New York, N. Y. 1,129,172. Feb. 23, 1915. Filed Aug. 15, 1911. Serial No. 644,097.

Leveler for Charges in Coke Ovens. D. F. Lepley, Connellsville, Penn. 1,129,352 Feb. 23, 1915. Filed Aug. 31, 1910. Serial No. 579,856.

Locomotive Fire Box. J. T. Anthony, assignor to American Arch Co., New York, N. Y. 1,118,615, Nov. 24, 1914. Filed Oct. 1, 1913. Serial No. 792,807.

Water Tube Boiler. J. E. Bell, assignor to Babcock & Wilcox Co., New York, N. Y. 1,129,538 Feb. 23, 1915. Filed July 8, 1907. Serial No. 382,588.

Mechanical Stoker for Promoting Smokeless Combustion. K. Yano, Oaza, Japan. 1,116,664, Nov. 10, 1914. Filed June 26, 1912. Serial No. 705,905.

Chain Grate Stoker. W. A. Jones, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,117,395, Nov. 17, 1914. Filed Feb. 3, 1913. Serial No. 745,776.

Steam Boiler Furnace. J. Wolff, assignor to Babcock & Wilcox Co., New York, N. Y. 1,129,534 Feb. 23, 1915. Filed Jan. 2, 1913. Serial No. 739,684.

Mining Machinery. C. O. Bemies, McClellandtown, Penn., and J. F. Bemies, New York, N. Y. 1,127,395 Feb. 9, 1915. Filed Nov. 7, 1910. Serial No. 591,031.

Means for Saving Fuel and Promoting Combustion in Furnaces. W. B. Evans, Philadelphia, Penn. 1,129,656 Feb. 23, 1915. Filed Nov. 28, 1913. Serial No. 803,496.

TRADE CATALOGS

Mayer Bros. Co., Mankato, Minn. Folder. "Little Giant" power hammer. Illustrated.

The Blaisdell Machinery Co., Bradford, Penn. Loose Leaf Catalog. "Air compressors, vacuum cleaners." Illustrated, 6x9 in.

The Jeffrey Mfg. Co., Columbus, Ohio. Bulletin No. 129-A. "Jeffrey Arc Wall Coal Cutters for Over Cutting System of Mining." Eleven pages, 8x10 in., illustrated.

The Sanford Reilly Stoker Co., Ltd., Worcester, Mass. "Reilly Self-Dumping Underfeed Stoker." Thirty six pages, 6x9 in., illustrating and describing the Reilly stoker and installations thereof.

NEW PUBLICATIONS

Illinois State Geological Survey, Bulletin No. 24, "Deep Borings," by J. A. Udden. Cloth bound volume of 141 pages, 6x9 in., with drawings and insert maps.

Department of the Interior, U. S. Geological Survey, Water Supply Paper 365. "Ground Water in Southeastern Nevada," by Everett Carpenter. 86 pages, 6x9 in., illustrated.

Department of the Interior, Bureau of Mines, Bulletin 90. "Abstract of Current Decisions on Mines and Mining, December 1913 to December 1914." by J. W. Thompson. 176 pages, 6x9 in. unillustrated.

Department of the Interior, Bureau of Mines, Technical Paper 99. "Probable Effect of the War in Europe on the Ceramic Industries of the United States," by A. S. Watts. Fifteen pages, 6x9 in., unillustrated.

CONSTRUCTION NEWS

Linton, Ind.—A mine will be sunk on the 500 acres recently purchased three miles southwest of this city, by the Fourth Vein Coal Co. It will employ 400 people.

Mullens, W. Va.—W. H. Thomas, of Bramwell, W. Va., is making arrangements to start work at once on the Iroquois mine, on Winding Gulf Creek. The property will be placed in operation as soon as possible.

Scranton, Penn.—Work was recently begun in re-timbering the shaft of the Conklin mine, formerly the Clearview, by Markwick & Co. Later on the shaft will be sunk 250 ft. deeper so that coal in the Clark vein may be mined.

Baxter, W. Va.—The store building of the New Central Coal Co., at Baxter, which burned down some weeks ago, is now being rebuilt. The structure which will be about the size of the former building and two stories high, will be of concrete. It is being built on the same location as the building which was destroyed.

Barbourville, Ky.—Contracts are being placed for cross ties and other materials to be used in the Barbourville-Manchester extension of the Louisville & Nashville R.R., with every prospect that actual construction work will begin inside the next two months. Clay County supporters of the project have secured rights-of-way in that county and have raised a bonus of $50,000 and rights-of-way are now being signed in Knox County, while engineers are to go over the proposed route immediately.

Huntington, W. Va.—It is reported that 20 new coal companies will begin operations in Raleigh and Wyoming Counties within a short time. Of 30,000 acres of undeveloped coal land in the Winding Gulf section, approximately 23,000 acres will be developed within the next few months. Both the Virginian and Chesapeake & Ohio railroads are planning extensions, the former starting from Stone Coal Junction and extending up Stone Coal Creek, and the latter building from Woodpeck up Piney Creek.

Bearcreek, Mont.—Developments and improvements of considerable significance have been planned by the International Coal Co. The plans contemplate the tapping of the No. 4 vein at the International Plant. This will be the first time that this measure has been touched on the Bearcreek side. It is expected that by fall the new slope will be completed, a new electric system for handling the coal underground installed, and perhaps a new tipple built. This will increase the out put of the International by some 400 tons per day, and increase the working force from 160 to 200 men.

NEW INCORPORATIONS

Tacoma, Wash.—The Ozark Coal Mining Co. has been incorporated with a capital stock of $400,000. The incorporators are E. Hutchinson, D. W. Watkins and C. C. Leigh.

Pekin, Ill.—The Ubben Coal Co. has been organized with a capital stock of $25,000 to engage in coal mining. The incorporators are A. U. Ubben, Theodore H. Ubben and John Bonk.

Terre Haute, Ind.—The Vigo Mining Co., of Terre Haute, was recently incorporated with a capital of $50,000. The directors are J. G. Van Winkle, Samuel D. Royse and M. E. Godley.

Cincinnati, Ohio—The Matthew Addy Co. has been incorporated with a capital of $100,000 to mine and deal in coal, iron and coke by James A. Green, Louise Coy Green, Benj. N. Ford, A. Burt Champion and Leland G. Banning.

Charleston, W. Va.—A charter to do business in West Virginia was recently granted to the Loraine Coal & Dock Co. with head-quarters at Columbus, Ohio. It is the intention of this firm to develop coal mines in Logan County.

INDUSTRIAL NEWS

Bridgeport, Conn.—The Bridgeport Brass Co. is erecting an addition to its plant, necessitated by its increasing business.

Pittsburgh, Penn.—The Chas. T. Topping Machinery Co., dealers in contractors, mine and quarry equipment, announces the removal of its offices to Suite 928, Oliver Building.

Birmingham, Ala.—The Montgomery Coal Washer Co. announces that it has closed a contract with the National Coal Co., with general offices at Seattle, for a 300-ton washer, at a cost of about $9000.

Buffalo, N. Y.—The Buffalo & Susquehanna R.R., between Buffalo and Wellsville, will be continued until July 1 by court order. The line was some time ago ordered abandoned, but stays have been granted in the hope of selling it.

Grafton, W. Va.—A supplementary contract or agreement has been made by the Sterling Coal Co., of West Virginia and Ohio, making its property security for a bond issue of $2,500,000, which was issued in 1910 by the Guardian Savings & Trust Co., of Cleveland.

Juneau, Alaska—The United States Land Office has announced the cancellation of 47 coal claims in the Christopher group in the Behring River coal field. These claims cover 7000 acres which were held to have been fraudulently located.

Morgantown, W. Va.—According to reports received at the headquarters of the United Mine Workers, preparation for the opening of the spring trade is being made by local coal operators and the opening of navigation on the Lakes will find all the mines in the district working to the limit of their capacity.

Port Jervis, N. Y.—It is stated that coal in paying quantities has been discovered in the hills near this city by the North American Exploration Co., and that work will be started shortly on a drift to reach the coal measure. If this verifies reports on diamond drill borings submitted to mining engineers, coal mining will be started.

Offutt, Ky.—The large commissary owned by the Royal Colliery Coal Co. at Offutt, Ky., was recently entered by burglars and several hundred dollars' worth of merchandise was stolen. An attempt to blow the safe proved fruitless. Dynamite was found in the crevices near the hinges. The goods stolen consisted of clothing, shoes and pistols.

Buffalo, N. Y.—The Delaware, Lackawanna & Western R.R Co., which was ordered to remove its coal trestle on north pier by Apr. 1, has asked the government to be allowed to remove the structure 60 ft. back, thus allowing a wider harbor entrance and not interfering with navigation. It seems likely that a compromise will be reached on this basis.

Martins Ferry, Ohio—A deal was recently consummated whereby a company known as the Burlington Coal Co. became the owners of the Miles Megrail Coal Co. The amount changing hands as a result of the deal was not made public, but it is thought to have been considerable. The new owners will take possession shortly and a new tipple, office and barn will be erected and a number of other improvements will be made by the new firm.

Columbus, Ohio—Charles Seidenfeld, president of the Seidenfeld-Hammond Coal Co., of Columbus, announces that after Apr. 1 the executive offices of the company will be moved to the location of the operating offices, at Murray City, Ohio. Mr. Seidenfeld some time ago acquired the interests of E. H. Hammond in the company and has also taken over the entire ownership of the Skidmore Coal Co., of Rutland, Ohio. These companies will be operated separately.

Washington, D. C.—West Virginia coal operators from all parts of the state recently met in Washington to take preliminary steps looking to united action to protect the coal industry. Another meeting will follow shortly at which an organization will be formed to resist encroachments on the rights of coal men. It seems to be the consensus of opinion that something must be done to prevent attacks on the coal industry, state legislation evidently being held principally in view.

Bluefield, W. Va.—At the recent meeting of the Pocahontas Fuel Co., it was decided to establish a line of ships to ply between Hampton Roads and the New England coast, and engage in making coal deliveries for the company. It is understood that the new firm, or rather the subsidiary company, will be known as the Pocahontas Navigation Co., and it is expected that by the expiration of the present contract for transportation, the Pocahontas Navigation Co. will be ready for business.

Philadelphia, Penn.—The Circuit Court of Appeals on Mar. 26 dismissed a petition for rehearing in the case of Charles A. Otis, et al, plaintiff in error, versus the Pittsburgh Westmoreland Coal Co. in the Western District Court. In the petition filed by Otis, it was indicated that the Appellate Court had affirmed a judgment upon two equally inconsistent grounds, first as to acceptance, because the bonds in suit were taken under the written contract, and second, as to termination because they were so taken.

Charleston, W. Va.—The statement of the shipments of coal and coke over the lines of the N. & W. Ry. for the month of February and the two months of the current year, has just been made public. The statement shows 1,689,606 tons shipped during the month, as against 1,762,344 tons during the same month last year, a decrease of 72,738 tons. For the two months of the year 3,646,759 tons were shipped over the lines, as compared with 3,846,903 tons during the same period in 1914, a decrease of 200,144 tons.

Pittston, Penn.—Mayor M. N. Donnelly will appoint a committee of business men to solicit subscriptions to purchase the coal under the Reap property, which the government proposes to buy for a Federal building site, and to present the title to the mineral rights to the government. Purchase of the coal by the government would make the price exceed the appropriation for the purpose. The company asks $10,000 for the underlying mineral but the mayor believes the government will be satisfied with less than the entire amount of coal or sufficient to give surface support.

Huntington, W. Va.—According to plans presented at a recent meeting of stockholders at Ashland, Ky., various coal companies operating in the Big Sandy and Kentucky River valleys, whose aggregate capital amounts to about $3,500,000, will be incorporated as the Kentucky Coal Corporation. The companies concerned in this merger include the Letcher Coal & Coke Co., the Slemp Coal Co., the Henry Coal & Coke Co., the Haley Coal Co. and the Kentucky River Consolidated Coal Co. It is understood that the new company expects to start extensive new developments in the Big Sandy and Kentucky valleys as soon as the organization is perfected.

Coal Trade Reviews

General Review

Anthracite buying lacks the customary vigor that should characterize the opening prices. Bituminous continues dull and contracting is slow. Current sales substantially below normal and some agencies are attempting to force the market.

While the opening of the new coal year finds a large volume of anthracite coal moving it is clear that the season is not starting up with the customary snap. There is a large amount of coal in all directions, and buyers will have no difficulty in getting full shipments of any description they require. Now that the large companies are quoting the minimum price of the year, the dealer demand has shifted from the individuals, but buyers are failing to respond to low quotations with the usual vigor and the situation is replete with uncertainties. Interest is centering principally on the steam grades; the stocks of the large companies are all cleaned out of these sizes, and there is some anxiety as to the supply during the summer.

The Eastern bituminous trade is devoid of interest. Some buyers are apparently trying to force the market with low prices, but with indifferent success, while others have about made up their minds to await further developments. Very cheap coal is being offered at nearly all of the distributing centers, and current receipts are absorbed with considerable difficulty. A turn for the better in ocean freights, together with the exceedingly high prices ruling on Cardiff coals, has caused a better outlook in the foreign trade, and there are already an increasing number of vessels moving to South American points; a number of coastwise boats are also going into this trade as fast as they can be released.

Though consumption has increased somewhat in the Pittsburgh district, it is clear that the production has been advanced faster than conditions warranted and there is a decidedly depressed situation with a large surplus of free coal. Contracting is proceeding very slowly, and operators are showing a disposition to make attractive offers to induce business, but consumers are strongly inclined to withhold contracts and confine their purchases to the prompt market.

Production in Ohio continues at an exceptionally low ebb and the situation is still generally weak on all grades with little hopes for any improvement in the immediate future. Dealers' requisitions are at a minimum, while expiring steam contracts are being renewed with the greatest difficulty. Steam coals are scarce in the Southern market due to the limited work at the mines. The outlook for the summer stocking is regarded as unfavorable because of the unusually low prices ruling throughout the past year.

Sales throughout the Middle West are substantially below normal, and the beginning of this month finds a number of mines in certain districts closing down indefinitely pending an improvement in the market. A large number of contracts have been let at moderate recessions on last year's figures while prices generally are varying over a large range; collections are also slow. The market is being maintained only by the most rigid curtailment in production.

ATLANTIC SEABOARD

BOSTON

April opens with a mid-summer market. Pocahontas and New River cargoes arrive "on the market." Little doing on contracts. Georges Creek and the Pennsylvania grades also dull. Sailing vessels chartering for South America. Anthracite companies accept April business without reservation.

Bituminous—April finds the Pocahontas and New River market as lifeless as in July. There are few favorable sides to the situation; both f.o.b. and alongside there is no demand worth mentioning. Even coal for contract application is very dull and cargoes continue to arrive without orders. No new business of any size has been closed recently, although one of the largest power-house contracts is pending. Some of the shippers are striving to make prices that will induce buying but so far they have had little success. March was a mild month and stocks are still large in most directions. Buyers generally are holding off and several of the agencies have about decided to sit still and wait developments. The bids on the City of Boston harbor institutions later in the month are bound to be followed with much interest.

The export trade so far is not proving much help to the Hampton Roads shippers. Cargoes for South America are increasing in number but the vessels are mostly small. The high prices on Cardiff coals are expected to throw an extra demand on the Chesapeake Bay terminals but such demand seems to develop very slowly.

In Georges Creek, coal is accumulating at all the distributing points and a general curtailment is beginning to be enforced. Receipts here are absorbed only after delay, and inquiry is light.

The Pennsylvania grades also share the general dullness. The transportation that ordinarily brings the bulk of these coals here is just now engaged in the anthracite trade and that reduces the volume that will be received this month. Prices remain about the same, although most operations are under heavy curtailment. Coal comes down only on orders; few operators are now willing to stand the risk of demurrage at the loading ports. All-rail movement is only spasmodic.

Water Freights are still dull at 85@90c., Hampton Roads to Boston, on bottoms 2000 tons upwards. Sailing vessels are chartering on South American business as fast as they are free of coastwise engagements. Since these voyages are of three to four months' duration it takes them out of the New England market for most of the season. There is little enough inquiry, however, for the barges and steamers that are left and a further recession in rates is still looked for.

Anthracite shipments have come forward with a rush, so much so that many dealers are expecting to get their entire storage filled at minimum prices. There is apparently very little restriction this spring on the proportion of stove size in shipments and buyers are assured they can have about what they require. Individual shippers are holding out special inducements but the tonnage so far developed has been small. May has every appearance now of being a dull month in anthracite.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.90@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*.....	2.15@2.65	2.40@2.85	2.92@3.02	
New York*.......	2.45@2.95	2.70@3.15	3.22@3.32	
Baltimore*.......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.50@2.75
Boston†..........	....	....	....	3.65@3.83
Providence†......	....	....	....	3.55@3.73

* F.o.b. †On cars.

NEW YORK

General apathy in bituminous with contracting proceeding slowly. April anthracite business opening up slowly. Uncertainty in the steam grades. Holidays interfere with production.

Bituminous—The soft-coal market is more remarkable for its extreme apathy than anything else. Dullness prevails in all directions, with requisitions and contracts apparently down to an irreducible minimum, and no demand at all in the prompt market. The bunkering trade is fair, holding up somewhat better than anticipated, and coastwise water rates are practically back to a normal basis. Operating schedules at the mines continue at about half capacity.

In contracting circles, the principal feature of the week was the closing of the Lehigh Valley R.R. Co.'s contract involving about half a million tons. In general, contracting is proceeding slowly with concessions of various kinds still the rule. The prompt market continues quotable on the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—With the company circulars now down to the April schedule, dealers are shifting their orders from the individuals, with the result that the latter are feeling the effect of the restricted demand quite severely. The business during March was generally unsatisfactory, though this is usually the case during that month. The outlook for April is not very well defined as yet, but it will probably be lacking in the customary activity that usually characterizes the period during which the lowest prices of the coal year are in effect. Buyers will be able to get all the shipments they desire and probably in any proportion that they want.

There is considerable speculation over the outlook for the steam grades during the summer. It is generally felt that with the mines on heavily curtailed working schedules, as now seems to be the outlook, there is liable to be an acute shortage of the steam sizes. Nearly all the companies have picked up their reserve stocks of buckwheat and with the storage piles cleaned up they will, in any event, have to depend on their current production in the future.

Mine operations during the past week were heavily restricted by the holidays. Eight-hour day on Thursday, and Good Friday resulted in a suspension on both of these days in most cases at all of the collieries while at a great many the holiday was carried on through Saturday and Sunday with a result that most of the companies got only three days during the week.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.60	$4.60	$4.55	$4.55
Egg	4.85	4.85	4.80	4.80
Stove	4.85	4.85	4.80	4.80
Chestnut	5.10	5.10	5.05	5.05
Pea	3.55	3.35@3.55	3.50	3.15@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.30@2.40	2.00@2.25	2.10@2.35
Barley	1.80	1.60@1.80	1.75	1.40@1.75

PHILADELPHIA

The anthracite market starts the season fairly active but there is an absence of the customary rush. Bituminous shows slight improvement here and there, as industrial conditions pick up.

Anthracite—There will be no surplus during the month of April, as practically every dealer is in the market for his requirements at the opening circular, but the fact still remains, that there is far from an optimistic feeling in either the wholesale or retail trade. Large dealers are predicting a slow market for the first three months of the coal year which is in sharp contrast with the conditions usually prevailing. Quite a large quantity of coal was carried over from the winter stocks, and there does not seem to be the usual disposition among householders to fill up their cellars at the spring prices.

The dealers are placing comparatively small orders for April shipment, as they do not expect a heavy demand, owing to the mild winter and the condition of the money market. This latter is receiving the particular attention of the retail men. Many of the dealers express the opinion that there will be no difficulty in securing all the coal they require at the April prices or even better, later in the season.

Bituminous—Here and there are indications of slight improvement in bituminous. The call for spot coal seems better, but this seems due to the fact that many purchasing agents are still combing the market for bargains, though it is also a fact that industrial conditions are slowly mending, and this would naturally have a tendency to improve the situation.

BALTIMORE

Bituminous business remains exceptionally quiet. Cool weather keeps up a small buying of anthracite. Foreign shipment prospects are good.

Bituminous is more or less of a drug on the market, as to spot business. Very cheap coal is offering at all of the mining centers. Fair grades of soft coal are offering in West Virginia and western Maryland as low as 85c., while the market for the less desirable kinds of coal is practically wiped out. Best coals are offering around $1.15 to $1.25. Pennsylvania low grade fuels are bringing from 85 to 95c., with best grades at about $1.20 and $1.25.

There is persistent demand for small quantities of hard coal for immediate household consumption. Most of the householders have reached the end of their winter supplies, and yet the weather has been very cool, the monthly average for March being about seven degrees below normal, with several days below freezing. Nut and pea coal have been the principal late sellers.

That April will be a good export month is indicated by the number of foreign charters. During the past week the following were noted: British steamer "Strathberg," to Sicily; bark "Bruce Hawkins," to Maranham, Brazil, at $5.70; British steamer "Holtye," to Geona; Italian steamer "Angelo Parido," to west coast of Italy, at $10.80; British steamer "American Transport," to River Plate, $9.60; schooner "Van Allens-Boughton," to River Plate, $8; British steamer "Westlands," to Alexandria, Egypt; British steamer "Llangollen," to Montevideo, $9.60.

TORONTO, CAN.

Dealers busy getting stocks cleaned up. Little coal coming in.

Trade is fair with a lessening demand for anthracite as the season advances. Stocks on hand are being reduced by dealers in view of stock-taking next month and anticipated fall in prices, and only a little coal is now coming forward. Quotations are as follows with some shading on wholesale bituminous: Retail anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.25@4.50; domestic lump, $6; cannel, $7.50; wholesale f.o.b. cars three-quarter lump, $3.80; screenings, $2.96.

OCEAN FREIGHTS

Steamers offering more freely and slight recessions are noted in rates.

A number of steamers have been chartered for export coal, some for South America and for the Mediterranean, at slight concessions under recently quoted figures. Steamers are offering more freely, but are being absorbed by various trades at rates slightly under those previously in effect.

To	Rate	To	Rate
Havana	**$2.75**	Guantanamo	$3.25@3.75
Cardenas or Sagua	3.50@3.75	Demerara	5.50@6.00
Cienfuegos	**3.00**	Bermuda	3.00@4.00
Port au Spain, Trinidad	**3.75**	Vera Cruz	**3.50**
St. Lucia	3.50@3.75	Tampico	**3.50**
St. Thomas	**3.25**	Rio	**10.20**
Barbados	**3.75**	Montevideo, Buenos Aires or La Plata	9.36@9.60
Kingston	3.00@3.25	Mediterranean*	10.80@12.00
Curacao	3.50@4.00	Valparaiso†	8.40@9.60

Note—Rates noted in **bold face** type are only approximate.

* To a direct port not east of the West coast of Italy, Spain, excluded.

† With 800 tons per day discharge.

W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Hilston (ship)		Atlantic Range	River Plate	1897	$8.00
Walden Abbey (ship)	Uruguay	Atlantic Range	River Plate	1754	
Domingos Joaquin de Silva (ship)	Uruguay	Atlantic Range	River Plate	1590	
Bruce Hawkins (bark)		Virginia	Maranham, Brazil	540	5.70
Wm. C. May		Virginia	Maranham, Brazil	607	5.75
Dean E. Brown		Philadelphia	Point-a-Pitre	621	
Benj. A. Van Brunt		Baltimore	Tampa	1132	1.85
Moama	British	Philadelphia	Fredericton, N. B.	384	2.50
Harold B. Cousens		Philadelphia	St. John, N. B.	360	1.50
Laertis	Greek	Atlantic Range	River Plate	2380	9.60
American Transport	British	Atlantic Range	River Plate	3003	
Angelo Parodi	Italian	Baltimore	West Coast, Italy	2488	10.80
Van Allens Boughton		Virginia	River Plate	1909	8.00
F. A. Allen		Philadelphia	Eastport	462	1.25
Melbourne P. Smith		Norfolk	Rio Janeiro	528	7.25
Rochdale	British	Atlantic Range	River Plate	2377	9.60
Llangollen	British	Baltimore	Montevideo	2446	9.60
Westlands	British	Baltimore	Alexandria	2001	
Balgray	British	Norfolk	Tampico	2318	
Berlin	Danish	Baltimore	Havana	1400	
Salaminia	Greek	Atlantic Range	River Plate	1983	9.60
Hazelmoor	British	Atlantic Range	River Plate	1979	
Boynton	British	Atlantic Range	River Plate	1630	
Sowwell	British	Baltimore	West Coast Italy	2430	12.00
Malcolm Baxter, Jr.		Hampton Roads	Rio Janeiro	1479	7.45
Anna R Heidritter		Hampton Roads	Bermuda	610	3.25
Vancouver	British	Atlantic Range	River Plate	2860	9.48
Holtye	British	Baltimore	Genoa	2714	
Itasca		Philadelphia	Bangor	989	1.00
Josephine		Norfolk	Pernambuco	842	

Note—Steamers are indicated by **bold face type**, all others being schooners.

HAMPTON ROADS

Movement continues fair. Excess accumulation in railroad yards. Dumpings for March close to a million tons.

The dumpings over the tidewater piers during the week have shown up well. There have been large cargoes coastwise and while the export movement has not been as heavy as anticipated, at the same time some fair sized cargoes have moved to Cristobal, Rio de Janeiro, Havana, Iquique, Pernambuco, Santo Domingo and Genoa. The demand for Pocahontas and New River run-of-mine seems to be increasing somewhat although there is practically nothing doing with the high volatile or nut and slack. Export shipments are still being made by sailing vessels although during the last week the number sailing was not so great as the previous week.

Prices for the standard grades of New River and Pocahontas remain at circular with an excess accumulation in the railroad yards. One of the large coastwise colliers which has been in the foreign general cargo trade for several months, is again in the coastwise service having loaded about 7500 tons at Hampton Roads during the week. These large vessels are much more satisfactory to handle than barges or schooners and are dispatched much quicker in a majority of cases.

All of the coastwise movement of the week has been to the

New England market, the largest quantity going to Boston, Providence, Portland, Everett, Beverly, New Bedford, Portsmouth, and Lynn. Practically all of the coal moving has been New River and Pocahontas mine-run although there have been some small quantities of nut and slack and the high volatiles shipped on contracts.

From figures now obtainable the indications are that the dumpings for the month of March should amount to close around the million-ton mark.

Vessels clearing from Hampton Roads ports from March 19 to 26 inclusive, were:

Norfolk			Newport News		
Vessel	Tons	Destination	Vessel	Tons	Destination
Ocland	4800	Cristobal	**Tibagy**	3300	Pernambuco
Procida	5400	Genoa	**Olaf**	2500	Havana
Wm. Critchett	802	Santo Domingo		and 159	coke.
Napoli	5800	Genoa			
Rebecca Palmer	3505	Rio de Janeiro			
Celia	1241	Iquique			

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

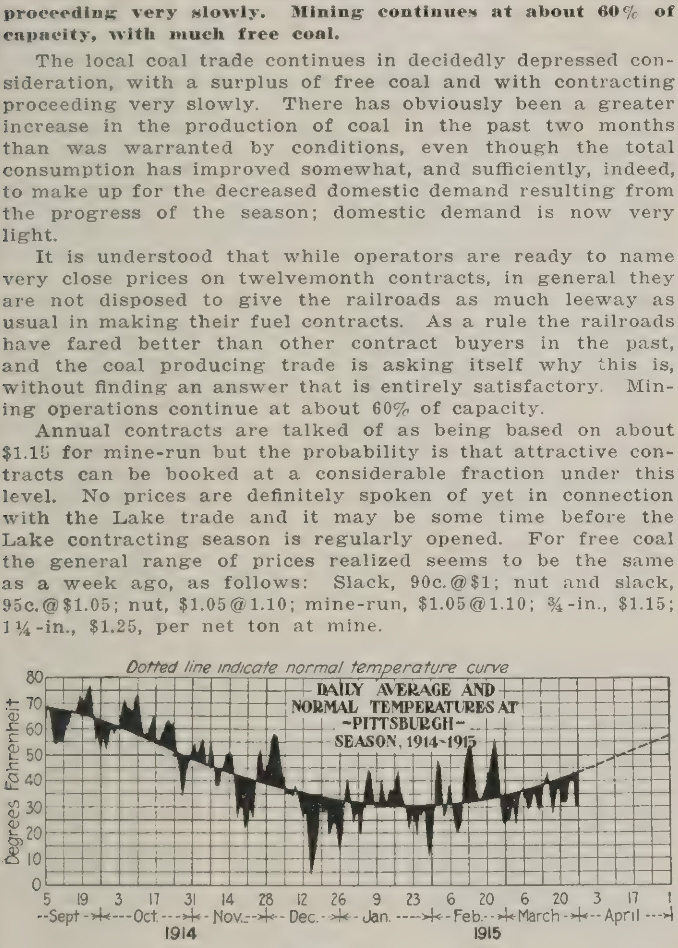
PITTSBURGH

Market still depressed with prices low and contracting proceeding very slowly. Mining continues at about 60% of capacity, with much free coal.

The local coal trade continues in decidedly depressed consideration, with a surplus of free coal and with contracting proceeding very slowly. There has obviously been a greater increase in the production of coal in the past two months than was warranted by conditions, even though the total consumption has improved somewhat, and sufficiently, indeed, to make up for the decreased domestic demand resulting from the progress of the season; domestic demand is now very light.

It is understood that while operators are ready to name very close prices on twelvemonth contracts, in general they are not disposed to give the railroads as much leeway as usual in making their fuel contracts. As a rule the railroads have fared better than other contract buyers in the past, and the coal producing trade is asking itself why this is, without finding an answer that is entirely satisfactory. Mining operations continue at about 60% of capacity.

Annual contracts are talked of as being based on about $1.15 for mine-run but the probability is that attractive contracts can be booked at a considerable fraction under this level. No prices are definitely spoken of yet in connection with the Lake trade and it may be some time before the Lake contracting season is regularly opened. For free coal the general range of prices realized seems to be the same as a week ago, as follows: Slack, 90c.@$1; nut and slack, 95c.@$1.05; nut, $1.05@1.10; mine-run, $1.05@1.10; ¾-in., $1.15; 1¼-in., $1.25, per net ton at mine.



BUFFALO

Contracts for bituminous scarce and prices low. Very little spot business developing. Large sales of pig-iron by local producers regarded as a hopeful sign. Anthracite more active.

Bituminous—Demand has not been gaining any momentum and all the agencies are reporting trade slow. A feeling of entire indifference on the subject of contracts prevails among consumers; there is a belief that business is to be poor throughout the year and consequently coal will be bought in the open market. Some large users are of course contracting as usual, but they are insisting on low prices; it is reported that they are meeting with success, though there is a feeling among many shippers that business will improve shortly and prices go higher. The Lake trade is not counted on for much this summer, but industrial conditions appear to be slowly mending. Coal on track is reported from leading Canadian centers, much to the injury of the market. Business in Canada remains poor and most factories are doing little.

The outlook for pig iron has been improved by the heavy sales which the local furnace interests have been making in New England; if pig iron revival is an indication of better business the situation is certainly encouraging. The business was taken at rather low figures, but furnaces have now advanced their quotations from $12 up to $12.50 for early delivery and $13 for delivery in the third-quarter of the year. Local furnaces will have plenty of business for some months to come.

Pittsburgh prices are uncertain at present and contracts are said to have been made at 5 to 10c. below the nominal figures which have been ruling for some time as follows: $2.80 for Pittsburgh select lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower tnan Pittsburgh

Anthracite—The April demand starts off fairly well, though orders are scarcely up to a year ago. The retail dealer had a poor month during March, so that buying was limited to immediate requirements. Now a good many find their bins about empty and are taking advantage of the low prices. A large amount of coal is above ground and orders will be filled more promptly than in most previous years.

Loading of anthracite into vessels has been going on rather slowly of late, though more companies are now beginning to take some storage coal. An inactive season at the start is the prediction and there will be no such rush as occurred last year. About 30 cargoes have been loaded thus far.

TOLEDO

Slack the feature of local market. Lake business will be slow in opening. Large amount of coal at the upper ports.

There is very little life in the trade but in a short time the usual spring and summer contracts will be open for bids which will create some activity. The first large contract will be that of the board of education; this is always a large contract and is usually let about April or May.

The general trade, both steam and domestic, is light. Slack is growing scarce and firmer as to price but this seems to be about the only feature of interest at the present time. The Lake trade will open late; the amount of coal carried over at the upper ports is so large that there is little prospect of Lake business opening much before July.

Coal shipped from the Pocahontas field to Cleveland in the future will be advanced 10c. per ton so that the Cleveland tariff will be on a level with the Toledo rate of $1.45 per ton. The new tariffs will be effective Apr. 12 and will be issued by the Pennsylvania and Big Four roads.

COLUMBUS

The trade continues featureless. Both domestic and steam demand are quiet. Lake trade will be slow in opening.

Weakness still characterizes the domestic trade and steam business is also at a low ebb. There appears to be little hope for improvement until the stocking season opens. The indications are that the Lake trade will be slow in opening because of the large surplus being carried over on the docks of the Northwest.

Dealers are only buying when it is absolutely necessary to take care of scattered orders; they are not desirous of entering the summer season with any large stocks and have been devoting their attention to cleaning up. The weather has been mild and consequently retail orders have been few. Prices have held up firmly even in the face of the slack demand but the April discount is now in effect.

The steam business is slow, although quite a few steam contracts are expiring at this time and are being renewed with considerable difficulty. Prices generally are not lower than those prevailing last year but a large part of the steam tonnage is now being purchased in the open market at rather low figures.

Lake trade is still a matter of considerable speculation. Reports from the Northwest indicate that it will be late in opening, as about 4,000,000 tons will be carried over. Boats will be plentiful and very few have been chartered for the coal trade to date. Lake prices have not been fixed.

Production in Ohio fields has been small in every locality. It is believed that with the closing of many mines, the output in the Hocking Valley is only about 20% of normal and the same is true of Jackson, Crooksville, Cambridge and Massillon. In the Pomeroy Bend field the output is also small.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.60
Coarse slack	0.55	0.60	0.50

CINCINNATI

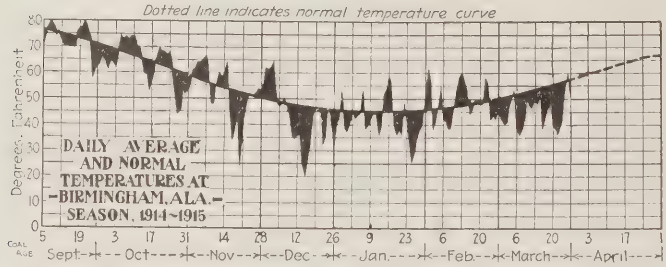
Improving industrial conditions and larger advance orders have caused a distinctly better tone. Continued over-production now the worst feature. The steam market is some stronger.

Cessation of domestic consumption and the delay in the opening up of the Lake trade have resulted in over-production, even with the mines on a restricted basis, but the steam market has been greatly improved. The large war orders, principally for machine-tools and ammunition, are having their effect and steam consumption is approaching a normal volume. In the absence of sufficient nut and slack, mine-run is being supplemented very generally. Many concerns using mechanical stokers have made arrangements to crush mine-run.

LOUISVILLE

Steam coals in active demand. Outlook on the summer stocking movement doubtful.

Steam coals continue scarce and strong, due to gradual improvement in the industrial situation, with nut and slack in the best demand at unchanged prices. It is hoped that a normal stocking business will be done in spite of the fact that during the past two winters it would have been possible for the retailers to have bought, at practically any time, at the prices they paid the operators during the early part of the season. Around $1.50 to $1.60 for the fancy coals and 65, 70 and .5c. for nut and slack of the better grades, are the prevailing prices.



COKE

CONNELLSVILLE

April furnace coke sold at good price. One large inquiry in market. Prompt coke dull. Production and shipments continue at fair rate.

The Producers Coke Co. has sold 10,000 tons of Thompson-Connellsville coke to the Eastern Steel Co. for April shipment at the reported price of $1.65 at the ovens. The contract made by the sales interest with Pickands, Mather & Co., for 10,000 to 12,000 tons a month to go to the Perry furnace at Erie, reported a week ago, likewise involved Thompson-Connellsville coke. The Pittsburgh Steel Co. is inquiring tentatively for about 20,000 tons of furnace coke for the twelvemonth beginning July 1 but negotiations are proceeding slowly as some operators are indisposed to quote for such extended delivery and none, apparently, will quote anything like the prices now ruling for prompt and second half. The prospective buyer has a contract with the Rainey interest running through June.

Prompt furnace coke continues in poor demand. Some choice brands are understood to have sold lately in a limited way at $1.65, but there is coke of fair grade available for spot shipment at about $1.50. We quote as the general market, depending on grade; Prompt furnace, $1.50@1.60; second quarter furnace, $1.60@1.65; second half furnace, $1.75; prompt foundry, $2@2.35; contract foundry, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 20 at 279,442 tons, a decrease of 285 tons and shipments at 281,384 tons, an increase of 2032 tons.

Buffalo—Nothing has developed to increase the demand for coke, while it is stated that foundry coke is in increased supply, which will no doubt have some weakening effect upon prices in the near future. All grades are showing little activity. Prices remain the same at $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—The demand for furnace and foundry cokes is light, with prices remaining unchanged. Domestic sizes show a little more activity. Quotations are as follows: Byproduct, $4.45@4.75; Connellsville, $4.65@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4@4.10; furnace, $4.40@4.65.

THE STEEL INDUSTRY

War orders assuming large proportions. Domestic buying less than shipments.

Orders placed in the past two weeks with steel works in this country by European governments have exceeded those in any fortnight since the war began. An important French steel interest has just placed 100,000 tons of bars with a Lake steel works through a Central Western dealer and specifications for 45,000 metric tons of 2-in. and 3-in. rounds applying on this order are already in hand. Negotiations are pending for 30,000 tons additional. Deliveries are to be made at the rate of 25,000 tons a month.

That this country must furnish large amounts of steel first and last to France and England is daily more evident and the urgency of the need will relieve shipments on these contracts from the uncertainties of ordinary ocean transport, the governments themselves providing vessels in some cases.

In domestic business new buying in most lines has been less than shipments, production of finished material in March being the largest in months, and an excess of shipments over orders is indicated for the immediate future.—"The Iron Age."

MIDDLE WESTERN

CHICAGO

Market in a comatose condition. Steam coals still bullish but domestic sizes without snap. Production below normal.

The Western coal trade continues in the same dull condition. Complaints are general that sales are much below normal proportions, and buyers show an almost complete indifference. Contracts for screenings are being renewed, in some instances, at higher figures than last year, but a number of buyers are seemingly delaying action with the hope that after Apr. 1 they will be able to obtain concessions.

The fact that a number of Chicago municipal contracts were recently let at less than last year's prices is having a bad effect, and one or two other large contracts have been executed at slightly reduced figures. The tonnages called for by most contracts so far executed have been of about the same proportions as last season. Little progress has been made thus far in the closing of contracts for domestic sizes.

Screenings have been averaging well around the 90c. mark, reaching as high as $1.05 per ton in spots, which is the average price of mine-run.

The demand for all grades of Indiana coal is very quiet except in screenings, where the undertone is very strong due to decreased production.

Southern Illinois operators report bullish prices for screenings; the demand for domestic coal is nil, and prices for the coarse sizes at a low level.

The demand for railroad coal from the Springfield district has slightly increased the last week, and activity on screenings is pronounced. The price of fine coal has increased 10c. per ton.

There is a comparatively fair market existing for Hocking coals, and little consignment coal is being offered.

There is a surplus of eastern Kentucky coals and prices have been badly cut.

The demand for anthracite is exceedingly slow, and some anthracite from the docks has been offered in lots of 500 tons or more on a 35c. commission basis under list, but it has not had the effect of stimulating orders.

Prevailing prices are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.45	$1.25@1.35	....	$1.30@1.50	$1.40@1.65
4-in. lump..	....	....	$1.40@1.65	....	....
Steam lump	1.20@1.35	1.15@1.25	1.25@1.45	1.25@1.35	....
2½-in. lump.	....	....	1.35@1.45	....	....
1¼-in. lump.	1.15@1.25	....	1.25@1.35	1.20@1.35	....
Mine-run...	1.00@1.10	1.00@1.10	1.00@1.15	0.95@1.10	....
Egg........	1.20@1.35	1.20@1.35	1.20@1.35	1.10@1.25	....
No.1washed	1.20@1.35	....	1.75	....	1.40@1.65
No.2washed	1.15@1.30	....	1.65	....	1.40@1.50
6x3-in. egg.	....	....	....	....	1.50@1.75
Nut.......	....	1.15@1.25	1.15@1.25	1.10@1.25	....
No. 1 nut..	1.15@1.35	....	....	....	....
No. 2 nut..	1.10@1.25	....	....	....	....
Screenings..	0.85@1.00	0.80@0.95	0.75@0.90	0.70@0.85	0.90@1.00

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.20@1.35	$1.10@1.35	$1.50@1.60	$1.50@1.60	....
1¼-in. lump.	..	....	....	....	$1.25@1.35
Mine-run...	1.00@1.10	1.10@1.25	0.90@1.25	1.00@1.10	1.00@1.15
Egg........	....	1.00@1.10	1.40@1.60	1.50@1.60	....
No. 1 nut..	1.25@1.40	....	....	....	....
No. 2 nut..	1.20@1.35	....	....	....	....
Screenings..	0.85@0.95	....	....	....	...

Knox and Greene County 5-in. lump, $1.25@1.35; 3-in. lump, $1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.05; screenings, 80@90c.

ST. LOUIS

A slight change in certain directions but the general situation continues as discouraging as ever. A number of mines closed down indefinitely on Apr. 1.

As compared with conditions during the past two or three weeks, the present week was not as disappointing as anticipated. Orders from the country were a trifle more plentiful, even though the price was low, and this helped to some extent to off-set the lack of demand from the steam trade. Local retailers were kept fairly busy with continuous small orders, so that there was a light demand for domestic coal throughout the entire week.

The same applies to the 5th and 9th district, or Standard field. Even the washed market is not strong, with the exception of Nos. 3 and 4, which seem to be in demand. Mines in the southern Illinois field that have crushers are crushing their lump and egg to take care of their contracts on Nos. 2, 3 and 4.

Effective the first of April, several mines in both the high grade and the Standard district will shut down for an indefinite period, until market conditions are better.

During the past week a little anthracite has moved in at the April circular, and a fairly good tonnage has been placed for April, but not in the same volume as in past years. There is very little doing in smokeless.

PORTLAND, ORE.

Warmer weather causes falling off in demand for domestic coal and business is quiet.

Warmer weather set in here this week and the dullness of spring is evident in the coal business. Until lower prices are put into effect to induce buying for storage for the next winter, this will undoubtedly continue. The summer prices will probably go into effect this month.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during November and the first twelve months of the last two years, in short tons:

	December		12 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	118,264	126,240	1,516,916	1,371,563
Chesapeake & Ohio[1]	681	1,082	16,545	16,728
Erie[2]	794,562	787,401	8,811,114	9,274,401
Pennsylvania[1] [3]	1,012,125	977,929	10,711,335	11,201,150
Virginian[2] [1]	86	261	1,045	745
Total 5 roads	1,925,718	1,892,913	21,056,955	21,864,587
Bituminous				
Baltimore & Ohio[1]	3,183,145	2,367,719	36,915,385	32,554,359
Buffalo, Roch. & P.[1] [2]	816,981	683,440	9,723,992	8,059,756
Buffalo & Susq.[1] [2]	141,895	121,728	1,787,551	1,190,181
Chesapeake & Ohio[1]	1,438,367	1,501,086	17,155,233	20,663,520
Erie[3]	10,389	3,921	350,590	75,818
Hunt. & Br'd T. Mt.[1] [2]	110,411	97,219	1,352,721	1,036,658
New York Central[3]	806,572	757,140	9,220,689	8,120,210
Norfolk & Western[1] [2]	1,835,823	1,641,165	23,892,469	25,471,969
Pennsylvania[1] [3]	4,354,729	3,755,675	51,526,267	47,769,227
Pitts. & Lake Erie[1] [2]	869,360	624,932	12,783,389	10,703,478
Pitts. Shaw. & North[1] [2]	264,145	234,734	2,799,308	2,359,807
Virginian[1] [2]	364,937	276,015	4,555,331	3,954,310
Western Maryland	309,833	258,891	3,383,697	3,069,708
Total 13 roads	14,506,587	12,323,665	175,446,622	165,029,001
Coke				
Baltimore & Ohio[1]	269,998	232,594	4,610,796	3,202,381
Buffalo, Roch. & P[1] [2]	27,559	33,553	500,230	302,996
Buffalo & Susq.[1] [2]	23,351	48,869	301,475	447,354
Chesapeake & Ohio[1]	33,079	11,207	361,535	298,632
New York Central[3]	....	....	36,207	....
Norfolk & Western[1] [2]	117,305	73,075	1,530,384	1,018,611
Pennsylvania[1] [3]	880,962	621,774	13,892,825	9,548,354
Pitts. & Lake Erie[1] [2]	470,912	297,052	6,710,138	4,839,185
Pitts. Shaw. & North[1] [2]	....	....	9,383	....
Western Maryland	4,801	2,658	73,344	59,646
Total 10 roads	1,827,967	1,320,782	28,026,317	19,717,159

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
August	19,757,104	18,740,453
September	19,080,318	18,601,926
October	20,646,424	17,802,496
November	18,959,086	15,495,739
December	18,260,272	15,537,360
Total 12 months	224,529,894	206,610,747

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 282,881 short tons of bituminous coal during November, 1914, and 3,607,584 short tons during the eleven months ending Nov. 30, 1914.

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during February and the previous two months:

	December		January		February	
	1914	1913	1915	1914	1915	1914
Coal	2,227,899	3,005,914	2,293,406	2,917,834	1,906,210	2,385,243
Coke	232,594	269,998	221,395	274,955	232,111	265,380
Total	2,460,493	3,275,912	2,514,801	3,192,789	2,138,321	2,650,623

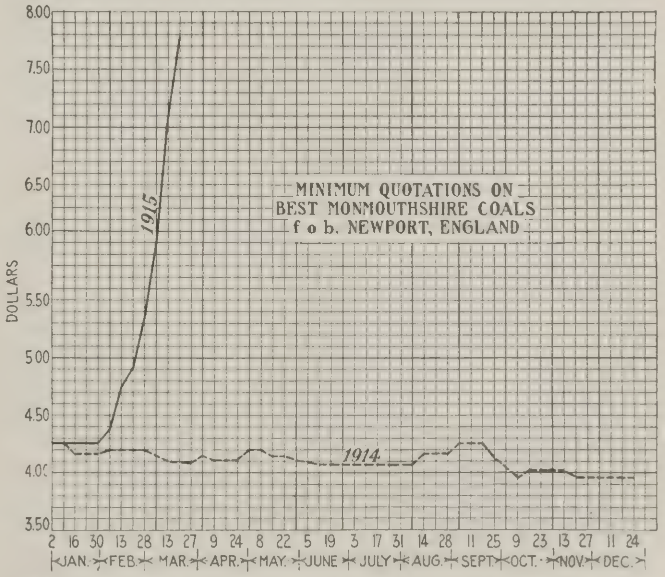
FOREIGN MARKETS

GREAT BRITAIN

Unsettlement in labor circles still the predominating feature of the coal market. House coals a trifle easier.

London, Mar. 19—Labor difficulties still loom large in the coal mining industry, and are engaging a great deal of attention which might be devoted to meeting the needs of the country in the present crisis. It is to be regretted that the Welsh miners have rejected the offer made by the coal owners, and at the special conference of the Miners' Federation of Great Britain held in London on Wednesday it was resolved to demand a general increase in wages to the extent of no less than 20 per cent. in view of the increased cost of living. The provisional agreement arrived at by the Conciliation Board for England and North Wales has been accepted by the men, and that difficulty is out of the way perhaps, but at present interest is naturally centered upon the demand for an immediate advance in wages all round, which may be considered apparently by a joint conference of employers and employed which the Mining Association of Great Britain has been requested to convene.

Despite the possibility of a higher wages bill, the market has been a little easier during the week so far as house coal is concerned, but most other kinds are firmly maintained at their former level, while in some cases further advances are reported.—"The Iron & Coal Trade Review."



Mar. 19—There is not much alteration in the general conditions. Tightness is fully maintained for all qualities, the production being still limited, while the demand is as heavy as ever. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$7.68@7.92
Best seconds	$7.92@8.16	Seconds	7.44@7.68
Seconds	7.68@7.92	Best Cardiff smalls	4.92@5.16
Best dry coals	7.20@7.68	Cargo smalls	4.32@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport both net, exclusive of wharfage.

Freights—Business is still very quiet. In most directions rates have sharply declined due to shortage of coal and the dearth of stems. Rates are approximately as follows:

Gibraltar	$5.04	Naples	$6.48	Las Palmas	$5.04
Malta		Venice, Ancona	9.60	St. Vincent	5.28
Marseilles	5.60	Alexandria	7.20	Rio Janeiro	7.44
Algiers	5.40	Port Said	6.72	Monte Video	6.72
Genoa	6.24			River Plate	6.96

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

+Indicates contracts regarding which official information has been received.

+No. 96—Farmington, Mo.—The Municipal Electric Light & Water Plant will be in the market during the current month for about 200 tons of 1½- to 2-in. screenings (p. 356). The usual contract price is $1.90 f.o.b. railroad station, Farmington. Address Supt. C. M. Thomsen, Municipal Electric Light & Water Plant, Farmington.

No. 97—Baltimore, Md.—According to recent press reports, this contract (p. 356), which provides for furnishing about 210,000 tons of soft coal to the Merchants' and Miners' Transportation Co., has been awarded. The Baker-Whiteley Coal Co., Shaw Bros., and Coale & Co., received a large portion of the Baltimore supply, and part of the Philadelphia supply, and W. H. Bradford, Philadelphia, received a large part of the Philadelphia business. It is understood that the supply for Newport News went to several out-of-town concerns. Address Pur. Agt. and Gen. Mgr. W. P. Coria, Merchants' and Miners' Transportation Co., Baltimore, Md.

No. 107—New York, N. Y.—The New York & Baltimore Transportation Co. purchases about 60,000 tons of soft coal per year (p. 357). This contract will be let during the current month. Address Pur. Agt. B. R. Roome, Pier 10, East River, New York, N. Y.

No. 110—Baltimore, Md.—The Maryland Biscuit Co., Baltimore, purchases 1200 tons of bituminous coal per year (p. 357). This company lets its contract during the current month. Address Pur. Agt. W. C. Scott, Maryland Biscuit Co., Baltimore, Md.

No. 112—Baltimore, Md.—The Coca-Cola Co. will award a contract during the current month for a supply of good grade steam coal (p. 357). Address Pur. Agt. William Martien, 3 Calvert St., Baltimore Md.

No. 114—Baltimore, Md.—Wise Bros. will soon be in the market for a supply of standard grade mine-run coal, the present contract expiring this month (p. 357). Address Pur. Agt. and Supt. L. A. Hazzard, Wise Bros., Baltimore, Md.

No. 116—Baltimore, Md.—Stewart & Co., of this city, consumes about 200 tons of Georges Creek coal per month (p. 357). The present contract expires this month, and is awarded on a competitive basis. Bids are received by J. Middleton. Address Pur. Agt. Geo. R. Russell, Baltimore, Md.

No. 117—Boston, Mass.—The Stone & Webster Co. will be in the market this month for 50,000 tons of New River and Pocahontas mine-run coal, deliveries to be made in proportionate amounts each month at Tidewater, Boston (p. 357). Address R. E. Hamilton, 147 Milk St., Boston, Mass.

No. 123—Baltimore, Md.—The G. B. S. Brewing Co. consumes about 10,000 tons of standard mine-run coal per year. The present contract expires this month (p. 357). Address M. L. G. Fesenmeier, care of the G. B. S. Brewing Co., Baltimore, Md.

+No. 143—Buffalo, N. Y.—The lowest bids submitted on this contract (p. 398), which provides for furnishing the annual supply of anthracite and bituminous coal for the schools and other buildings were as follows: C. A. & M. Kaiser, bituminous: Mine-run, $2.65; screened nut, $2.60; slack, $2.45; screenings, $2.15; smokeless, $2.70. Connell Anthracite Mining Co. quoted on anthracite as follows: Grate, $5.10; egg, $5.30; pea, $4.25. Address Comr, of Public Works, Col. Francis G. Ward, Buffalo, N. Y.

No. 165—Stamford, Conn.—Beck & Co. will contract for 2500 tons of bituminous coal about Apr. 7 (p. 399). Address Pur. Agt. George F. Leeming, 206 West 29th St., New York, N. Y.

+No. 205—Norristown, Penn.—The local Board of Education will be in the market this month for 165 tons of anthracite, egg and stove coal each, 225 tons of pea, and 150 tons of bituminous coal (p. 400). Address Sec. Harry W. Akins, 717 DeKalb St., Norristown, Penn.

+No. 206—Woonsocket, R. I.—The local school board will be in the market some time this month for about 1000 tons of the best Lehigh and Scranton coal (p. 400). Address Chn. of Comn. on Supplies, T. Guerin, care of Alsace Worsted Co., Woonsocket, R. I.

+No. 225—Madison, Wis.—The Board of Education of this place will be in the market this month or next for about 500 tons of anthracite pea and Pocahontas coal (p. 446). Address Chief Clk., Board of Education, Madison, Wis.

+No. 268—Buffalo, N. Y.—On this contract (p. 448), which provides for furnishing anthracite and bituminous coal as required by the Police Department during the year beginning Apr. 10, the Buffalo Fuel Co. submitted the lowest bid. Address Board of Police Commissioners, Headquarters Bldg., Franklin and Seneca St., Buffalo, N. Y.

+No. 282—Meriden, Conn.—The School Board here will place a contract for about 800 tons of anthracite coal this month (p. 448). Address Chairman of Committee on Buildings, School Department, Meriden, Conn.

+No. 298—Clarendon, Ark.—The Clarendon Electric Light & Ice Co. will be in the market this month for about 2400 tons of pea and slack coal (p. 488). Address Cont. Agt. J. T. Bateman, Clarendon Electric Light & Ice Co., Clarendon, Ark.

+No. 305—Atlantic, Iowa—The Municipal Electric Light Works will contract this month for about 4300 tons of Iowa steam coal (p. 488). Address Mgr. T. E. Nichols, Municipal Electric Light Works, Atlantic, Iowa.

+No. 306—Algoma, Wis.—The City Water & Light plant will be in the market this month for a supply of mine-run Youghiogheny coal (p. 488). Address Supt. J. O. Posson, City Water & Light Plant, Algoma, Wis.

+No. 311—Chaska, Minn.—The Municipal Electric Light & Power Plant of this place will be in the market this month for approximately 800 tons of coal (p. 488). Address Mgr. & Supt. E. F. Strong, Municipal Electric Light & Power Plant, Chaska, Minn.

+No. 316—Wyandotte, Mich.—The Municipal Light & Water Plant will be in the market this month for 5000 tons of West Virginia mine-run coal (p. 488). Address Supt. A. S. McClenehan Municipal Light & Water Plant, Wyandotte, Mich.

+No. 320—Clarion, Iowa—The Clarion Light Plant will be in the market this month for 1000 tons of ¾-in. Christopher Illinois screenings (p. 527). Address G. Mack, Clarion Light Plant, Clarion, Iowa.

No. 349—Baltimore, Md.—The National Enameling & Stamping Co. advises that it is not in the market for coal as stated in our previous issue (p. 566). Address Pur. Agt. R. D. Samuels, 305 Fifth Ave., New York, N. Y.

No. 371—Alexandria, Ind.—This contract (p. 567) provides for a supply of mine-run coal for the Alexandria Paper Co., and not the Alexander Paper Co., as stated in our last issue. Address the Alexandria Paper Co., Alexandria, Ind.

NEW BUSINESS

+No. 432—Minneapolis, Minn.—The Board of Education at this place will be in the market during April or June for about 15,000 tons of bituminous and semibituminous coal. This includes the annual supply, and the contract is awarded on the B.t.u. basis. Address Business Agt. F. E. Reidhead, Board of Education, 407 City Hall, Minneapolis, Minn.

+No. 433—Reading, Penn.—The Board of Education at this place will be in the market during April or May for approximately 2500 tons of pea, egg and stove coal. This contract is usually let to local dealers. Address Secy. F. Roland, Jr., Board of School Directors, Reading, Penn.

No. 434—Adams, Mass.—The Renfrew Mfg. Co. will be in the market for 4000 to 6000 tons of anthracite and bituminous coal about May 1, delivery via B. & A. R.R. Address Treasurer, Renfrew Co., Adams, Mass.

+No. 435—Gloversville, N. Y.—The Board of Education at this place will purchase about 800 tons of egg coal during May or April. The present contract was closed at $6.60 per ton, and was awarded to a local company. Address Supply Committee, Board of Education, Gloversville, N. Y.

+No. 436—West Point, N. Y.—Sealed proposals in triplicate will be received until 2 p.m., Apr. 26, for furnishing anthracite coal required at the U. S. Military Academy during the fiscal year ending June 30, 1916. Address Quartermaster, U. S. Military Academy, West Point, N. Y.

+No. 437—Boston, Mass.—Sealed proposals will be received until 2 p.m., Apr. 14, for furnishing 2000 tons of anthracite coal and 1300 tons of bituminous coal to the Post Office and Sub-Treasury building during the fiscal year ending June 30, 1916. Address Custodian William F. Murray, U. S. Post office and Sub-Treasury, Boston, Mass.

+No. 438—Fort Reno, Okla.—Sealed proposals will be received until noon, Apr. 22, for furnishing domestic and steam coal as required during the fiscal year, commencing July 1, 1915. Address Depot Quartermaster, Fort Reno, Okla.

+No. 439—Fort Sam Houston, Tex.—Sealed proposals will be received until 11 a.m., Apr. 15, for furnishing charcoal and smithing coal, as required at the Southern Department posts during the fiscal year commencing July 1, 1915. Address Depot Quartermaster G. S. Bingham, Fort Sam Houston, Tex.

No. 440—Chicago, Ill.—The American Compound Door Co. will be in the market about Apr. 20 for a month's supply of Franklin County, Illinois, No. 2 nut coal. This company consumes from 350 to 400 tons per month. Address the Purchasing Agent, American Compound Door Co., Chicago, Ill.

+No. 441—Garfield, N. J.—The Standard Oil Co. at this place is in the market for 2000 tons No. 1 buckwheat, deliveries to be made over the next year. Address Coal Pur. Agt. J. L. Hutchinson, 26 Broadway, New York City.

+No. 442—Minot, N. D.—Sealed bids will be received until 2 p.m., Apr. 5, for furnishing coal to Ward County for the ensuing year. Address County Audr. L. J. Thompson, Minot, N. D.

+No. 443—Troy, N. Y.—Sealed proposals were received until 11 a.m., Apr. 2, for furnishing and delivering anthracite coal to the various city buildings and charities, for the season of 1915-16. Address Secy. John J. McLaughlin, Board of Contract and Supply, Room 21, City Hall, Troy, N. Y.

+No. 444—Kalamazoo, Mich.—The Board of Education is in the market for about 3500 tons of Pocahontas mine-run coal and bituminous No. 2 gas coal. Address the Secretary, Board of Education, 207 Majestic Bldg., Kalamazoo, Mich.

+No. 445—National Soldiers' Home, Tenn.—Sealed proposals will be received until 2 p.m., Apr. 19, for furnishing and delivering 10,500 tons of bituminous coal to the National Soldiers' Home, Mountain Branch, N. H. D. V. S. Delivery is to be made according to instructions. Address Treas. Oliver K. Marshall, Mountain Branch, N. H. D. V. S. National Soldiers' Home, Tenn.

No. 446—Buffalo, N. Y.—The Larkin Co. at this place is in the market for a supply of slack coal, contract to go into effect Apr. 1, and the amount required being from 100 to 150 tons per day. Address Purchasing Agent, Larkin Co., Buffalo, N. Y.

No. 447—Alexandria, Ind.—The General Ins. & Mfg. Co. is erecting a plant at this place, and it is understood that they will be in the market for coal about Apr. 1. Address General Ins. & Mfg. Co., Alexandria, Ind.

+No. 448—Springfield, Mass.—Sealed proposals will be received until 10 a.m., Apr. 15, for furnishing coal to the armory for the fiscal year commencing July 1, 1915, and ending June 30, 1916. During the fiscal year ending June 30, 1915, 65,000 lb. of egg and 110,000 lb. of nut coal were used. Address Depot Quartermaster, Springfield Armory, Springfield, Mass.

+No. 449—Fort Wayne, Ind.—Sealed proposals will be received until 5 p.m., Apr. 9, for furnishing and delivering to the different engine houses, 165 tons of nut coal, 64 tons of egg coal, and 17 tons No. 4 stove coal. Address Clk. D. C. McCarthy, Board of Public Safety, Fort Wayne, Ind.

+No. 450—Braddock, Penn.—Sealed bids will be received until 7:30 p.m., Apr. 4, for supplying the Braddock Water Works with the best steam mine-run coal for one year, beginning Apr. 1, 1915. The amount required is about 125 tons per week, to be delivered as specified by the Water Commissioner, at water works siding of the P., McK. & Y. R.R. Bidders are to state from which mine coal is to be supplied, and bond of $1000 is required. Address Secy. L. L. Todd, Braddock, Penn.

No. 451—Chicago, Ill.—The American Sand & Gravel Co. will purchase throughout the coming year about 100 cars of Illinois or Indiana lump coal. The first purchase will be made about Apr. 15. Address Gen. Mgr. Fisher, American Sand & Gravel Co., Chicago, Ill.

+No. 452—San Francisco, Calif.—Sealed proposals will be received until 10 a.m., Apr. 15, for furnishing bituminous mine-run coal for steaming purposes for the army transports, also screened bituminous coal for the National Cemetery and Recruiting Office. Address Depot Quartermaster Lieut. Col. W. H. Hart, 1086 North Point St., San Francisco, Calif.

+No. 453—Fort Keogh, Mont.—Sealed proposals will be received until 11 a.m., Apr. 26, for furnishing 600 tons of lump coal and 150 tons of pile-run coal, at the Fort Keogh Remount Depot, Mont. The storage capacity is 400 tons lump and 150 tons pile-run. The siding of the N. P. Ry., also the siding of the C. M. & St. P. Ry. Co., permit direct unloading into storage shed. Address Depot Quartermaster Capt. Sam. Van Leer, Fort Keogh Remount Depot, Mont.

No. 454—Cleveland, Ohio—The Municipal Electric Light Dept. will be in the market about Apr. 1 for from 35,000 to 40,000 tons of Youghiogheny coal. The present contract was closed at $1.70 per ton. Address Supt. of Service and Distribution C. G. Beckwith, Municipal Electric Light Dept., Cleveland, Ohio.

+No. 455—Clinton, Mass.—Sealed bids were received up to noon, Mar. 30, for supplying the School Department with coal. Address Frederick E. Clerk, Clinton School Committee, Clinton, Mass.

+No. 456—Dell Rapids, S. D.—Sealed bids will be received until noon, Apr. 6, for furnishing 500 tons of Youghiogheny coal to the city, for the year commencing Apr. 1. Delivery is to be made as required. Address City Audr. James Ridlington, Dell Rapids, S. D.

+No. 457—Belle Fourche, S. D.—Bids will be received until noon, Apr. 6, for furnishing egg, lump, and mine-run coal to the County Court House and Jail. Address County Audr. N. P. Lang, Belle Fourche, S. D.

No. 458—Baltimore, Md.—Press reports state that bids will soon be received for furnishing about 25,000 tons of bituminous coal for the Maryland penitentiary, House of Correction at Jessups, the State Sanitarium at Sabillasville, and the Maryland Agricultural College at College Park. Samples are to be analyzed by the United States Bureau of Mines. Bids are to be submitted separately on each contract or one bid is to be made on all contracts.

No. 459—Chicago, Ill.—The American Cocoa Butter Co. will be in the market about July 1 for a supply of Indiana mine-run coal, the contract to cover a period of one year. This company uses about 200 tons per month. Address the Purchasing Agent, American Cocoa Butter Co., Chicago, Ill.

+No. 460—Belvidere, Ill.—The Board of Education at this place will be in the market during July for about 300 tons of Winifred Splint and Pocahontas coal. Address Secy. R. B. Andrews, Board of Education, Belvidere, Ill.

+No. 461—Boston, Mass.—Sealed bids will be received until noon, Apr. 7, for furnishing and delivering about 41,300 gross tons of coal, as follows:

PLAN NO. 1—For big vein Georges Creek Cumberland coal, mined in Maryland, or best quality Pocahontas or New River.

PLAN NO. 2—Or for any good steaming coal, to be paid for on a valuation basis, to be delivered as follows: About 800 tons in bins of Children's Institutions Dept., Suffolk School, Rainsford Island; about 6000 tons in bins of Infirmary Dept., Almshouse and Hospital, Long Island; about 11,000 tons in bins for Ferry Service; about 8000 tons in bins of the Calf Pasture Pumping Stations, Sewer Division: about 6500 tons alongside Penal Institutions Dept., Deer Island; about 9000 tons in bins to the City Hospital, deliveries as required by the Superintendent. Address Supt. of Supplies D. Frank Doherty, Room 808, City Hall Annex, Boston, Mass.

No. 462—Rochester, Ind.—The Rochester Electric Light, Heat & Power Co., at this place, will soon be in the market for approximately 7000 tons of Indiana mine-run, or coal of equal quality. Address Mgr. Charles Davis, Rochester Electric Light, Heat & Power Co., Rochester, Ind.

No. 463—LaFayette, Ind.—The Wabash Valley Coal Co. is in the market for a supply of Indiana 1¼-in. and 4-in. lump coal and also a supply of egg coal. Address Secy. P. F. Freel, Wabash Valley Coal Co., LaFayette, Ind.

No. 464—Boston, Mass.—Bids will be received about May 1 for furnishing about 3500 tons of anthracite coal, furnace size, to the State House. Delivery is to be made as required. Address Sargeant-at-Arms Thomas F. Pedrick, State House, Boston, Mass.

+No. 465—St. Louis, Mo.—The Board of Education here will be in the market during May for about 30,000 tons of bituminous coal and 700 tons of anthracite. Pennsylvania anthracite best quality coal, in stove and chestnut sizes, and standard Illinois bituminous screened coal is required. The present contract was closed as follows: Stove, $7.60; chestnut, $7.85; bituminous, $1.77¼. Address Supply Comr. E. M. Brown, 3431 School St., St. Louis, Mo.

+No. 466—Reading, Penn.—Sealed proposals will be received until 10 a.m., Apr. 14, for furnishing 400 tons of pea coal and 50 tons of stove coal to the Berks County Prison. Coal is to be freshly mined and is to be either Schuylkill Valley or Lorberry red ash. Address County Controller D. K. Hoch, County Controller's Office, Reading, Penn.

+No. 467—Somerset, Penn.—Sealed proposals will be received until 1 p.m., Apr. 6, for furnishing coal at the Water Works, Pumping Station, and Municipal Building. Address Secy. C. E. Pile, Town Council, Somerset, Penn.

+No. 468—Constable Hook (Bayonne), N. J.—The Standard Oil Co. will receive bids for anthracite coal for delivery at this point. The tonnages involved are 13,000 tons of pea coal and 6000 tons of No. 1 buckwheat. The contract will be closed this month. Address, Coal Pur. Agt. J. L. Hutchinson, Standard Oil Co., 26 Broadway, New York City.

No. 469—Chicago, Ill.—The American Hide & Leather Co. will be in the market about June 15 for a supply of Illinois or Indiana screenings and Illinois or Indiana mine-run coal. This company uses from 400 to 500 tons of screenings per month and two cars of mine-run coal. This contract is to cover a period of one year. Address Assist. Pur. Agt. Mr. Bruno, American Hide & Leather Co., Chicago, Ill.

+470—Batavia, Ohio—Sealed bids were received until noon, Mar. 26, for furnishing genuine Thacker mine-run coal or Pocahontas mine-run coal, for operating and running the waterworks and electric light plant at Batavia. Address Secy. Thomas Glancy, Board of Public Affairs, Batavia, Ohio.

No. 471—Chicago, Ill.—Spielman Bros. Co. contract about Apr. 1 for approximately 4000 tons of egg or mine-run coal, the present supply coming from southern Illinois. Address Pur. Agt. Geo. W. Raithel, Spielman Bros. Co., Kingsbury and North Ave., Chicago, Ill.

No. 472—Traverse City, Mich.—Bids were received on Mar. 30 for furnishing the City Water Works, a supply of mine-run, lump or slack coal. The works consume from six to seven carloads per annum, and delivery is made via the G. R. & I. R.R., or the Pere Marquette R.R. Address City Clk. W. H. Nash, Traverse City, Mich.

+No. 473—Portland, Ore.—Sealed proposals will be received until Apr. 20, for furnishing the steam and lump coal required at Portland and Astoria, Ore., and Seattle, Wash., for vessels and stations of the 16th and 17th lighthouse during the fiscal year ending June 30, 1916. Address Lighthouse Inspector, Portland, Ore.

+No. 474—Niagara Falls, N. Y.—Sealed bids were received until 8 p.m., Mar. 29, for furnishing 1500 tons of anthracite coal in grate, egg, stove, chestnut and pea sizes, to be delivered to the various school buildings in the city. About 1260 tons is for immediate delivery and the balance as directed. Address Clk. J. B. Kelley, Supply Committee, Board of Education, Niagara Falls, N. Y.

+No. 475—Rock Island, Ill.—Sealed proposals will be received until 11 a.m., Apr. 15, for furnishing fuel to the Arsenal for the fiscal year commencing July 1. Address Lieut.-Col. Kenneth Morton, Rock Island Arsenal, Ill.

+No. 476—Jeffersonville, Ind.—Sealed proposals in triplicate will be received until 10 a.m., Apr. 21, for furnishing about 1,000,000 lb. of bituminous coal to the Jeffersonville depot during the period commencing July 1, 1915, and ending June 30, 1916. Address Maj. Joseph T. Davidson, Jeffersonville, Ind.

No. 477—Chicago, Ill.—The American Asphalt Paving Co. at this place will be in the market about May 1 for approximately 4000 tons of No. 3 washed or raw Illinois or Indiana nut coal. Address Purchasing Agent, American Asphalt Paving Co., 133 West Washington St., Chicago, Ill.

+No. 478—Newfoundland, N. J.—The Standard Oil Co. at this place is in the market for 3000 tons of No. 1 buckwheat, delivery to be made via New York, Susquehanna & Western. Address Coal Pur. Agt. J. L. Hutchinson, Standard Oil Co., 26 Broadway, New York City.

No. 479—Jersey City, N. J.—The Public Service Gas Co. is in the market for 25,000 tons of coal, to be delivered during the period beginning Apr. 1, 1915, and ending Mar. 31, 1916. Deliveries are required alongside the Gas Company's dock on the Hackensack River, West End Works, Jersey City. Address Pur. Agt. J. A. Pearson, Public Service Gas Co., Broad and Arch Sts., Philadelphia, Penn.

+No. 480—Toronto, Ont., Can.—The University of Toronto is in the market for about 8000 tons of bituminous slack coal and 2000 tons of anthracite grate, stove and nut sizes, deliveries to be made some time after July. At present, tests are being made of various kinds of coal for the central heating plant of the University. Address Superintendent, the University of Toronto, Toronto, Ontario, Can.

+No. 481—Toronto, Ont., Can.—The City Property Department will soon be in the market for 3500 tons of anthracite, 500 tons of bituminous coal and 2000 tons of slack coal. Address Property Comr. Daniel Chisholm, Toronto, Ont., Can.

No. 482—Louisville, Ky.—The Kentucky Wagon Mfg. Co. is testing various grades of coal in order to find the variety that is best adapted to its needs. This company consumes about 8000 tons per year, and usually contracts during January for its supply. Although the present contract has been let, it is understood that the supply does not come up to the requirements of the company and there is a probability of a change being made. Address Pres. R. V. Board, Kentucky Wagon Mfg. Co., Louisville, Ky.

No. 483—Chicago, Ill.—The Hartman-Sanders Co. will soon be in the market for about 25,000 tons of 2-in. southern Illinois screenings, or some coal of equal quality. Address Pres. A. P. Weidner, Hartman-Sanders Co., 2155 Elston Ave., Chicago, Ill.

No. 484—Holland, Mich.—The present contract of the Holland-American Sugar Co. for 20,000 tons of slack and 3500 tons of lump coal expires on Apr. 30. This coal comes from West Virginia mines. Address Pur. Agt. C. M. McLean, Holland-American Sugar Co., Holland, Mich.

No. 485—Chicago, Ill.—The Art Bedstead Co. at this place will be in the market about May 1 for several cars of No. 2 southern Illinois washed nut coal. This company purchases about 1200 tons of this grade during the year. Address Gen. Mgr. F. W. Adams, Art Bedstead Co., Chicago, Ill.

CONTRACTS AWARDED

Note—Successful bidders are noted in **bold face** type.

No. 285—Lynchburg, Va.—This contract (p. 187), which provides for furnishing approximately 800 tons of coal, has been awarded to **Diuguid Bros.**, at $3.25 for mine-run coal and $6.90 for Pennsylvania anthracite. Address City Clk. J. M. Otey, Board of Education, Lynchburg, Va.

+No. 296—Leavenworth, Kan.—This contract (pp. 488 and 566) has been awarded to the **Carr Coal Mining & Mfg. Co.** for furnishing screen lump coal at $2.10 per half-ton lots and $3.90 per ton lots. Address County Clk. J. E. Voorhees, County Clerk's Office, Leavenworth, Kan.

+No. 334—Jersey City, N. J.—This contract (p. 566), which provides for furnishing anthracite coal to the various public school buildings, has been awarded to the **E. L. Young Co.**, 507 Grand St., Jersey City. Address Secretary, Board of Education, Jersey City, N. J.

+No. 344—Attleboro, Mass.—This contract (p. 528), which provides for furnishing and delivering 450 tons of bituminous coal, has been awarded to the **Eastern Coal Co.**, Providence, R. I., at $4.90 per ton. Address Supt. of Pub. Wks. H. J. Goodale, Room 9, Sturdy Block, Attleboro, Mass.

CONTRACT NOTES

The high cost of coal to the Boston & Maine was responsible for the deficit which this company shows. Five representative Eastern carriers are perhaps the New York Central, the Pennsylvania lines, East and West, Baltimore & Ohio, and Erie, and these roads, together pay on an average of $1.48 per ton for their fuel at the points of distribution on their lines, as compared with $2.86 thus paid by the Boston & Maine. Although many of the transportation rates now in operation on the Boston & Maine (for example, its passenger fare basis of practically 2½c. per mile) are no higher than rates on other enumerated lines. The Boston & Maine, if it could last year have gotten the fuel consumed by its locomotives at the average cost of $1.48 per ton, it could have showed earnings $2,245,225 higher than they were, the equivalent of 5.7% on common and preferred stock.—"The Boston News Bureau."

Portland's consumption of coal during the year 1914, that is, coal sold by dealers, was about 100,000 tons, which is a little under the normal consumption on account of mild weather. In this district wood and oil fuel figure prominently; it has been estimated that if all the fuel used here were coal it would amount to 1,000,000 tons. It is believed, therefore, that increased shipping facilities and reduced prices will mean a large increase in the consumption of coal here in the future.

One of the commercial attaches of the Department of Commerce in a neutral European country reports that buyers of American coal there desire specific terms and information relative to deliveries, quality, etc. Quotations should be made c.i.f. port of delivery.

An American consular officer in South America has been requested to assist in securing connections with a firm in the United States which is prepared to sell and deliver gas coal. It is stated that the inquirer uses about 7000 tons per year.

COAL AGE

Volume 7, No. 15
Issued Every Saturday
Hill Publishing Company

NEW YORK, APRIL 10, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

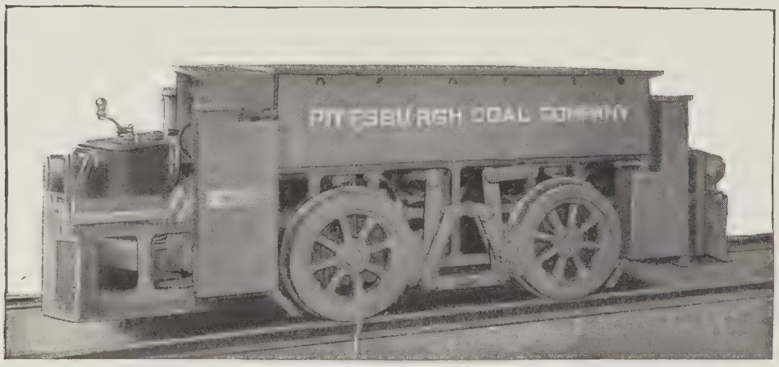
Government Coal Mine at Williston, North Dakota

(See Story Inside)

Why It Costs Less

to gather coal with

The Barsteel Storage Battery Mine Locomotive



It handles more cars on one charge—

Pulls less current from the battery—because it has

1. Five-point series-parallel control—Only two resistance points.
2. Low voltage battery motors—with highest efficiency.
3. Maximum drawbar pull—with minimum current.
4. No dead weight in frames.

Low Maintenance Cost—Secured by

1. Outside-hung motors—*accessible without removing battery.*
2. Open side frames—*Inside parts accessible without removing battery.*
3. Most rugged batteries made—*long life—minimum repairs.*
4. Spring-suspension of entire frame—*prevents jarring of battery.*
5. Best brake rigging—3 point suspension—Double brake shoe hangers—M. C. B. detachable Brake Shoes—Turnbuckle adjustment to keep full pressure on Brakes.
6. Barsteel frames—*Unbreakable.*

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000

None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

HERE'S a little talk that will interest every one of you. It is by Herbert N. Casson, Vice President, H. K. McCann Co., New York.

"What is the matter with the United States?" As I have been residing in London since the beginning of the War, I have been hearing this question asked on all sides. I have never heard any satisfactory answer. No one seems to know.

Why are the American factories not running night and day? Why are the railroads not opening up new territories and getting ready for the millions of immigrants who have already made up their minds to leave Europe as soon as the war is over?

Why are there not fifty American drummers in London right now, trying to sell $200,000,000 worth of American goods in place of the goods that were bought last year from Germany and Austria?

Why have advertisers become quitters, just at the time when their advertisements were most needed and most effective, in cheering on the business forces of the United States?

From the European point of view the United States is a haven of peace and security and prosperity. It has no troubles that it dare mention to Belgium or Austria or France or Germany or Servia or Great Britain or Russia.

Every tenth Briton has enlisted. Every tenth Frenchman is at the front. Every tenth Belgian is dead. What does the United States know of trouble?

If I could afford it, I would charter the Mauretania and Lusitania, and convey a party of 5,000 *American advertisers* to Europe for a trip of education. I would give them a week in London, a week in Paris and a week in Antwerp.

I would let them look at the United States from the scene of war. I would give them a look at *Real Trouble.* I would let them see trains, ten at a time, five minutes apart, packed with the maimed and the dying.

I would let them hear, from fragmentary survivors, the incredible story of battlefields 150 miles wide, and armies that are greater than the entire population of Texas.

I would let them see graves 100 yards long and full—and Belgium, the country that was, nothing now but 12,000 square miles of wreckage.

Then, when they began to understand, to some slight extent, the magnitude and awfulness of this War, I would say to them:

"Now go back and appreciate the United States. Realize your opportunities. Don't start digging trenches when nobody is firing at you. Don't fall down when you have not been hit. Don't be blind to the most glorious chance you have ever had in your life.

"Go back and advertise. Get ready for the most tremendous boom that any nation ever had. Build your factories bigger. Train more salesmen. Borrow more money. Go ahead, and thank God that you are alive and that your family is alive, and that you are living in a land that is at peace, at a time when nearly the whole world is at war."

COAL AGE

Vol. 7 NEW YORK, APRIL 10, 1915 No. 15

How Are You Educating Your Children?

> "Of all work that produces results, nine-tenths must be drudgery."
>
> *—Saying of an English Bishop.*

THE FATHERS of growing boys around our coal-mining camps would do well to ponder these words of the bishop. Too many of them—frugal coal miners and company men as well, who have laid by a small competency—so train their sons that they are fitted only for a life of idleness. These fathers realize the truth expressed by the bishop's maxim so far as their own work is concerned, but do not get it through their heads that it applies with equal force to the learned professions.

Such men, because they have toiled long and hard, often with meager rewards, decide that they will choose differently for their sons, and in consequence do not allow them to labor around the mines nor soil their hands and clothes, but urge them to acquire an education and fine manners so that they may secure a sufficient income to live in ease.

Because such fathers have passed through life without an education, they do not realize that nine-tenths of education is also drudgery and that it takes the same amount of determination to pull through the periods of drudgery along the educated route to bankable knowledge that it does to win a competency through manual labor.

If fathers could relieve their sons of the tribulations apportioned unto them by Fate by assuming themselves all such tribulations, the sons of this world would have a tolerably easy time of it. It generally happens, however, that when a father attempts to shield his son from a predestined rap the father gets the rap and the son gets two whacks immediately thereafter.

At any rate, many fathers who stint themselves for years that their sons may be advanced a round or two on the social ladder often live to see their boys disgraced and dropped back to a station in life below that occupied by the parents themselves. When such a father looks back at the wreck of his boy, he sees too late that the young man followed instructions implicitly.

Much of the prejudice against education in laboring communities can be traced to the unsuccessful careers of many educated sons of uneducated men, born and reared in the community in which they disgraced themselves.

Because of the growing tendency to force education upon all children by legislation, no matter what the sentiment of the particular community may be, it is important that uneducated parents be made to realize the reasons for such failures so that their own children may be prepared to receive an education that will fit them for a useful career instead of a life of idleness.

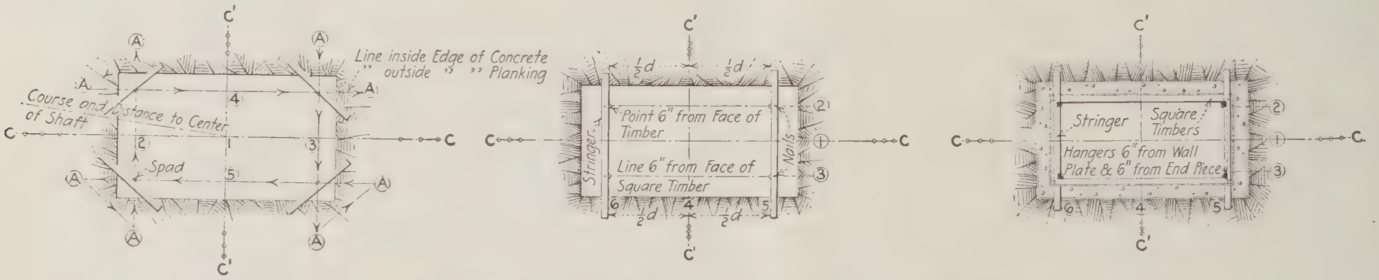
Laying Out Development Work in the Anthracite Region

By J. McCrystle*

SYNOPSIS—The work of prospecting, locating the mine opening, laying out the mine and yard tracks, staking out tipples, breakers, etc., is here described, and some useful hints for tunnel driving are given.

In the anthracite region when an unexplored territory is to be developed, surveys are first made locating the dip and strike of the exposed measure; and a map is drawn showing the black dirt laid bare by uprooted trees, the terraces which often indicate the outcrop of coal beds, the streams, roads, timbered areas, the inhabited sections and other objects and natural features that are likely to have a bearing on future operations.

Where more than one coal bed underlies the area, if the identity of one of the measures can be determined, the others may be sought with greater certainty. In the vicinity of Lansford, Penn., egg conglomerate underlies the Buck Mountain vein, while pea conglomerate is found in proximity to the Lykens Valley and Mammoth coal beds.


C'
Ⓐ
Ⓐ
A
A
Ⓐ
Line inside Edge of Concrete
" outside " " Planking
Course and Distance to Center of Shaft
4
C
2
1
3
C
Spad
5
Ⓐ
Ⓐ
Ⓐ
Ⓐ
C'
C'
½d
½d
Point 6" from Face of Timber
Stringer
Line 6" from Face of Square Timber
Nails
②
③
C
C
6
4
5
½d
½d
C'
C'
Stringer
Square Timbers
Hangers 6" from Wall Plate & 6" from End Piece
②
①
③
C
C
6
4
5
C'

FIGS. 1, 2 AND 3. SHOWING SUCCESSIVE STAGES IN THE STAKING OF A MINE SHAFT

The color of the ash, the thickness of the coal measure and the relative distance from other coal beds, as well as the texture of the coal itself, the partings in the vein, etc., may be used in a general way to identify the seams found. Shafts and drill holes may also be sunk to further ascertain the geologic formation.

Cross-sections not over 1000 ft. apart are now drawn and the adjacent provings projected upon them. The general work of prospecting is continued until sufficient data are secured or the funds allotted for this purpose have been exhausted. During the progress of the above work, the boundaries of the tract are relocated, topographic surveys made and levels carried from the nearest tidewater elevation. Spur tracks from the main-line railroad are also located.

Small-scale maps showing the entire lease, contour improvement maps to the scale of 50 ft. per in. and temporary working maps at a scale of 100 ft. per in. are next drawn. Contours are also drawn of the coal measure which show the probable location of these beds at intervals of from 5 to 25 ft.

The limits of the proposed collieries are now laid out on the small-scale map, and working maps at the 100 ft. scale are made for each colliery and coördinated. All surveys on these latter are traversed and balanced.

LOCATING THE MINE OPENING

The location of the mine opening is determined in a general way by the position of the railroad, the height available for dumping into the breaker, the disposal of refuse, the geologic and surface condition (including the location of the mine buildings, tracks, wagon roads, timber yards, reservoir, etc.) and the position of present and future town sites.

A water-level drift and tunnel which entail no hoisting or drainage form the most economical mode of development. Their use, however, is restricted to ravines and hillsides.

Although various types of slopes may be employed, in many instances to advantage, the shaft is today everywhere supplanting other forms of hoisting. The shaft may be carried to great depth, its maintenance is less than that of a slope, it is not easily affected by local conditions of either strata or surface, and if properly constructed its output is great.

As soon as the nature and location of the mine opening have been determined a preliminary plan of mine tracks is drawn on the improvement map. Turnouts are usually designed to hold 50 empty or loaded cars. The loads feed to the hoist or dump on a 1.6-per cent. grade to within 50 ft. of the shaft, while the balance of the way 2-per cent. is employed. The empties run on a 3-per cent. to the kickback and then on a 1.8-per cent. grade. Standard frogs and switches are employed, the lead being taken at twice the gage times the number of the frog and the radius as twice the gage times the square of the frog number. A No. 5 is the largest frog carried in stock, while a No. 2¾ is the smallest. A 50-ft. radius is the least that experience will allow.

When the paper location has been approved, it is staked out on the ground. Two methods of staking the tracks are in common use: First, to scale all curves and tangents from the map and replace them on the ground—this is the method generally followed. Second, when the opening is some distance from the dump, grade stakes are placed every 50 ft., tangents are selected from them and the intersections established. The distance from the point of intersection to the line of grade is used as the external secant in determining the radius of the curve. In this latter method, the idea rather than the letter of the plan is carried out.

---

*Division engineer, Lehigh Coal & Navigation Co., Lansford, Penn.

If a shaft is the type of opening approved, the landing at the top is frequently elevated, the rock from the development being employed in grading the tracks and yards. The piers for the permanent headframe, etc., are, however, first built a few feet above the proposed surface.

In the staking out of piers, engine houses, buildings, etc., the corners are roughly staked out for the excavation and grade stakes are placed a few feet distant for the building lines. When anchor bolts for engines, steel work, etc., are to be hung, an additional center line and cross line are given for setting the template.

The accompanying illustration, Fig. 1, shows the method of staking out rectangular shafts. The point 1 in the center being located, the center lines *CC* and *C′C′* are placed where they may be extended at any time and will not be disturbed. The setup points 1, 2, 3, 4 and 5 in Fig. 1 are to be used merely for the original staking and are on the line of the inside edge of the concrete. The planking behind the square timber is used as the inside edge of the concrete form.

In Fig. 2 if the original staking has not been disturbed, the stringers, which are usually of 8-in. to 12-in. round timbers, are measured from this staking so as to bring the inner face of the stringer 6 in. inside of the inside face of the square timber. It is frequently necessary to notch the stringer or spike a "scab" onto it in order to bring it to the proper alignment.

When hard rock is encountered the sinking is stopped and the shaft is timbered to the surface. The set of spads on the stringers is used until the timber is only a few feet below them. The operation for Fig. 2 is then repeated, and permanent hangers are placed in the corners instead of spads (see Fig. 3). Plumb bobs are hung from these hangers, and others are placed below them, this continuing until the shaft is complete.

ALIGNMENT OF SLOPES

In aligning slopes a notch is cut in one of the mudsills on the line. A nail is driven in it and allowed to protrude about 1/8 in. Two spads are then placed in collars a few sets below the notch in the mudsill and lines given as often as requested. In using these lines one end of a cord is looped over the protruding nail and the other end fastened a short distance below the set to be erected, so that the cord will just touch the bobs suspended from the spads.

In staking out breakers the center lines of the sidings and breaker are first located and heavy plugs driven flush with the ground on the center line of the various rows of piers. The sum of the distances between the piers is then checked against the total measurement. A transit is then set up upon the center line of each row and heavy plugs put in at right angles at intervals where they can be easily referred to and where they will probably not be disturbed. The cross base-line is then located, and heavy plugs are put opposite each longitudinal row of piers. The transit is then set on these plugs, and heavy plugs are placed at intervals as was the case with the cross-line. As the center lines of the pier boxes are usually saw-marked they are easily brought in line with the longitudinal and cross-lines.

Levels are then run over all the center-line plugs and level boards placed for the height of the pier as desired. The elevation on top of the form is checked before the concrete is poured, and again after it has set. All subsequent work is based on the original center line. For convenience the staking is marked off for easy reference on a print of the ground plan.

SHAFT LANDINGS ARE 17 FT. HIGH AND TAPERED

In turning landings off a shaft the distance is given to the top. This is 17 ft. above the wall plate at the landing. This distance gives ample room for taking long timber and rails off the cage and permits the testing of the cages readily. A set of bearers is placed sufficiently above the opening to be secure, and the timber between the bearer to the top of the opening is hung.

The next set of bearers is placed two sets below the landing. This set consists of one bearer under each end piece and a longitudinal bearer under each wall plate. The shaft is sunk sufficiently below the landing to prevent the blasting from affecting it. No timber is erected opposite the proposed opening until the landings have been turned 30 ft. Punch props the full height of the opening are then erected under the end pieces, as well as buntons for fastening the guides.

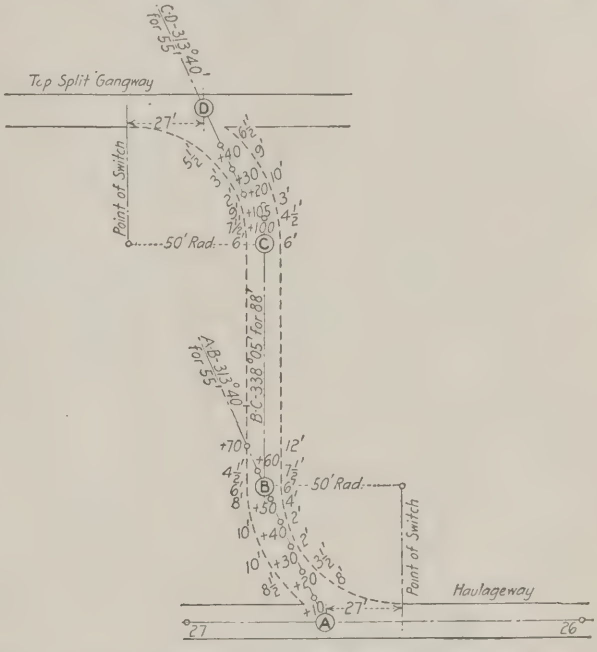


FIG. 4. PROPOSED LAYOUT OF A CURVE IN A TUNNEL

The top of the opening to the shaft is tapered 30 deg., so as to have the regular 8-ft. tunnel height at 15 ft. from the shaft. In most cases the alignment for 300 ft. of tunnel on each side of the shaft is given by right-angling from the shaft timber. This allows a sufficient length of tunnel to place plugs.

At the landings on the shaft, as distinguished from the one at the bottom, the loaded cars do not feed directly into the shaft, but to a transfer beyond the end of the shaft, on which they are then taken to the desired compartment. The chances of a trip running down the shaft are thus eliminated.

The difference in elevation necessitated by the grades to and from the shaft or slope is overcome either by a car hoist on the empty track or, if possible, by the motor. The pitch of the car hoist is usually made 4 to 5 in. per foot.

DRAWBAR PULLS ARE MADE EQUAL

From the ends of the turnouts the main haulageways are driven on a grade of 0.35 per cent. in favor of the loaded cars. This grade is sufficient to drain the workings and give the same drawbar pull for empty as for loaded trips.

A tracing with the probable contour of each coal bed at the elevation adopted for the level is made, and all proposed panel tunnels, etc., are laid out upon it. The gangways are all driven on a grade to connect the panel tunnels with the haulageway. One of the lower beds the maintenance of which is small and which will not be disturbed by the robbing of the overlying veins is usually selected for the permanent airway and haulageway.

For driving tunnels, three points are given in the roof, and plumb bobs are hung from them and the face aligned by sighting over the strings. The distance between the bobs should be between 2 and 4 ft. where possible. This method requires two men to do the aligning—one at the plumb bob and one at the face. This line is extended whenever requested, but in any case it should be extended when the face has passed the inside bob 100 ft.

Planes through rock are usually aligned in a manner similar to tunnels. A piece of ¾-in. or 1-in. pipe about 5 ft. long is sometimes suspended from the plumb bobs. This is adjusted so as to give the same pitch on the pipe as is required for the plane. One man at the face and one at the pipe do the aligning, which gives the grade and line at one sighting. In Fig. 4 is shown a suggested method of aligning tunnels. The lines *AB* and *CD* are each given as the work progresses, the foreman cutting the ribs to agree with the offsets as indicated. When the tunnel has reached the point *B* it is necessary to give instructions for drilling a short distance further without a line before a set-up at *B* can be made. This is necessary at each turn of the tunnel. It frequently happens when the engineers are sent for that a sufficient distance has not been driven to permit giving the next angle point.

In Fig. 4, instead of stopping at the point *B*, the ordinates to the ribs have been given for 15 ft. beyond this point. This gives the foreman time to advance the tunnel three cuts on the proper offset and keeps the transit out of the way of drilling, giving the engineers a short time to arrange for the next alignment.

In remote portions of the mine, where locomotives do not ordinarily operate, curves of smaller radius than mentioned above may be employed, the rails being bent to the curve of a board template. Where coal beds lie close together, the panel tunnels are driven at 1000 ft. intervals, and the various measures, with the exception of the haulageway, may be then robbed.

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A Stoker Installation That Has Proved Economical

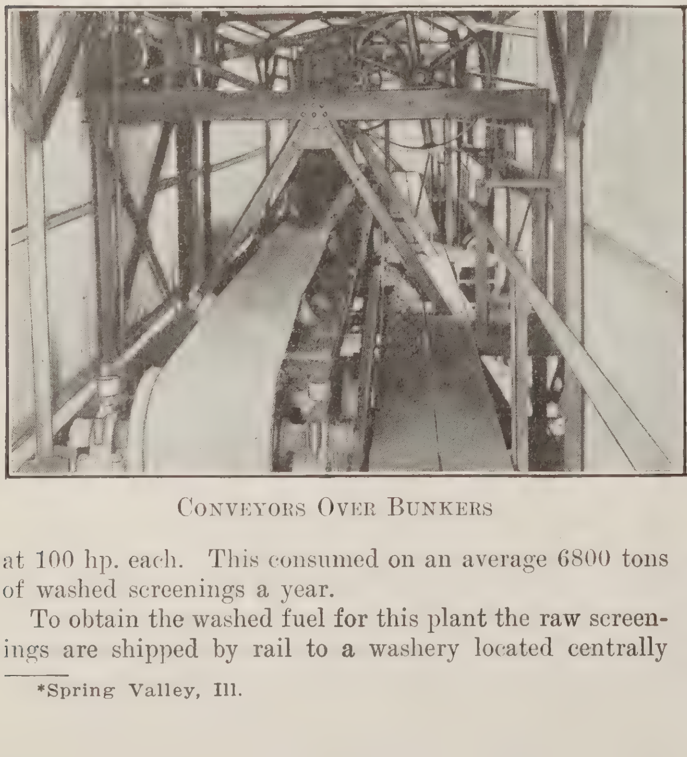
By W. N. Cole*

SYNOPSIS—At an Illinois mine where washed slack had been employed as fuel the installation of stokers which successfully burned raw screenings resulted in a saving of more than $5000 per year.

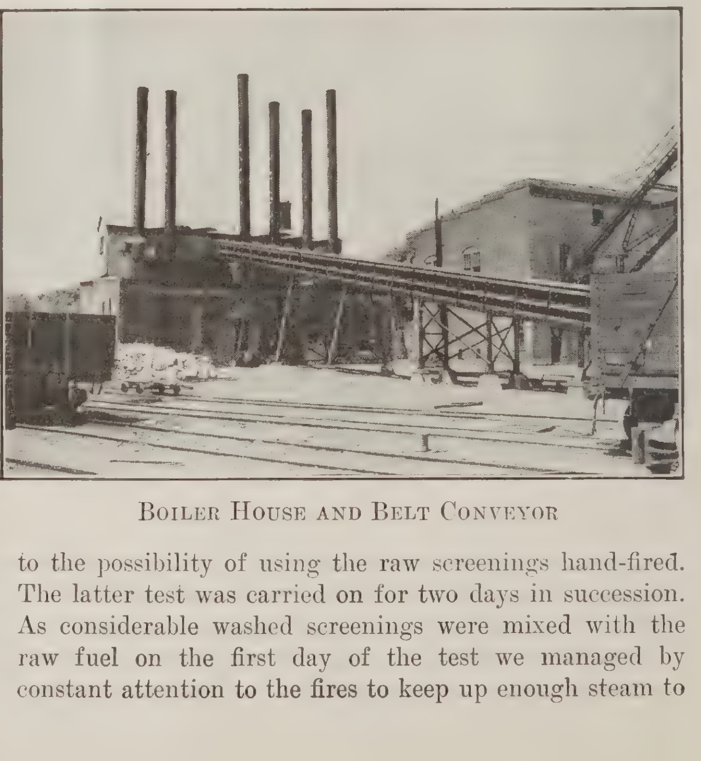
The boiler plant of a certain mine in northern Illinois consists of six 66-in. by 16-ft. return-tubular boilers rated at 100 hp. each. This consumed on an average 6800 tons of washed screenings a year.

To obtain the washed fuel for this plant the raw screenings are shipped by rail to a washery located centrally with respect to four mines. This movement carried a switching charge both ways and with the cost of washing added 83c. a ton to the cost of the raw screenings at the mine before shipment. The question arose as to whether the raw screenings could not be used for fuel in place of the more expensive washed coal.

I made several tests to ascertain the efficiency of the boilers with the fuel we were using and also a test as to the possibility of using the raw screenings hand-fired. The latter test was carried on for two days in succession. As considerable washed screenings were mixed with the raw fuel on the first day of the test we managed by constant attention to the fires to keep up enough steam to



Conveyors Over Bunkers



Boiler House and Belt Conveyor

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*Spring Valley, Ill.

enable us to run; but on the second day the washed screenings had been entirely worked out, and we found it impossible to raise the steam to a working pressure, so I had to place three of the boilers on the better fuel in order to keep the plant running.

I then submitted the results of my tests and a sample of each of the coals to the Underfeed Stoker Co. of America for figures and estimates.

The results of my tests for efficiency showed an evaporation of 6.02 lb. of water per pound of coal from and at 212 deg. F. with washed screenings. The stoker company guaranteed an evaporation of 7.28 lb. of water per pound of coal with the same coal or an evaporation of 5.48 lb. of water per pound of coal using the raw screenings. In other words, it would take 1.1 times as much raw screenings stoker-fired as washed screenings hand-fired, or on a yearly basis of 6800 tons of washed screenings it would mean a consumption of 7480 tons of raw screenings; but as there was a difference of 83c. a ton in favor of the raw screenings the use of the latter would mean a saving of $5028 a year in our coal bill.

The proposition looked so good that the company decided to make the installation, and orders were given to that effect.

In connection with the stokers, we installed in the boiler room a 100-ton Ferro-Inclave coal bunker made by the Brown Hoisting Machinery Co. with spouts to each stoker; a 14-in. Robbins belt conveyor, 172 ft. c. to c., from the screenings chute to the center of the bunker, and a 14-in., 30-ft. cross-conveyor from the discharge point of the main conveyor running across the top of the bunker, thus enabling us to fill the bunker at any point necessary. A practically automatic feed of the fuel from the tipple to the bunker and from thence to the stokers and boilers was thus secured.

This installation has been in operation for about a year and a half and has proved entirely successful. Our records for the first 12 months succeeding the installation of the stokers show a consumption of 7031 tons of fuel, making a saving of $5431.48, and as the cost of the entire installation was less than $15,000 it will pay for itself in less than three years.

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Some Views of the Layland Rescue Work

SYNOPSIS—The head of the State Department of Mines of West Virginia declares that no Federal apparatus-men should receive medals for the Layland rescue work. An editorial published by a local newspaper is quoted to show how sentiment in Fayette County is directed.

The following remarks by Earl A. Henry, the head of the Department of Mines of West Virginia, will be of interest to readers:

"I arrived at the Layland mine on the evening of Mar. 2, the day of the explosion, and was on the ground from that time until all the bodies, both dead and alive, were removed from the mine. The rescue work was in charge of H. M. Bertolet, the general superintendent, and the State Mine Department, ably assisted by Oscar Knerr and John Clapperton, superintendents under Mr. Bertolet, also several hundred volunteers from the different mines in the New River coal field.

"While Secretary Lane and George S. Rice, through the press, give great credit to the helmetmen connected with the Bureau of Mines, they would be unable to convince the mining people of any heroic work accomplished by them at the Layland disaster. The statement has been made in an interview that the helmetmen worked in advance of the state mine inspectors and others; that their work consisted of constructing brattices and arranging the ventilation in the dangerous sections of the mine, making it possible for the parties engaged in the rescue work to proceed without any danger whatever. If the helmetmen constructed any brattices or did anything to assist in arranging a system of ventilation, it is unknown to any person who was on the ground.*

"There were no extremely dangerous conditions encountered in the rescue work, as the mine did not liberate explosive gas and there was no evidence of great force in any section of the mine, there being only a few light slate falls to travel over. The greatest difficulty was the afterdamp resulting from the explosion.

"I have no desire to do or say anything that might detract from or take away any honors due to the helmetmen. I believe that credit should be given to those to whom credit is due, and I desire to go on record by saying that no more heroic men could be found on God's earth than those who volunteered their services and assisted in the rescue work at the Layland mine. These men were mine superintendents, mine foremen, firebosses, miners and mine laborers from the different mines in the New River field. They hurried to the scene and entered into this work of their own free will and did not expect to be rewarded with medals of honor for anything they might do in an effort to remove the dead, or to rescue the living, if any might be found entombed in the mine. Their only motive was one of humanity, and they were in no way seeking honors.

"As to the helmetmen rescuing a number of live persons—this is a misstatement of facts. At midnight on Friday, Mar. 5, all the rescue workers were called from the mine and the fan was stopped so that arrangements could be made on Saturday morning to reverse the air current. About 8 a.m. of the latter day five Italians walked out of the mine with open lights, making the statement that on the morning of the explosion they had inclosed themselves behind a brattice at the head of 9th left entry off No. 3 main haulage road, approximately a mile and a quarter from the entrance of the mine.

"These men had each day tried to make their way out, but could not do so by reason of the afterdamp; but after the fan had been stopped and the air current had ceased for about seven hours these men were able to travel to the outside, at which time they reported that 42 men were bratticed off in the 10th left heading off No. 3 main haulage road, a distance of 500 ft. farther in the mine than the 9th left heading. The 9th and 10th left headings were the regular working places of these men and were in no way affected by the explosion except by the cutting off of the ventilation.

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*In our issue of Mar. 20, p. 508, George S. Rice, chief mining engineer of the Bureau of Mines, states in effect that the oxygen-apparatus men "explored in advance of the rescue men, who, being without apparatus, were engaged in bratticing and the recovery of bodies."—EDITOR.

"The question that is raised by the mining people in this state is, Why should the use of helmets be necessary to rescue the entombed men when they were able to use an open light all the time they were entrapped in the mine and when rescued were able to travel to the outside without the use of helmets?

"In conclusion I desire to say that the Department of Mines of West Virginia is willing to coöperate and assist the Bureau of Mines in all its efforts to determine the cause of these disastrous explosions and will cheerfully adopt any recommendations that will prevent any other disastrous catastrophe in this state, but I do not believe that mine explosions can be prevented by long-winded statements given out to the newspapers booming the work of any person along this line."

The report of the coroner's jury contains no matters of interest, the statement being that the five men whose deaths were investigated "came to their death by a dust explosion caused by a blownout shot in the third left of the main tunnel heading in No. 3 mine of the New River & Pocahontas Consolidated Coal Co., located at Layland, county of Lafayette, State of West Virginia, on Tuesday, Mar. 2, 1915."

The *Fayette Tribune and Free Press,* of Fayetteville, W. Va., on Thursday, Mar. 18, 1915, under the heading, "Pricking a Bubble," said:

"It is learned from newspaper reports emanating from Washington that the 'expert' rescuers sent by the Federal Government to Layland are to be decorated with gold medals in commemoration of their brave services in rescuing 47 men alive from the mines. And not only are they to have these mute testimonials of their rare courage, but the Secretary of the Interior, Mr. Lane, treats them to a tribute such as would make modesty shrink. Here is the item that is going the rounds:

"Tribute to the Bureau of Mines' rescuers for saving 47 men from death in the mine at Layland, W. Va., was paid by Secretary Lane, of the Interior Department, in a statement issued this week. 'Out of the gloom of such a catastrophe,' said Secretary Lane, 'involving, as it appeared from the earlier dispatches, more than one hundred lives, the saving of 47 men comes almost as a benediction. I am proud of the brave fellows from the Bureau of Mines who have been working heroically for several days to bring about this consummation. I am equally proud of their associates who have been trained in the modern rescue methods by our men. For years it has been demonstrated that the old methods of rescue work not only did not save lives, but even cost the lives of many brave volunteers.

"'The oxygen helmets worn by the trained rescuers, which permitted them to penetrate parts of the mine filled with poisonous gases where no other human being could go, are undoubtedly responsible for the saving of the miners. The bureau's men, always in advance of the volunteers, restored the ventilation in the mine, thus permitting the volunteers to advance. Presumably the entombed men had protected themselves from the deadly gases by the erection of temporary doors. Then the way out of the mine was comparatively easy, for it had been restored to normal conditions as the rescuers proceeded.

"'I have wired to the rescuers,' said Secretary Lane, 'my heartfelt appreciation of their heroic efforts in saving these lives. I am also told that the American Mine Safety Association has already started a movement to award to each rescuer one of its gold medals.'

"From unbiased, unprejudiced sources the *Tribune* learns that not only are the federal rescuers not entitled to so lavish a testimonial, but are entitled to none at all. Instead of being of service in this time of great distress, they were an almost intolerable nuisance, for they could not be induced at any time to penetrate the mines beyond where the local rescuers were working, despite the fact that they were equipped with oxygen helmets and other paraphernalia intended to increase their efficiency in this kind of work.

"Such credit as is due for heroism in the rescue work at Layland, and much *is* due, should go to the volunteers and not to the trained rescuers of whom Secretary Lane speaks. They were there with the real article of courage and almost foolhardy zeal in their efforts to clear up the mine and rescue survivors, if such there should be.

"The State Department, headed by Mr. Henry, assisted by Inspectors Holliday, Absalom, Murray, Blenkinsopp, Lambert and Cobb, working without safety appliances and unaccompanied by canary birds to give them warning of foul air, were the real heroes of the week of horror at Layland. There were dozens of others too that might be mentioned who went about the work with a seriousness born of courage.

"These were thinking of the distress and discomfort of the mourning ones about the mine mouth. The others were taking up their time telegraphing reports to headquarters and informing the newspapers of their heroic handiwork. Secretary Lane has been imposed upon."

The Largest Electric Mine Locomotive in the World

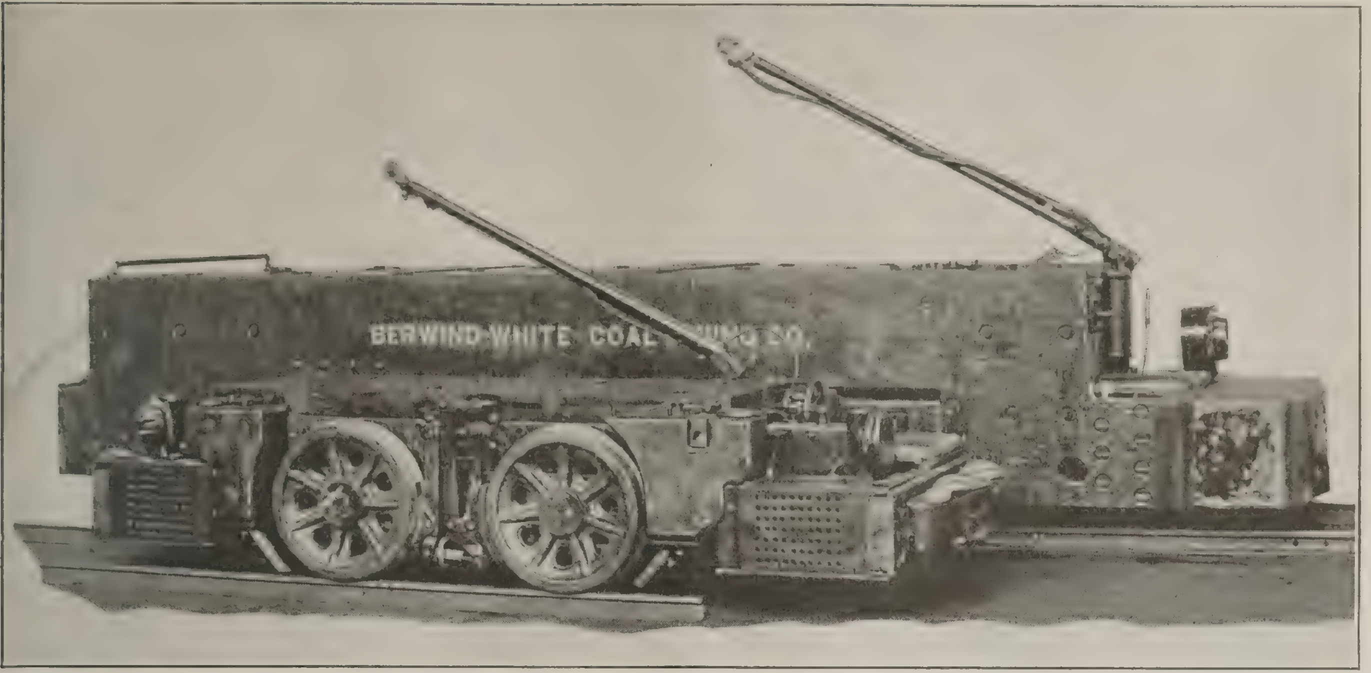
It is the endeavor of every mine operator to secure a maximum output with a minimum cost. In order to successfully execute this plan, the haulage apparatus must operate at a high percentage of efficiency. Where conditions will permit, electric locomotives are displacing all other methods of mine transportation and are giving uniformly satisfactory results.

To keep up with the demand of the times for increased production, the Berwind-White Coal Mining Co. recently placed in operation at Windber, Penn., the two largest and most powerful single-unit electric mine locomotives in the world. These machines weigh 30 tons each, and are of the three-motor, six-wheel type, with equalizing levers to evenly distribute the weight upon the drivers. The side and end frames are constructed of what is known as "armor plate," solid rolled steel slabs, the sides being 5-in. thick, 40 in. high and 17 ft. long.

These members by the aid of angles of heavy steel casting are securely bolted together, forming a rigid unit.

The motor equipment of each locomotive consists of three 115-hp., 500-volt ball-bearing motors, capable of developing a tractive effort of 15,500 lb. at a speed of 8 miles per hour. Incorporated in the design of these motors are the essential mechanical and electrical features which have, to a large extent, solved the troubles encountered in mining work. The application of ball bearings permits the use of gearing of 5½-in. face, and a commutator 5⅛ in. wide, within the space available on a 36-in. track gage, without a sacrifice in size of any other part.

The use of ball bearings eliminates to a large extent the motor troubles arising directly and indirectly from the wearing down of armature supports of the ordinary type.



Comparative Size of 6-Ton and 30-Ton Locomotives

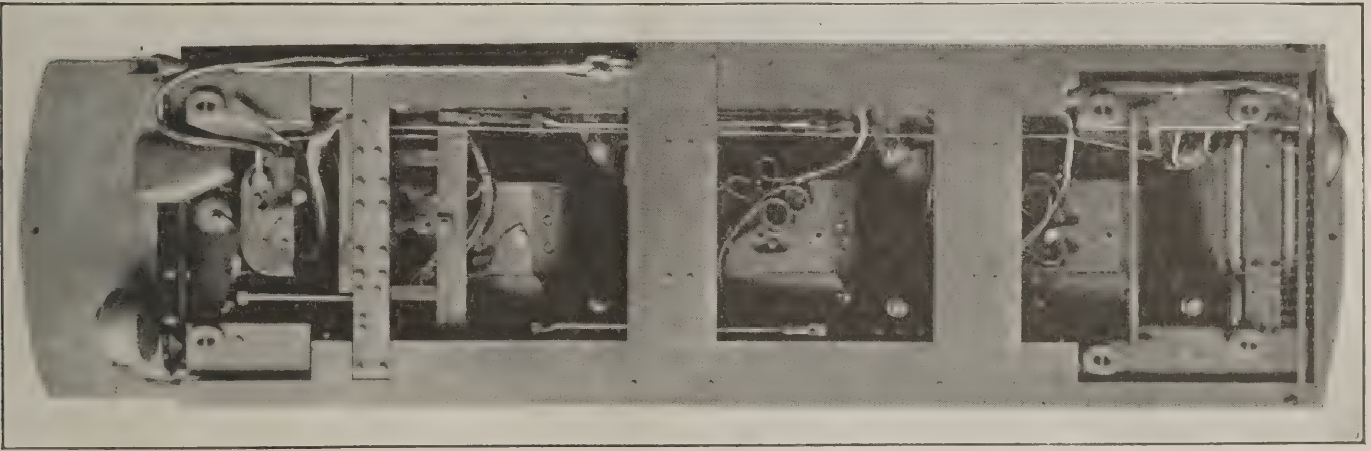
Large commutator doors give ample access to the brushes and commutator for inspection and cleaning.

The armature field frames are supported from the bottom half, so that the top may be removed, thus permitting the removal of the armature without disturbing any other part. Three-point suspension on a spring-hung cross-bar gives flexibility and absorbs shock.

The controller is of exceptionally large current-carrying capacity, with a double set of brushes on the operating cylinder, which are used to cut out the steps of the rheostat when bringing the locomotive up to speed. The two sets of brushes are each provided with a magnetic blowout coil.

On each end of the locomotive is mounted a powerful arc headlight, which is the most efficient method of lighting for work of this nature. The four cast-iron sand boxes have a total capacity of approximately 9 bu., this amount being necessary for the successful operation on the long hauls and heavy grades over which these locomotives run.

The journal boxes are of the latest type, with a hardened steel plate in the lid for taking up the thrust of the wheels transmitted to it through the hardened steel pin in the end of the axle. This eliminates the wear on the wheel hubs and the face of the journal box incident to the end thrust.



Top View of Locomotive, Showing Interior

Among the electrical features is an automatic contactor connected in series with and operated by the controller cylinder. The contactor is designed to break circuits carrying heavy current and its use eliminates the heavy arcing in the controller case sometimes encountered where the main break is incorporated within the operating cylinder. The rheostat is of the cast-grid type of the latest design and of sufficient capacity for operating without excessive heating.

The wheels are of rolled steel, 33 in. in diameter, pressed and keyed onto a 5½-in. axle. Wheels of this type have been adopted as standard by the manufacturer.

These machines were built by the Jeffrey Manufacturing Co., of Columbus, Ohio.

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Right to Terminate Coal Lease—If a contract for the privilege of mining coal on the royalty basis does not fix any duration of the lease, it is terminable at the will of either party. (Alabama Supreme Court, Christian vs. Stith Coal Co., 66 "Southern Reporter," 641.)

The Labor Situation

SYNOPSIS—A settlement is anticipated in the Coshocton district of Ohio. Cabin Creek miners, and those at Blakely mines, W. Va., present grievances. The coming contract in the anthracite region arouses interest. The monthly employees in that district receive a favorable decision.

There has been no change in eastern Ohio, though the miners have now been on strike over a year. A few tons are being produced in small mines, but there is no hope of a general settlement. Both sides are awaiting the passage or rejection of the Gallagher amendment to the Green Antiscreen bill, now pending before the House of Representatives.

In Belmont County it is stated that the strikers are leasing farms, but most of the miners do not understand the business. Charles J. Albasin, the president of the subdistrict in which the strike is in progress, No. 5, has issued to the press a long, poorly worded notice alleging that the Ohio operators have been keeping up the Ohio railroad rates so as to make more money out of their West Virginia mines. Probably a truer statement would be that the high Ohio railroad and wage rates drove them to purchase the properties in West Virginia.

It has been persistently reported, and never denied, that the strike leaders proposed that the rate be made 47c. instead of 44.61c., agreeing to make up the difference between the two rates by modifications of the dead-work and yardage scales. Thus the strikers would be able to claim a victory and to declare that they had kept their word to the other operators in Ohio. One leading eastern Ohio operator has said that if the mine owners of that district had the Hocking Valley conditions, they would regard 49c. a ton as a figure from which a profit could be obtained.

The miners on strike desire to farm the coal companies' properties and much resent the fact that these lands are to be used as pasturage for the idle mules. They are making extensive application for government seed.

At the joint conference of representatives from operators and miners in the Coshocton district in Ohio, which started Apr. 5, at 2 p.m., and continued the following day, prospects for the settlement of the wage controversy, which has continued for more than a year, appeared brighter than for some months. Reports from the conferences declared that both sides showed a more conciliatory attitude. The wage agreement in this district was practically settled at one time, but in a referendum vote the miners failed to approve its provisions.

West Virginia Troubles

The Cabin Creek coal miners of West Virginia are declaring that they should receive the check-off and outside daywage scale, as secured by the Kanawha River miners. They claim that they are entitled to these under the 1913 contract. A committee of seven has been appointed to wait on the operators. The latter, it is stated, declare the contract to have a different meaning.

Apparently the referendum in the New River and Winding Gulf sections of Fayette and Raleigh Counties of West Virginia has ratified the agreement recently prepared between miners and operators. At the Blakely mines of the Blue Creek Coal & Coke Co., in the same state, which had about 300 employees in 1913, the miners are said to have been required to throw the bug-dust from the electric machines into the gob. This they refused to do, as thereby they would have to handle it without compensation.

A convention will be held on Apr. 12 by the members of District 17 of the United Mine Workers of America to elect a vice-president in place of John Cunningham, whose election was set aside by the executive board last autumn. The entire set of officers may be voted upon again. This action grew out of a contest instituted by C. G. Griffith, the defeated candidate for vice-president, who claimed that there had been extensive frauds in the Winifrede district and elsewhere, resulting in his defeat and the election of Cunningham. Cunningham did not contest the matter, and the decision of the board was unanimous.

The 134 men arrested in connection with the riot and with the death of Constable W. R. Riggs during a strike of the men at the Jamison Coal & Coke Co.'s works near Farmington, W. Va., on Feb. 20, will be tried on Apr. 6 before Judge W. S. Haymond.

Quiet in Colorado

In Colorado conditions are quiet. The coal commission has reported to President Wilson that 71 of the mine operators, producing 61 per cent. of all the coal mined in the state, have expressed the opinion that no useful purpose would be served by the commission going to Colorado at this time. The same opinion, it is said, is shared in labor circles.

At the mines of the Harrison Coal Co., Streator, Ill., the men have struck for higher pay and the right to fire shots twice in each shift instead of once as at present. They claim that there is too much material to be handled. The mine employed about 105 men in 1913.

Conflicting Statements about Kentucky

W. S. Wells, the general manager of the Middle Creek Coal Co., writes us among other matters:

> In your article you state that this company employs only 40 men, when in fact we have between 125 and 150 working for us. You further stated that we have resumed irregular operation at the old scale, which is entirely false, as we have started at three days per week at the new scale—a reduction of 15 per cent. on everybody from the general manager down, excluding trappers. The cut is merely temporary, and the old rates will be put back into effect on May 1, if conditions permit.
>
> Your article seems to cast reflection upon our action, and we cannot see wherein it is of importance to you. Therefore, we shall demand that you immediately publish the facts in this case, giving reasons for your recent misinformation.

We had the story, at least, almost correct in the first instance, when a correspondent, who is a leading coal man in the State of Kentucky, wrote us that we had overstated the importance of the Middle Creek Coal Co. It is, we believe, just as we said, the largest concern in Floyd County. We avoided stating how many men were employed, because our record was back in 1913. It was only after we were told what we believed was the truth that we made the correction. We leave it to Mr. Wells to remove any misunderstanding, and merely quote his statement. We cannot, however, admit that we believe it is good policy to reduce wages.

Next Year's Scale in Anthracite Region

The celebration in the anthracite region of Pennsylvania of the establishment of the 8-hr. day in bituminous mines served John P. White and others with an opportunity to express the intentions of the miners relative to the coming scale to be signed in that region in 1916. Apparently the 8-hr. day is the leading issue, but an increased wage of 5 per cent. for inside employees and 10 per cent. for outside workmen is also sought, and it is desired that the check-off be made a part of the contract.

The miners take hope from the unity of the organization. They desire a full 100 per cent. membership when the strike commences. The unions in the anthracite region embrace so large a proportion of the men that there is no fear as to the outcome of a strike. J. P. White, the president, however, does not appear so sure of the outcome. To him membership is not so important as funds; and though membership, time and peace will assure the necessary capital to sustain a strike, the time is now too short to accumulate the funds, and there is no peace, for 15,300 men are on strike. Unless the times improve, it is likely that the 8-hr. day will alone survive the progress of time.

A Welcome Decision for Anthracite Mine Workers

Judge George Gray, of Wilkes-Barre, Penn., gave two decisions this week in favor of the men. It was decided that the Delaware, Lackawanna & Western R.R. coal department and the Price-Pancoast Coal Co. must pay their men a 10-per cent. increase over the schedule in force on May 30, 1912.

After the agreement operative on that date certain monthly men, such as watchmen, electricians, helpers and barnbosses, were denied the 10 per cent. increase, the companies contending that these men relinquished their rights by accepting a stipulated salary at increased pay after the agreement of Apr. 1, 1903. This decision is retroactive and applies to all the companies in the anthracite region. It will compel the disbursement of a large sum of money, the ruling retroacting for nearly three years. The Price-Pancoast Coal Co. did, however, give an increase in no case less than 5½ per cent. to its monthly men.

There is much dissatisfaction throughout the anthracite region with the status of the compensation bill. It is alleged that Senator W. M. Lynch, who is chairman of the Mines and Mining Committee of the state, is opposing the reporting of the Catlin Bill, without the passage of which, it is stated, the miners cannot obtain compensation.

The Discussion of Mining Laws and Needed Legislation Summarized

By J. T. Beard

SYNOPSIS—Following is an altogether too brief summary of the leading points and arguments presented in one of the most valuable discussions that have thus far been conducted in Coal Age. *These suggestions merit close study and careful consideration, as they are all the outgrowth of experience in the practice of coal mining.*

Probably no discussion that has been conducted in Coal Age has attracted wider attention or excited deeper interest among all classes of coal-mining men than the discussion of the manifold features of the present mining laws of the different states. Certainly none has proved more valuable in the results it may be expected to accomplish.

The criticisms offered and the suggestions made come from practical mining men whose experiences have revealed to them the weak points in existing laws and led them to suggest measures that would insure greater safety in mining. In the following review, I will attempt to group these references under common heads and to emphasize those points that have received the widest attention at the hands of contributors.

The Need of Clear and Specific Terms in Mining Law

Letters Nos. 7, 8, 19, 20, 31, 32 and 37 have drawn attention to the fact that the wording of the mining laws, in many cases, leaves much to be assumed. The wording is often *ambiguous* and capable of different interpretations by different persons. More often it is *contradictory* or, to say the least, *inconsistent* in itself, instances of which have been pointed out in the letters referred to above. The fact of the matter is that most of our mining laws are patchwork; they do not show the steady growth and development from a single root base. Too often the terms used need to be specially defined or the language requires to be interpreted in order to understand the intention of the law.

Responsibility for Accident

The lack of clear definition and logical development in mining law is one of the greatest obstacles in the fixing of the *responsibility for accident* or for a violation of the law where it belongs. Attention has been drawn to this fact in numerous letters, Nos. 8, 12, 13, 17, 25, 33, 35, 37, 40 and 44. The truth of this condition is shown in the following numerous references.

The Anomalous Position of the Mine Foreman

Reference has been made to this feature in Letters Nos. 25, 30, 32, 35 and 43, in which it has been shown that the mine foreman is, so to speak, a "bumping block" between the mine inspector and his company. In Letter No. 22, it was shown that the mine foreman is usually given *too much territory* to supervise, which makes it impossible for him to comply honestly with the requirements of the law. This condition led to the suggestion that a *sworn statement* should be required by the inspector of every foreman and assistant foreman as to the actual condition of the mine in the interval between the inspectors' visits.

The Mine Foreman a State Officer

It was even suggested in Letters Nos. 30, 35 and 40 that, owing to the conflicting duties of his position, the mine foreman might properly be *employed by the state* and act under the direction of the mine inspector of the district. This suggestion, however, was strongly opposed by the writer of Letter No. 35, who argued that this would practically place the mine foreman beyond the control of the company of whose mine he has the charge.

To obviate the loss of his position because of a faithful compliance with a requirement of the mining law objectionable to his company, it was suggested (Letter No. 30) that the removal of a mine foreman from office should only take place after a fair trial before an executive board. But this, it was stated (Letter No. 35), might be an injustice to the company, which would at times be compelled to operate at a loss, if at all.

Classification of Mines

The need of a proper *classification* of mines, in mining law, was referred to in Letters Nos. 7, 14 and 24; and it was suggested in the last-named letter that a similar classification should apply to *all* legislation relating to safety in mining. It was shown that, owing to the lack of such a classification on a practical basis, it frequently happens that neighboring mines are brought into *unequal competition* with each other because of different methods being employed for evading those requirements of the law that would bring the mine under the particular classification of a "gaseous mine." Instances were given of such dishonest evasions of the law whereby the mine inspector was hoodwinked and deceived.

Attention was drawn in Letter No. 41 to the fact that, owing to peculiar roof conditions that required special methods of timbering, mines generating no gas are often more dangerous than others generating gas. But notwithstanding this fact, the more dangerous mine is classified as nongaseous and therefore subject to fewer restrictions and less expense, while its operation is accompanied with greater possible fatality than the mine generating gas. Similar *unnecessary burdens* imposed by law in coal mining were referred to in Letters Nos. 8, 14, 19 and 42.

Letter No. 9 draws attention to the importance of specifying in mining law the particular method to be adopted in the *removal of accumulations of gas* in mine workings, in respect to the withdrawal of all men working on the return current of the affected section of the mine and permitting no persons to enter the mine except those actually engaged in the work of removing the gas until after the mine has been again examined and pronounced safe for work. It is further urged that the law should forbid the *dangerous practice* of "brushing" out the gas, making it compulsory to remove all gas by the ventilating current and using only safety lamps while so doing.

THE USE OF NAKED AND MIXED LIGHTS

Attention is drawn to this important matter in Letters Nos. 34, 37 and 38, and the two last named letters refer to the danger of the provision made in Sec. 2, Art. 28, of the Pennsylvania bituminous mine law (1911), which apparently annuls the requirements of previous sections of the same law in respect to the use of safety lamps. The section here referred to states that the provisions of the act relating to the use of safety lamps "shall not apply to any mine wherein explosive gas is being generated only in live entries."

It has seemingly been overlooked that the gas generated in the "live entries" would circulate through the rooms and other workings where it is permitted to use open lights. Perhaps no feature of coal mining is attended with so great a risk as the permitted *use of open lights* in any portion of a mine requiring the use of safety lamps in other portions. Letter No. 26 suggests that state mining laws should compel the introduction of *safety lamps* in every mine where it is known that quantities of firedamp are generated.

WORKING MINES IN OIL AND GAS FIELDS

Letters Nos. 23 and 35 draw attention to the great danger encountered when operating a coal mine in *oil and gas fields*. In this respect probably the new law of Ohio furnishes the fullest protection from accident due to this cause. The provisions of the Ohio law in this regard are fully given in Letter No. 35. This is certainly a very important matter and should receive careful consideration in all mine legislation.

APPROACHING ABANDONED WORKINGS

The need of using special precaution when driving toward abandoned workings that may contain either gas or water is mentioned in Letters Nos. 8 and 19. It is recommended that *advance boreholes* should be maintained in the face of all headings or other workings that are being driven toward abandoned places. In addition, it may be stated that flank holes should be bored at an angle, every 8 or 10 yd., in the ribs of all such headings, which should be driven single. Plugs should be kept ready for instant use to stop the holes in case water is tapped. Only safety lamps should be used, and a close watch must be kept for the first appearance of water or gas in the seam.

MINING METHODS AND EQUIPMENT

A good suggestion is made in Letter No. 32 in respect to making an *effort to standardize*, as far as practicable, certain general mining requirements relating to the conducting of the ventilating current, the construction of stoppings and air bridges, the shooting of coal, the timbering of working places, lighting of mines, safeguarding electrical installations, and the foolproofing of mining machines and all mechanical appliances.

The compulsory use of *safety catches* on all cages and trips used for hoisting or lowering men is recommended in Letter No. 9. Letter No. 10 refers to the Avondale, Penn., disaster, which first drew attention to the need of maintaining *two openings* in every mine; likewise, the terrible Cherry, Ill., disaster, which taught the lesson of greater *fire protection* for mines and the need of the fireproofing of mine shafts. It may be added that the Throop, Penn., disaster taught the lesson of a similar fire protection for all underground engine and pump-rooms.

Letter No. 10 also advises legislation prohibiting the use of *gasoline motors* in coal mines. Other recommendations in respect to mine equipment are: The maintenance of *refuge stations* that would be available in time of accident, Letter No. 34; the regulation by law of *mine timbering* and the adoption of some regular system of timbering the working face in every coal mine, Letter No. 26; the adoption of the *electric head lamp* in gaseous mines, Letter No. 9; the regulation and control of the *company-store curse* where such exists; the prohibition of the *sale of liquor* in all mining towns and districts; and the prohibition of the employment of persons who cannot *speak and understand the English language,* Letter No. 38.

BLASTING IN COAL MINES

Letters Nos. 9, 13, 15 and 17 draw special attention to the dangers of the all too common practice of *"shooting off the solid,"* the *excessive use of powder* in blasting and the *use of dynamite* for breaking down the coal. A closer *examination* of the workings and *inspection* and *firing of shots* by duly authorized *shotfirers* is recommended, also the exclusive use of *permissible explosives.* These recommendations are certainly worthy of the most careful consideration.

THE MORNING EXAMINATION OF A MINE

Letters Nos. 5, 9, 12, 13, 14, 20 and 26 refer to the important matter of regulating by law the time within which the morning examination of a mine should be made by the firebosses. Attention is drawn to the fact that in most cases the fireboss is given *too large a territory* to examine and is therefore unable to cover the ground within a proper time before that for the men to go to work. It is stated in Letter No. 5 that no fireboss can truthfully say that a place is "free from gas" 6 or 8 hr. after making his examination. It is urged in Letter No. 9 that this examination should be made not more than 3 hr. previous to the time set for the workmen to enter the mine.

Letter No. 12 argues for a *higher standard of inspection* of all working places and the most *improved methods of timbering* the roof and coal. It may be added that the work performed in the morning examination before the men are permitted to enter the mine should include the *inspection of the roof, timber and brattices* and other requirements of safety in all working places. Letters Nos. 5 and 20 urge the *limitation* by law of the amount of work required of the fireboss and the employment of *a sufficient number* of men to make this examination thoroughly within the time limit.

THE SELECTION OF STATE MINE INSPECTORS

The manner of selection of state mine inspectors, *by appointment* by the governor or *by election* by popular vote, is treated in Letters Nos. 9, 14, 17, 26, 27, 28 and 29. Almost without exception the writers of these letters argue for a competitive examination to determine the eligibility of candidates for this office. It is worthy of note that not a single writer advocates the elective system of choosing mine inspectors, but the arguments are strongly opposed to this method.

A strong argument is advanced in Letter No. 29 in reference to the *length of tenure of office* of the state mine inspector, and Letter No. 9 argues that the *removal from office* of an inspector should only be effected "for cause." This feature of mine inspection work has often been advocated in Coal Age.

The Discretion of Mine Inspectors

It is remarked in Letters Nos. 10, 14, 32, 37 and 38 that in many mining laws too much is left to the *discretion and judgment* of the mine inspector. While this is undoubtedly a necessity in respect to certain mining conditions that cannot be forecasted in the law, it is too often carried to an extent that makes the mine inspector the lawmaker. This feature possesses the disadvantage that the inspector is liable to an error of judgment and occasional favoritism and unjust discrimination. But, in addition to this, the law thus imposes an unnecessary burden on the inspector in requiring that he shall both make and execute the law.

Effect of Political Influence

The undue effect of political influence as affecting the *selection and appointment* of men to the position of state mine inspector and the *certification* of mine officials is forcibly treated in Letters Nos. 5, 10, 11, 14, 18, 26, 27, 28 and 29. The two letters last named argue strongly for *civil-service control* in these matters. Instances are cited illustrating the baneful effect of such political influence in securing the appointment of men to positions that they are unfitted, by knowledge or experience, to fill. Letter No. 29 refers to the influence of the United Mine Workers' organization in this respect as particularly harmful under the elective system, owing to the strength of the miners' vote in the inspector's district.

The Enforcement of Present Mining Laws

Much stress is laid on the enforcement of present existing mining laws as being of as great importance as the enactment of new laws, in Letters Nos. 5, 9, 11, 12, 13, 14, 17, 19, 20 and 22. The truth of this argument cannot be denied. The *rigid enforcement* of any law standing on the statute books is absolutely essential to safety in mining. The law should either be enforced or wiped from the record. *A dead law is a menace to safety,* as it invites a similar disregard of other laws.

In this connection it is rightly claimed in Letters Nos. 22 and 38 that the mine inspector frequently has charge of *too large a territory* for the thorough performance of his duties. In order to secure the enforcement of his orders in a mine and to enable him to place the responsibility for any violation on the right shoulders, it is argued in Letters Nos. 25 and 35 that the mine inspector should give *written orders* to the mine foreman and a duplicate to be handed to the mine superintendent, the mine foreman being required to read and sign said order at once, thereby indicating that he understands the same.

Interstate Mines

Attention is drawn in Letters Nos. 16 and 24 to an important condition that is quite generally overlooked in mining laws. This relates to the rightful jurisdiction of the mine inspector in those portions of a mine in his charge that extend beyond the border line of his state. The pertinent question has been raised, How can the mine inspector be responsible for the safe operation of such a mine when his jurisdiction is limited by the state line on the surface and underground? This is an important matter that should be treated in all state coal-mining laws, and we hope for its further discussion in Coal Age.

Coöperation and the "Play-Safe" Spirit

Commendable attention is drawn to the need of coöperation on the part of mine officials in assisting the mine inspector to carry out the mining laws as they pertain to the *safety of mine operations.* This feature is mentioned in Letters Nos. 3 and 10, while Letters Nos. 19, 20 and 37 draw forcible attention to the fact that the mines in which the greatest degree of safety is secured are those in which the management manifests a *desire to "play safe."*

Many large companies have shown a praiseworthy desire and purpose, not only to carry out all the requirements of the law, but to go further and enforce such other regulations as are found to be necessary for a safer operation of the mine and the health of the men employed therein. It goes without saying that a still greater manifestation of this spirit on the part of not only mine officials, but all mine workers, would greatly reduce the number of mine fatalities and accidents and increase the health of mine workers.

The Workmen's Compensation Act

Reference is made to the generally successful operation of coal mines in different states under the Workmen's Compensation Act, which provides for a suitable compensation for loss of time and injuries sustained by mine workers while in the performance of their duties in the mine. Such references appear in Letters Nos. 3, 10, 11, 18, 25 and 38 and argue strongly for the adoption of such a law in all coal-mining states as being an effective means of increasing the degree of safety in mining operations and lowering the cost of coal production by reducing the number of fatal accidents with all their attending expenses.

The Education and Technical Training of Mining Men

Letters Nos. 6, 11 and 27 urge the growing need of more technical knowledge combined with experience on the part of *all* mine workers and the recognition of this need in all state mining laws, to the end that suitable provision may be made for the necessary training and instruction of mine workers. While many laws require the examination and certification of certain mine officials, little attention is given to provide the means for such education and training among all classes of employees.

Certification of Mine Officials

Numerous features of the certificate law in many coal-mining states are discussed in Letters Nos. 14, 17, 22, 24, 31, 34, 36, 38, 39 and 41. Letters Nos. 14 and 22 refer to a proper *classification and grading* of these certificates that would insure greater safety. Letters Nos. 17 and 34 urge the need of more *rigid examinations* as a requisite to obtain a certificate of competency. Letter No. 24 draws attention to the different *standards of efficiency* and requirements for certification in the different states, and with Letter No. 38 argues for the *interchange of state certificates.*

Letters Nos. 31 and 36 refer to and illustrate the *inconsistency* of the Pennsylvania anthracite law, requiring that the applicant for a certificate of competency to act as mine foreman shall have had five years' practical experience as a miner. Letter No. 34 advises that all mine officials should be examined at least every five years up to the age of 50 years. Letters No. 38 and 41 urge the need of requiring the *certification of mine superintendents,* as being the mine foreman's superior in office and ordering his work; while Letter No. 39 draws attention to the fact that an *uncertified assistant* mine foreman is frequently compelled to perform the duties of the mine foreman and held responsible by law for any violation of its requirements, while the law does not require his certification. These are all important matters and worthy of careful attention in mine legislation.

Requirements of Examination for Certificates of Competency

The kind of examination that should be given to determine a candidate's fitness to hold the office and perform the duties of mine foreman, assistant mine foreman or fireboss is treated in Letters Nos. 14, 17, 24 and 29. These letters urge that the *questions propounded* in examinations should be suited to the class of work to be performed and the duties involved. Letters Nos. 17 and 29 urge that both *practical and theoretical* questions should be given to determine the candidate's knowledge of mining, while Letter No. 24 urges a *uniformity* in state examinations for these positions that would make possible a suitable *interchange* of certificates between states.

Rights of Examining Boards

In this connection, Letters Nos. 2, 4, 10, 11 and 21 discuss the *right of examining boards* to withhold the corrected papers and not return the same to the candidate to whom they belong. On the one hand, it is claimed that the return of these papers to the candidate, after they have been properly corrected by the examining board, would enable the candidate to understand better the points in which he failed. On the other hand, it is argued that examining boards are not necessarily instructors and that the return of the papers so marked might do the candidate more harm than good. It was suggested that the return of candidates' papers to them might necessitate much correspondence and explanation, which is avoided by the filing of the papers in the State Department, where they can be seen by the candidates interested.

Capability of Members of Examining Boards

The frequent incapability of the members of examining boards is discussed in Letters Nos. 2, 4, 10, 11, 28 and 29. Attention is drawn to the fact that probably a majority of the mine superintendents appointed on examining boards are *incapable* of passing intelligently on the technical questions asked in examinations; and, further, that the miners appointed on these boards are likewise *incapable,* with few exceptions, of knowing whether or not such questions are correctly answered in candidates' papers. The suggestion is made, Letter No. 2, that such *board members should themselves hold a certificate of competency* obtained in a previous examination. We heartily indorse this suggestion and advise that such a provision be made in all mining laws relating to the examination of mine officials.

Mining Capabilities of Lawmakers

Attention is drawn in Letters Nos. 3, 8, 11, 14, 19 and 24 to the fact altogether too well known that it cannot be expected that lawmakers shall be intelligently acquainted with mining operations and requirements. For this reason, it was suggested in Letter No. 3 that it is desirable that mining representatives shall be present on needed occasions to give to legislators the desired information that would enable them to act more intelligently on the passage of mining laws. Objection is taken to this suggestion by the writer of No. 11, who states that such *lobbying* does not tend to generate the best of feeling among the working classes, who are prone to regard such activities as animated by a selfish purpose on the part of controlling interests.

With this summary of views, the discussion of needed mining laws and legislation will close. As stated some time since (Coal Age, Vol. 6, p. 958), it is expected to print a résumé of the opinions expressed in this discussion and to place the same in the hands of lawmakers in all coal-producing states. Copies will also be sent to the different state mining departments, mine inspectors and leading mine officials. Copies can also be secured by request in writing when these are ready for issue; but such requests should be made at an early date.

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The Price of Anthracite

The brief filed on behalf of the respondents in the Interstate Commerce Commission's investigation of rates, practices, rules and regulations governing the transportation of anthracite coal contains the following statement of the amounts respectively retained by the retailer, the transporter and the producer out of the consumer's payment for a long ton of tidewater coal:

DIVISION OF THE COST OF A TON OF ANTHRACITE

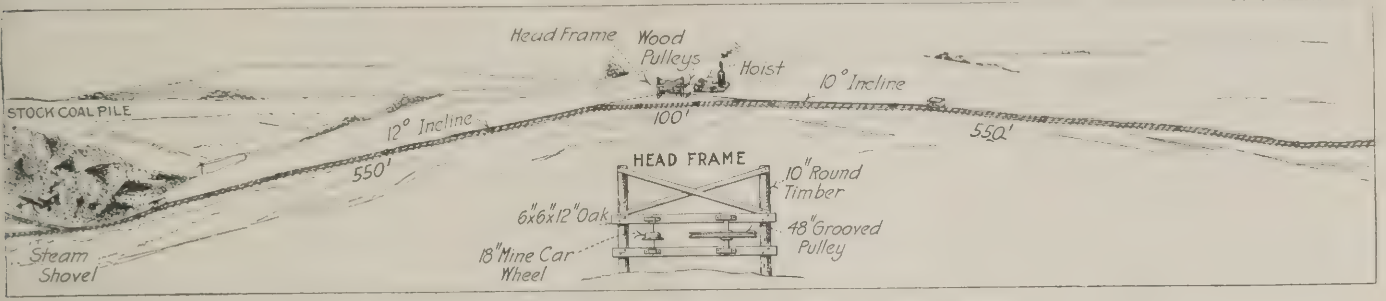
Size of Coal	Consumer Pays	Retailer	Transporter	Producer
Grate	$7.28	$2.68	$1.60	$3.00
Egg	7.28	2.43	1.60	3.25
Stove	7.28	2.43	1.60	3.25
Chestnut	7.56	2.46	1.60	3.50
Pea	5.88	2.33	1.45	2.10
Buckwheat No. 1	4.37	1.57	1.30	1.50
Buckwheat No. 2	3.53	1.23	1.15	1.15
Buckwheat No. 3	3.19	1.39	1.15	0.65

The amounts retained by the retailer, the transporter and the producer represent gross returns and not net profit. Out of them the retailer must pay for the cost of marketing coal and delivering it to his customers, the transporter must pay in large part for the maintenance and operation of his railroad and equipment and for hauling the empty cars back to the mines, and the producer must pay for mining his coal, preparing it for market and also find the wherewithal to meet his taxes and royalties.

Getting Coal from Stock-Pile to Breaker

By D. R. Llewellyn*

The accompanying sketch shows the general plan used to reclaim a stock-pile which was dumped on the opposite side of a hill from where the shaft and breaker were located. The colliery in question belonged to the Enterprise Coal Co., and the chief problem was to get the coal to the breaker for preparation. An engine was installed on the top of the hill in such a way that the coal could be hoisted up one side and let down the other, with one engine and one gang of men; otherwise it would have taken an engine to hoist it up and a double-track plane to let it down. The system here shown requires only a single track on both sides of the hill and a steam shovel to load the coal. A switch and double track are located close to the steam shovel. The size of the engine is 8x12 in., double geared 3 to 1, 34-in. drum; size of the mine car, 119 cu.ft.



A Practical Plan for Recovering a Stock Coal Pile

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A Simple Plan for Cooling a Pump Bearing

By Timothy A. Ryan†

An interesting experiment was tried at the mine where I am foreman. Some time ago we had a centrifugal pump installed, driven by a 75-hp. motor, at a speed of 1200 r.p.m. Owing to the high speed, the pump is equipped with a water-cooled thrust bearing.

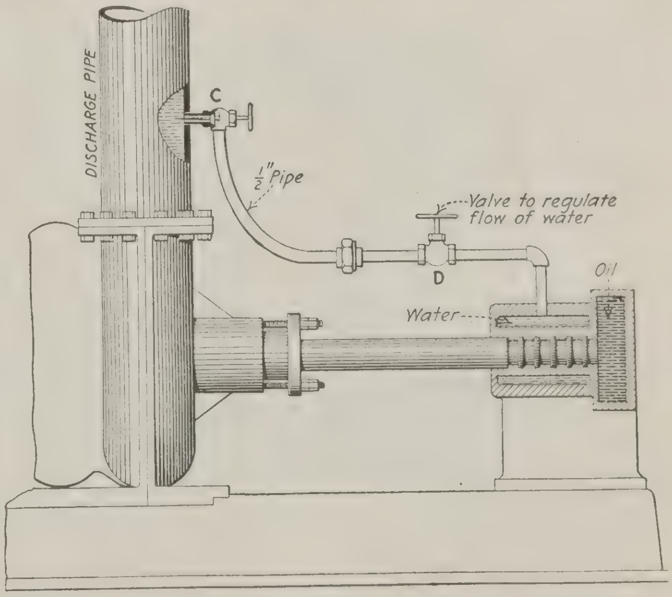
The first question that arose was the supply of water for the bearing. As there was no fresh water around the plant except what was purchased from the city water company—and which would be too expensive to use on the bearing—we decided to use the mine water. We tapped the column for a ½-in. pipe and connected it to the bearing, as shown by the sketch. We did not, however, have the angle valve shown at *C*; we had a ½-in. ell in its place.

We first had a screen put on the suction pipe, with a ¼-in. mesh, but we found it blocked very easily; so we replaced it with a ½-in. mesh, which eliminated that trouble.

We next had trouble with the feed pipe leading to the bearing. Every little particle of wood or foreign matter that found its way into the pump would lodge in the ½-in. nipple that was tapped into the column, thus stopping the flow of water to the bearing. If no one were present to stop the pump, inside of 20 min. the bearing would be destroyed and the pump disabled. One pump, therefore, required one man's attention, and even at that we had the pump only four months before the bearing commenced to run hot and disabled the pump for three days.

We then tried the arrangement shown at *C*. It is very simple, but works like a charm. It consists of an old ½-in. angle valve, with a piece of heavy brass wire attached to where the disk was, and the wire extends down through the nipple and about an inch into the column. When the water shows any sign of slowing up, open and shut this angle valve a few times, thus moving the wire up and down in the nipple. This keeps the nipple clear.

We have had this arrangement on for about eight months, and it has never failed or given any trouble. It does not require the service of a man watching the flow of water and the pump runs for weeks without any attention except cleaning and oiling once a week. The drawing here shown is intended to give an idea of the arrangement of the cooling-water pipe and not the details of the pump or bearing.



Arrangement of the Cooling-Water Pipe and Discharge Column

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Since the weight per unit length of any electrical wire varies directly as the cross-sectional area, it follows that the resistance of a wire weighing, for example, 500 lb. per mile will equal one-fifth of the resistance of a wire weighing 100 lb. per mile. This is assuming uniform quality and treatment in manufacture.

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*Outside foreman, Excelsior, Penn.

†Hazleton, Penn.

New Apparatus and Equipment

Believing that one of the greatest services that a journal such as Coal Age *can render its readers is to acquaint them with new and improved equipment which may be employed directly or indirectly to the benefit of the coal-producing industry, this department is inaugurated. For the present it will appear in the second and fourth issues of each month. We shall therefore be glad to receive from builders, manufacturers or dealers brief descriptions of new or improved pieces of apparatus in which they are interested, the use of which will tend toward better results in or the economic development of the fuel industry or any of its numerous ramifications.*

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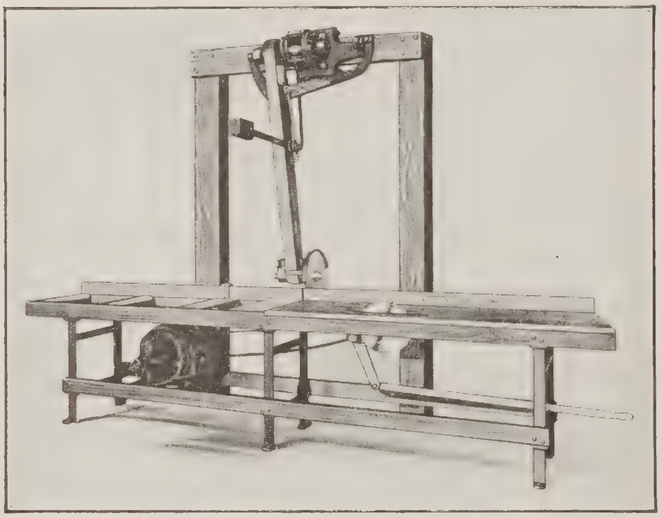
Reliance Motor-Driven Saws

The Reliance swing-saw for crosscut work is a self-contained unit, which may readily be installed by fastening with four bolts to any convenient wall or post. It is motor-driven, thus doing away with the loss of power incident to line shafting and belting. An automatic starting-box permits of quick starting and stopping by means of a knife switch placed convenient to the operator. Current is thus consumed only while the saw is in operation. Outfits of this variety are made in several sizes for both direct and alternating current and will cut lumber up to 12 in. thick.



The Crosscut and Rip-Saws Attached to the Same Frame

A recent addition to the Reliance line of electrically driven saws consists of the above-described swing-saw in combination with a rip-saw. A double-throw switch controls the operation of these saws and assures that only one may be in use at a time.

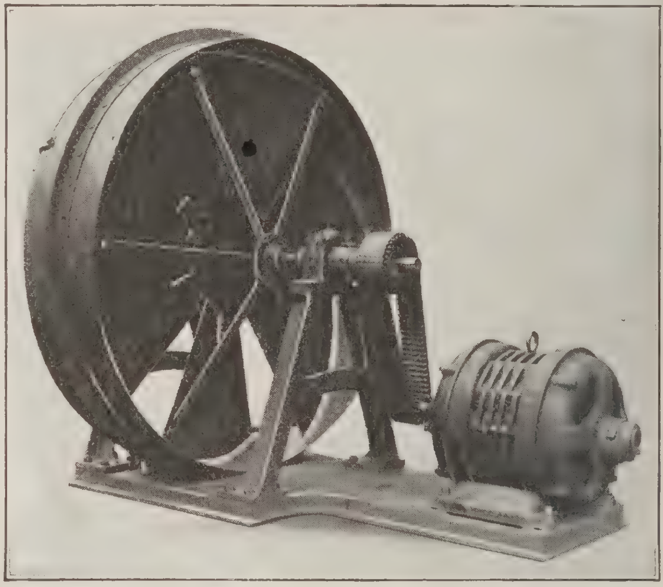
Another attractive feature of this combination is the fact that the two units may be employed independently of each other at different parts of the plant.

Both of these outfits are especially suitable at mines for cutting up and shaping lumber in the manufacture of cars and the linings of mine shafts. They are manufactured and sold by the Reno-Kaetker Electric Co., of Cincinnati, Ohio.

⁂

A New Two-Speed Fan Unit

In order to secure the benefits and savings inherent to two fan speeds in mine-ventilation work, the J. C. Stine Co., of Tyrone, Penn., has recently placed upon the market the unit shown in the accompanying illustration. The fans are built in sizes ranging from 4 to 8 ft. in diameter, the bedplate being extended to receive the two-speed alternating-current motor. These motors, instead of being connected to the fan by gearing or belt, as has formerly been done, are connected by a Morse silent chain, and the fan is supported on Hyatt roller bearings.



The Fan and Motor on One Bedplate Ready for Installation

This combination forms an exceedingly compact and reliable unit, as well as one which is comparatively inexpensive from every standpoint. Experience has shown that the roller bearing not only requires less power to overcome friction, but that considerably less attention is required in the way of attendance and supervision generally.

The silent chain drive possesses many advantages over gears or belts. It is compact, silent, powerful, reliable and is not affected by moisture or mine gases. It is consequently highly efficient so far as power transmission is concerned, and—what is more important from the mining standpoint—thoroughly reliable.

The savings which may be effected through running the fan at high speed during the daytime or working hours and at half speed during the balance of the day are greater than is usually appreciated. In a mine which requires under working conditions 70,000 cu.ft. of air per min. at a

1-in. water-gage, operating the fan at half speed during the night effects a saving of about $480 annually, when power costs 1c. per kw.-hr., or enough to pay for this fan equipment in about two years' time. The motors may be wound for either 220, 440 or 550 volts, as may be desired.

Combining the fan and motor upon the single cast-iron bedplate renders only one light foundation necessary, and at the same time maintains both motor and fan shaft in correct alignment with, and at the proper distance from, each other. The minimum amount of work is therefore necessary, both in installing this unit and in maintenance and attendance after it is in proper working condition.

"Pottsville Telltale" for Electric Lamp-Charging Rack

When charging electric mine-lamp batteries in large numbers on a mine-haulage circuit subject to voltage variations and interruption, an active attendant is required to watch all details to see that the batteries receive proper attention during the time they are on charge. The Philadelphia & Reading Coal & Iron Co. has devised an electric servant ready to work every minute of the day or night, one that never gets tired, needs neither rest nor sleep, never complains of too much work, and whose services cost nothing. In fact this is exactly what is embodied in what is termed the "Pottsville Telltale" for miner's electric lamp charging racks.

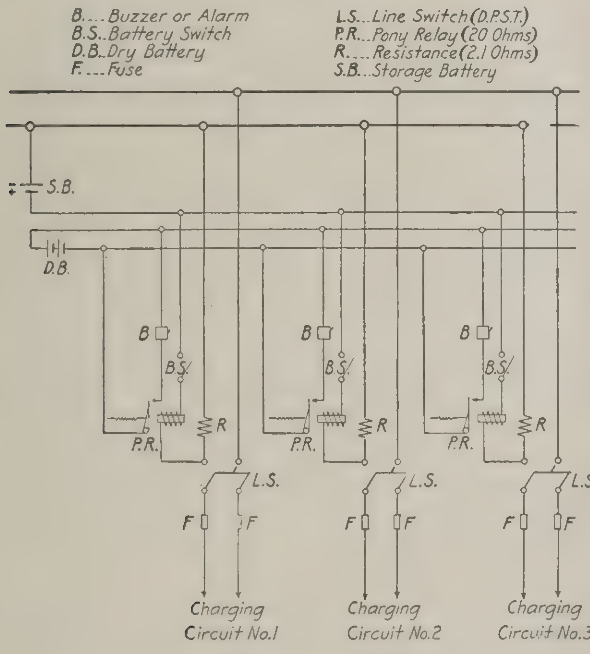


DIAGRAM OF TELLTALE CONNECTIONS

When the charging commences the attendant simply closes a switch and the little worker responds instantly, sticking to the job until finished. The accompanying illustration shows the connections for such a system, which can be applied to any number of charging racks. The equipment consists of a miner's lamp battery, two dry cells, relay, buzzer, resistance unit, switch and wiring. The function of this device is to sound an alarm when any of the following conditions exist:

First, when the charging current varies above or below the normal by a predetermined amount. Under this condition the operation is as follows: Assuming a charging current of 1 ampere is desired, a resistance unit of 2.1 ohms is inserted in the negative side of each charging circuit, thus giving a voltage drop of 2.1 volts across the resistance. A storage cell which gives a normal potential of 2.1 volts is connected across the resistance through the primary of a relay of about 20 ohms with its polarity opposing the voltage drop across the resistance, the small buzzer being connected in the battery circuit across the relay contacts. Should the charging current drop below 1 ampere the voltage drop across the resistance becomes less than the battery voltage, permitting the battery to discharge through the relay, which will act, closing the contacts, thus ringing the buzzer. Should the charging current increase above 1 ampere the voltage drop across the resistance becomes greater than the storage cell voltage, hence it will take a charging current through the relay, closing the relay contacts, thus ringing the buzzer. By the relay spring adjustment any desired variation of the charging current to a minimum of 10 per cent. can be maintained, the buzzer continuing to operate until the charging current is brought to normal.

Second, should the charging circuit become open by reason of a fuse blowing or poor contacts, no current will flow through the resistance, thus destroying its counter e.m.f., and the full voltage of the storage cell will actuate the relay, thus ringing the buzzer.

Third, should the supply of power fail, the batteries on charge will discharge back into the line. This reversal of current through the resistance will produce a voltage drop that will be added to the battery voltage, which will actuate the relay regardless of the value of the reverse current. It will be noted that the storage cell will automatically keep charged without attention.

The usefulness of this "Telltale" system may be summarized as follows:

It enables the station attendant to maintain the proper charging current without constantly watching the ammeter.

It saves the battery from an excessive discharge in case of a reverse current.

It prevents the battery from becoming injured by an excessive charging rate.

When putting the batteries on or removing them from a rack it immediately notifies the attendant of any poor contacts.

In testing the voltage of each battery on charge it is essential that the proper charging current be maintained when readings are taken; therefore considerable time and work are saved as it is unnecessary to read the ammeter each time.

This device has been in use for the past six months on the "Pottsville charging rack" described in Volume 7, page 427, of COAL AGE, and is giving the results above enumerated.

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George Otis Smith says that to increase industrial prosperity in the United States we need to export finished rather than crude products and to import raw materials rather than manufactures. Betterment of industrial conditions can come best through expansion of manufacturing. The increase of the element of labor in the product exported will mean that we are not bartering away our heritage of natural resources, but rather that we are using these resources as a basis simply for the expenditure of labor, which renews itself.

Extracts from a Superintendent's Diary

Of late I have fallen into a habit of amusing myself by trying to divide all of my subordinates into two classes: Those who would be able to credit all of their impulses to subordinates, or fellows lower in rank, and those who are spurred into action by keeping their eyes constantly upon their superiors.

The idea was suggested to my mind by a sermon in which men were conjured to shun evil companions, and by companions, the minister explained, he meant that one's thoughts should be given first consideration. That text is as old as the hills, but never before had the importance of one's thoughts been brought out so convincingly and it set me to thinking.

It is evident that some people are easily led, but the thing that I had never realized before was that the people who are easily led measure themselves in terms of their inferiors—no wonder the inferiors often take the whip hand. The minister brought that point out clearly and it impressed me.

I began to dig into the motives of the men who call me boss and I found that a man's point of view is the key to most of his actions. Some men spend most of their time comparing their lot with the circumstances of those below them in rank, and they are naturally very much pleased with themselves and have no time to turn about occasionally in search of inspiration from the men above them in position. Others forget the old job as soon as they rise above it and begin to cast longing eyes on the men still higher up; they can never be boastful or fall victims to flattery because they think in terms of the men above them and realize their own insignificance.

At first I tried to discover a third division somewhere between the other two, but I have decided that it does not exist. Numbers of men seem to be satisfied to remain where they are, but they justify their acts entirely by their past record, and as they are continually in need of justification in order to keep their conscience under control, they keep close tab on the men who have succeeded them lower down the ladder.

I find this study of the motives underlying men's actions of the very greatest assistance in choosing men for promotion, and with a little more experience I feel that I shall always be able to pick men who will make good, and in time I shall have a nearly perfect organization.

There is one thing sure and that is with an organization where every man has his eyes on the job of the man just above him, every man, the superintendent included, will have to keep extremely busy to even hold his own, and it wouldn't be possible under such conditions to conceive of a man who considered himself so important to the organization that the organization could not get along without him. That would eliminate a whole lot of unpleasantness because it is pretty hard to handle a valuable man after he becomes possessed of the idea that he is indispensable.

I find myself applying the test not only to my own employees, but to my former associates who are now occupying various high and low positions. And in recalling their ruling passions my memory plays me strange tricks and wanders off into reveries and often before I get control of myself again, I have submitted my past to my own test, and then I realize why at times I stood still.

How a Coal Miner Can Save

Several years ago there came to the manager of one of the coal mines in the New River field of West Virginia a darky from South Carolina, by the name of Ike Mitchell, who asked to be put to work in the mine. He was given work, and for the first time entered a coal mine. From the start, his industry was noticed, as were also the facts that his home surroundings soon had a clean and healthy appearance, that his wife and children were well clothed, and that his family lived well, as judged by his purchases at the company store.

After working several months, Ike came to the manager one day and asked if he would keep for him some money he had saved from his earnings, and the manager was surprised when he was handed $300. From this time on, this industrious colored man left his savings with the manager, and at the end of two years, after paying all his living expenses, he had accumulated upward of $2000 in cash. This he drew, and returned with his family to the cotton fields of his native state. There he bought a piece of land, and the latest report from him was to the effect that he was raising cotton, as well as serving a milk route in a neighboring town, and was still making money from the capital he had accumulated from working in the mine.

Ike Mitchell might have picked cotton in his native state for a life-time before his savings would have amounted to as much as they did in the West Virginia mine in two years, and there is a similar opportunity in many coal fields for the laborer who wants to work hard and save his surplus earnings.

⁂

Guyan Valley Coal Operators Association

The operators of the Guyan Valley in West Virginia, forming what is known as the Guyan Valley Coal Operators Association, met in Huntington, March 24, for their fourth annual meeting.

The objects of the society are to standardize the sizes of coal, to promote more friendly relations between the employer and the employees, to do more effective betterment work in behalf of the latter, to extend trade to foreign nations, particularly South America, and to disseminate accurate knowledge concerning the industry. C. W. Jones, of Logan, is president; A. R. Beisel, of Holden, is vice-president and A. H. Land, of Barboursville, W. Va., is secretary.

⁂

"Mine, Quarry and Derrick"

Our Canadian friends have been publishing under this title since Feb. 3 of this year an excellent fortnightly magazine of about 36 pages, which appears to be well deserving of the support of the reading public.

It is edited by J. C. Murray, whose fitness for the work is unquestioned. W. C. McGinnis is associate editor, and R. W. Coulthard is a contributing editor. L. S. Kempher is manager. The offices of the paper are at Calgary, Alta. Attention is given all kinds of mining, and the field covered by its title seems to be well filled by this publication. The subscription price is $3 per year.

Editorials

The Layland Rescue Work

The rescue work at Layland after the recent regrettable explosion does not prove the uselessness of oxygen apparatus, but rather the fact that if men so equipped will not take an energetic initiative they will retard rather than aid the recovery of a mine. The Layland operation did not have many live workings, so it is a fit matter for surprise that it was still not wholly explored after four days.

Forty-seven men were after that length of time still huddled in the roadways leading to their working places. They were not hidden in their rooms, nor in old workings, nor buried in the gob, nor under falls of roof, nor in sags full of water, but located and easily findable in just those places where men should first seek them—just where a preliminary reconnoissance might be expected to be made. But they were not discovered; in fact, five men had to come out and reveal their presence, which they did at the drift mouth. Only then were the other 42 men really sought.

Had the work been pressed at Layland as it was at Royalton by the state rescue-men of Illinois, an earlier release for the entombed would have been assured. Happily, the unfortunates had a leader, or leaders, of good judgment and marvelous patience; otherwise the long delay would have been fatal to the two small bands of entombed men. As it happened, they suffered only from hunger and thirst, but that their experience was no worse was not due to the work of those directing the rescue.

Who these directors were seems to be open to much doubt. Probably no one was invited to take the lead, yet by tacit consent leadership was accredited to those generally known as the "experts of the Bureau of Mines." It is not well for a coal company already self-condemned by a disaster at its mines—for what company, however correct its management, wholly escapes condemnation—to oppose the representatives of the nation, which have the ear of the public press.

If the state department and the corporation have no oxygen apparatus, they must await the reëstablishment of ventilation before investigating any part of the mine. They cannot well bid the oxygen-apparatus men examine this or that place, when they themselves are not competent to do so. Certainly they do not like to instruct the "experts."

So without being arbitrary at all, and without any great obsequiousness on the part of the state department and corporation, the oxygen-apparatus men of the Bureau of Mines are permitted to take the lead. If they fail to do so, effectual apparatus work cannot be done.

We purposely overlook the men from Gary, W. Va. No one could expect an outsider like Vitus Klier to force his little band in ahead of the federal rescuers. So it is clear we cannot avoid the view that to the Bureau of Mines should have been accorded the glory, and to that organization must be accorded—whatever is rightfully due. Let us not express it too baldly.

It is stated that the oxygen-apparatus men examined for fire. They were there, we are told, not so much for salvatory as for precautionary measures, to prevent a second Hanna, Wyo., or Rush Run, W. Va., disaster. Yet air was allowed to play on parts of the mine not explored. The air was so good that men came through it alive, some even entering, working and returning in it, and not being even discommoded.

Had there been a fire, there would doubtless have been a Hanna which would have killed the 47 men and maybe others around the drift mouth. So the oxygen-apparatus men did not fill their part as guards, much less as rescuers.

Brave men there were at Layland. Sore-hearted men they are now, to think that with all their fearlessness they failed to cut the strand of red tape and relied on others when the right of initiative was theirs.

We have always claimed the life of the canary hung on a thread and that the endurance of that bird was not the proper measure for that of a red-blooded man when life was in the balance. Still less is it his measure when he has an oxygen apparatus, and half a hundred men are still unfound and several working places still unexplored.

We do not blame Secretary Lane for his words of congratulation to the bureau under his charge. He is one of the best men in the President's cabinet, and he did but voice the natural judgment of an ill-informed public. But there should be no medals for anyone; for though many were fearless, there seemed to be a lack of moral and mental bravery. The courage of leadership is different from the quality which risks life for humanity, and that courage was lacking.

But if there is to be a medal awarded by the American Mine Safety Association, as Mr. Lane has suggested, it would seem to belong rightly to that veteran who took charge of the 42 men and bade them wall themselves in and prohibited smoking, who put heart into his followers when they despaired. He is a credit to America and to the mining industry. He had courage, brains and heart. By all means, if room can be found to express on a medal all the honor due him let him have it and an engrossed diploma to boot. The whole coal industry salutes him.

◆

Amortization, a National Issue

Amortization is the continual replacement of dead by living capital, an action corresponding physiologically to the renewing of dead animal tissues. Without such tissue renewal the physical death of the individual would result, just as without replacement there must come an end of all capital.

We more often consider amortization as the repair of the decadence of a single business than think of it as a corrective of the property decay of a whole industry. Still more rarely do we regard it in terms of a nation as the redemption of a yearly national loss, or in world terms as the replenishment of an annual world-fund decrement. So it is to us a small thing if the result of the business of Tom and Dick and Harry is an unrepaired loss of capital. We do not see that the death of their property is a partial death of the national or world property from which we must all derive our sustenance.

The nation which loses and does not amortize its losses is not pursuing conservation. It is spending its all on its immediate needs and is drifting to a condition of pauperism. We wonder sometimes if the world realizes that periods of depression like the present are times in which there is a permanent loss to the world's fund. They are times during which there is a real lack of conservation. When the buildings of the nation stand idle and the labor of its people is unemployed, then there is no conservation, but rather capital decay. The construction wealth of past years, the slow accumulations of the centuries are wasted in the immediate expenditures of a generation or part of a generation.

Let it never be forgotten that amortization is not solely an interest of the individual capitalist, but of the nation, or rather of the world. A century without it would restore us to the condition of the Middle Ages, when war and pestilence and lack of machinery took toll on the people just as restrictive legislation takes today.

History records several actual declines in wealth, times when as it were the nations of the world lived on their past and became emaciated from the lack of reproductive energy. No one seems to know what happened, but wealth declined. We may face such a blight if the clothes, pleasures and idleness of the toilers be the sole outcome of activities of capital.

Clean-Up Day

The annual clean-up day has or should have arrived at all mining camps. The winter has snowed under all the pollutions of months, and winds have scattered the rubbish far and wide. Now the sun is removing the snow and revealing all the distressing unpleasantnesses which have been accumulating.

It behooves all mine managers to get busy and, when nature decks itself in new garments, prevent the unseemliness of beerkegs, waste-paper, ash-heaps and tin cans from spoiling the natural beauties of the town-sites. The cities have their clean-up days, and the villages should have theirs. Above all, the things which cause disease should be removed.

In West Virginia we learn that most of the mining villages will get a general refurbishment. It is to be hoped that in other states an equal energy will be shown.

The period now shortly to follow is one in which disease is often rampant. The ground swept off by rains and melting snows pollutes the streams, and the greatest care should be taken to protect the water-supply. The wash-water from the houses should be sewered to some nearby stream that is not used by men or animals as a source of water-supply, or better yet to a cesspool. Springs liable to contamination should be sealed up.

In some states the turning of sewage untreated into streams is forbidden. Whenever it can be mixed with strong sulphur water from the mines it would probably be rendered entirely harmless. In some states turning untreated mine water into the streams is also unlawful, but the law is probably a dead letter, as the handling of such a volume of water in the existing state of the science of treatment is almost an impossible proposition.

Pollution of water, with consequent milk contamination, seems the most important source of typhoid. The "typhoid" fly has received much of the blame, but the figures suggest, even if they do not prove, an alibi. We have compiled the case rate for typhoid in Pennsylvania, somewhat arbitrarily terming May, June, July, August, September and October the fly-beridden months and taking the others as being free from that pest, and we have arrived at the following result:

PERCENTAGE OF TYPHOID CASES IN PENNSYLVANIA

Year	In Months When Flies Are Common	In Months Which Are Too Cold for Flies
1906	45.8	54.2
1907	44.8	55.2
1908	52.5	47.5
1909	60.6	39.4
1910	62.2	37.8

The uncertainty of results seems to show that a nonseasonal cause is back of the plague of typhoid, and for that reason care should be taken to keep the water-supply under surveillance.

Why the World Needs Pockets

The cry of the worker of late has been that capital gets an undue share of the gross receipts of industry, the attempt to prove it usually being made successful by sedulously overlooking the cost of material in evaluating the manufacturers' profits. But in recent years it has been extremely doubtful whether capital has been, in any large number of instances, in the receipt of even adequate reward.

It is surely true that the capital of the coal industry, especially of the bituminous branch of it, has been invested without a fitting return. In this case the material purchased, both unmined coal and supplies, may be ignored, and still the showing will attest that the income is meager. Making allowance for the value of the material used and destroyed, the return for coal production is more often loss than profit.

The workman believes that the need for profit would be removed should the state replace the capitalist. This is a grievous error. Profits might be made even larger in order that there might be an opportunity to expand industry with increasing population and in accord with the demands for more complex machinery and equipment arising out of our growing needs and desires.

The worker should never get the full usufruct of his labor under any administration of mundane affairs. If he digs a ton of coal, he cannot expect to get the equivalent of that ton in pay. Some part must go to swell the world capital, and that deduction might be greater under an enlightened socialism than ever it has been under a restrictive capitalism.

Let no one think that when the Millennium comes man will have hands and a mouth, but will get along without pockets. For the pocket is one of the most wonderful contrivances of civilized man. Mankind saves because it thinks, and because it both thinks and saves it is superior to all other animal-kind.

The question of the capitalist has been always, Where do I "come out" when there are no profits? It may be said truthfully that the world is caring less and less as to the answer. But another question is just as natural; namely, How can the public and the workingmen be provided with a progressive, comfortable living or even with the degree of prosperity which they now enjoy if there is no increase in the instruments of production other than an increase of laborers?

Book Reviews

THE ANTHRACITE COAL COMBINATION IN THE UNITED STATES, with Some Account of the Early Development of the Anthracite Industry. By Eliot Jones, associate professor of economics, State University of Iowa, sometime instructor in Harvard University. pp. xiii + 250 + 9 index; 5⅞x8⅞ in. 7 charts. Harvard University Press, Cambridge, Mass., 1914. Price $1.50, cloth boards.

This book, which is a perfect mine of information regarding the financial aspect of the anthracite industry, was awarded the David A. Wells prize for the year 1913-14 and is published from the income of the David A. Wells fund. It is a careful, concise, scholarly review of the formation of the anthracite combination. Sometimes we wish it were a little less dispassionate, perhaps, for the interest occasionally flags—and we find ourselves in a mass of information so long and detailed as to be burdensome. But reviewers are apt not to be sufficiently patient, and the man who wants the facts for his weapons of defense or of offense wants a complete armory and not a few instruments of war, no matter how quaint and interesting they may be.

Arkansas and Virginia Anthracites

We do not feel able to question the facts in this volume, except, perhaps, the short references to geology. But with these exceptions the book is probably in every way reliable. It says: "Other deposits of anthracite besides those in the State of Pennsylvania are found in the United States, but they are so small as to be of slight consequence." "There are deposits" of anthracite "in Alaska, Washington, Arkansas and possibly in a few other states, but as yet litle is known of their extent or their value." And again: "The anthracite beds in the southwestern portion of the State of Virginia are now being developed."

The American technician will tell you that there is no anthracite in Arkansas or southwestern Virginia, but the trade will possibly agree with the professor, owing to a difference in definition. If the trade view of what constitutes anthracite is correct, then the Arkansas anthracite is somewhat important. The Geological Survey, by Marcus R. Campbell, its chief, lists in "The Coal Resources of the World" neither anthracite nor semianthracite in southwestern Virginia. However, in an extremely lax use of the word, anthracite is found in Arkansas, southwestern Virginia and even in central Pennsylvania, and the deposits are important. It is wrong to say in one breath that they exist and that they are not of much significance.

Maps and Charts

The maps in this volume are somewhat deficient, and we cannot but wish that the various railroads had been named and the canals had been charted and designated on maps of adequate size or number. The one map furnished—the same as that in the report made by H. H. Stoek on "The Pennsylvania Anthracite Coal Field" for the Geological Survey—does not contain the names of any railroads or canals. Yet the reader can get this information from a good map if he will take the trouble, so that it is not really so important an omission as is that of a map showing the confines of the various districts—Wyoming, Lehigh and Schuylkill; for these divisions are not exactly geologic, but are rather geographic and topographic, and as the geologic areas are alone shown on the map furnished, the student needs to be informed as to the exact delimitations of the commercial areas mentioned.

The book is not quite up to date, the charts and figures unfortunately being only extended up to 1910. The illustration we produce, slightly changed, we have ventured to extend to 1913 on the basis of the report of Edward W. Parker, statistician of the Geological Survey. However, much of the information in the text is not so recent, as it dates back to 1907, when an investigation was made from which many figures in the book are derived.

The following quotations from the book will give a good idea of the character of the information to be found within its covers:

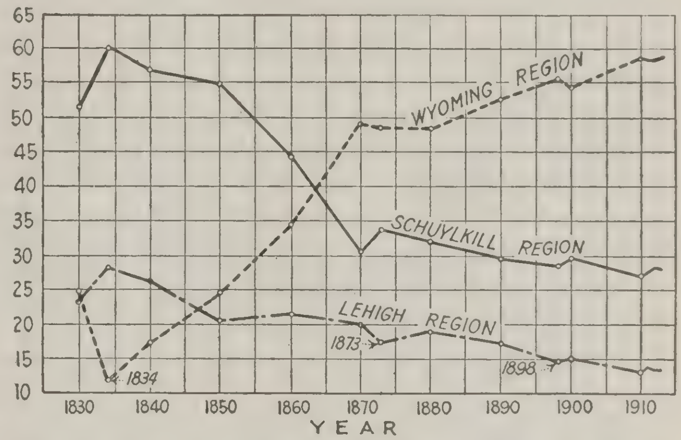
The Preponderance of the Railroad Coal Companies

"Most of the anthracite coal now produced is mined by the railroads, or by their subsidiary coal corporations, which will be referred to hereafter as the railroad coal companies. This classification head includes the coal departments of roads like the Delaware, Lackawanna & Western, which has always mined its coal directly.

"These companies in 1907 produced nearly 80 per cent. of the total output. By far the largest producing company, in spite of the fact that its coal lands are located mainly in the southern field, where the cost of mining is greater, is the Philadelphia & Reading Coal & Iron Co., which produced, in 1907, 12.3 million tons, or 16 per cent. of the total anthracite output of Pennsylvania. The second largest company was the Delaware, Lackawanna & Western R.R., which mined directly 12 per cent. of the total output. The Reading Coal & Iron Co. and the Delaware, Lackawanna & Western R.R. Co., therefore, together produced considerably more than all the independent operators in the whole anthracite basin.

The Railroad Companies Increase Their Percentage of Output

"The proportion of the total output mined by the railroad companies has steadily increased. In 1900 the combined production of these corporations was 62 per cent. of the total output, while the operators not controlled by the railroads produced 38 per cent. of the total. By 1901, through the purchase of the Pennsylvania Coal Co. by the Erie and that of a number of independent operators by the New York, Ontario & Western, the output of the railroad coal companies had increased to nearly 70 per cent. of the total.



Graph Showing Percentages of Anthracite Mined in the Three Pennsylvania Districts from 1830 to the Present Date

"The acquisition of individual properties continued in the years which followed. In 1905 the large firm of Coxe Brothers & Co. was purchased by the Lehigh Valley, and a number of smaller properties were absorbed by other railroad companies. By 1907 over three-fourths—78.04 per cent.—of the total output of anthracite coal was being mined by the railroad coal companies, while less than 22 per cent. was mined by the remaining operators. The largest individual operator at this time was the Kingston Coal Co., producing in 1907 slightly over 1.5 million tons, yet 425,855 tons of this were mined for the Delaware, Lackawanna & Western R.R., and practically all the balance was sold to various railroad coal companies. This was the only independent company with a production of over a million tons. There were eight other companies in 1907, producing over a half million tons, but all these, with one exception, sold practically all their coal at the mines to the railroad coal companies—hence they were not important competitive factors.

The Railroad Companies Control over 90 per Cent. of the Anthracite Production

"In 1907, as we have seen, the anthracite coal roads, either directly or through their affiliated coal companies, produced 59,960,287 tons, or 78.04 per cent. of the total production of anthracite coal. This does not indicate fully, however, the completeness of their control over the output of anthracite. The production of the individual (and independent) operators in 1907 was 16,875,795 tons. This includes the 425,855 tons mined by the Kingston Coal Co. but belonging to the Delaware, Lackawanna & Western R R. Deducting this amount, the independent output is reduced to 16,449,940 tons, or 21.41 per cent. of the total production.

"But, it will be remembered that a large number of the individual operators had entered into long-term, and in many cases perpetual, contracts with the railroad coal companies, whereby they agreed to deliver at the mines to the coal companies all the coal mined by them. The output thus bound by contract in 1907 according to the record in the Sherman Anti-Trust case was 7,427,634 tons. This figure includes two-thirds of the output of the Pine Hill Colliery, approximately one-third being free and really independent. This tonnage, for all practical purposes, was as thoroughly controlled by the railroad coal companies with whom the contracts had been made, as if it had been produced directly by them. It should therefore be added to their production in order to ascertain the extent of their control over the output.

RELATIVE AND ACTUAL PRODUCTION OF RAILROAD AND OTHER ANTHRACITE OPERATIONS

Operator	In Percentages 1900	1901	1902	1903	1904	1905	1906	1907	Millions of Tons, 1907
Philadelphia & Reading Coal & Iron Co.	16.17	15.88	15.02	14.96	15.46	16.35	15.87	16.01	12.304
Delaware, Lackawanna & Western R.R.	9.61	10.49	11.95	11.48	11.91	11.34	12.61	12.04	9.249
Delaware & Hudson Co. and Hudson Coal Co.	8.37	9.10	9.52	9.64	8.97	8.94	9.36	9.50	6.661
Lehigh Valley Coal Co.	6.13	6.61	6.84	8.62	8.55	9.54	10.28	10.51	6.676
Pennsylvania Coal Co.	....	6.33	8.22	7.27	6.74	7.02	7.21	7.59	4.246
Hillside Coal & Iron Co. (Erie R.R. Subsidiaries)	1.48								
Lehigh & Wilkes-Barre Coal Co.	6.01	6.11	5.52	5.94	5.86	5.95	5.93	5.79	4.451
Pennsylvania R.R.*	5.58	5.60	4.69	5.89	6.19	5.93	6.69	6.44	4.943
Lehigh Coal & Navigation Co.	3.87	2.97	2.77	3.02	3.20	3.52	3.85	4.14	3.178
Temple Iron Co.	2.59	2.57	2.35	2.47	2.49	2.40	2.58	2.67	2.053
New York, Ontario & Western Ry.†	2.23	3.58	4.00	3.42	3.66	3.46	3.24	3.35	2.576
Coxe Bros. & Co.	....	....	....	....	....	....	....	....	1.394
Total	62.04	69.24	70.88	72.71	73.03	74.45	77.62	78.04	59.960
All other operators	37.96	30.76	29.12	27.29	26.97	25.55	22.38	21.96	16.875
Grand total	100%	100%	100%	100%	100%	100%	100%	100%	76.836

*Susquehanna Coal Co. and other subsidiary coal companies controlled by the Pennsylvania R.R.

†Scranton Coal Co. and Elk Hill Coal & Iron Co., controlled by the New York, Ontario & Western Ry.

From Transcript of Record in Sherman Anti-Trust Case, iii, Exh. 169.

Some of the Independence Is only Relative

"After deducting from the independent output the tonnage sold to the railroad coal companies under the percentage contracts, the independent operators are in control of only 9,022,306 tons, or 11.74 per cent. of the total production. The railroad coal companies controlled, therefore, 88.26 per cent. of all the coal mined. One further deduction, however, still remains to be made. A number of the individual operators sold their total output, or a portion thereof, to the railroad coal companies under contracts based upon the 65 per cent. division, but extending only for a year or in some cases terminable at will by either party. The amount so sold to the railroad coal companies in 1907 was 2,335,918 tons. These purchases placed the railroad coal companies in control, in the year 1907, of 70,149,694 tons, or 91.3 per cent. of the total production. Therefore, though the individual (and independent) operators mined in 1907 nearly 22 per cent. of all the anthracite coal produced, yet so much of this was bound in various ways to the railroad coal companies that only 8.7 per cent. of the total production could be classed as really independent.

The Independent Operators Own Less than Nine per Cent. of the Anthracite Coal

"A consideration of the unmined area shows that the proportion of the total output mined by the independent operators will steadily decline. The individual (and independent) operators not controlled by a transportation company owned, in 1896, 9.07 per cent. of the unmined tonnage available for shipment to market. In making this estimate, all the coal not owned by the railroad coal companies has been classified as belonging to the independent operators. Some of this may have been undeveloped and separately owned. But the tonnage owned by the independent operators certainly did not exceed 9.07 per cent. of the total. Since 1896, as the result of the buying out of a large number of operators, the holdings of the railroad coal companies have been considerably increased. It is obvious, therefore, that the proportion of the unmined coal owned by the independent operators has declined.

"In spite of this decline, these operators as late as 1907 mined nearly 22 per cent. of the total output. Yet it is clearly impossible for them to maintain this proportion, inasmuch as they own less than 9 per cent. of the unmined tonnage. A steady decline in their relative output, therefore, is to be expected. Yet just how long their production will continue is difficult to predict with assurance.

DISTRIBUTION OF THE UNMINED TONNAGE ON JAN. 1, 1896, IN THOUSANDS OF TONS

Owner	Unmined Coal Owned	Per Cent.	Owned and Controlled byContract	Per Cent.	Duration in Years on Basis of Shipments in 1895
Philadelphia & Reading Coal & Iron Co.	2,087,490	41.14	2,143,706	42.25	216
Lehigh & Wilkes-Barre Coal Co.	863,760	17.02	877,569	17.30	163
Lehigh Coal & Navigation Co.					
Lehigh Valley Coal Co.	787,200	15.52	855,511	16.87	116
Delaware, Lackawanna & Western R.R.	300,853	5.93	332,332	6.55	54
Susquehanna and affiliated coal companies	248,142	4.89	316,502	6.24	63
Delaware & HudsonCo.	115,823	2.28	115,823	2.29	26
Pennsylvania Coal Co.	94,876	1.87	94,876	1.82	54
Coxe Bros. & Co.	67,361	1.33	69,901	1.38	35
Hillside Coal & Iron Co.	34,718	0.68	38,879	0.77	21
New York, Susquehanna & Western Coal Co.	13,551	0.27	26,890	0.54	18
Scranton Coal Co.	......	....	13,971	0.28	9
Remainder	460,008	9.07	187,822	3.71	
Grand total	5,073,786	100.00	5,073,786	100.00	

A summary from William Griffith's estimate.

"We may certainly look, however, in the comparatively near future for the elimination of the independent element, unless, indeed, new conditions shall arise through the enactment of additional, and effective, legislation, state or national."

PRESENT WORTH OF SERIAL PAYMENTS. By W. E. Fohl, Mining Engineer, Farmers' Bank Building, Pittsburgh, Penn. pp. 20; 4⅛x6½ in. Price $1.00 postpaid, linen paper cover.

In this pamphlet are given the present worth or equivalent of single payments of $1000 to be made after various periods of time, these periods being in a series of half-year intervals running from 6 months to 50 years. The rate of interest is compounded semi-annually and is figured as 3, 4, 5 and 6 per cent. Thus if we desire to pay $1000 4½ years hence, we find in these tables that we can lay aside $874.59 and, by the end of the 4½ years, it will have increased in value so that it will meet the payment of $1000.

The tables also show what fund must be provided to meet, with the help of 3, 4, 5 or 6 per cent. interest, a drain of $1000 at the end of every six months for times varying by half years from six months to 50 years. For example, if the interest rate is 3 per cent., it will take $8360.51 to provide for the payment of $1000 at end of every six months for 4½ years.

Such tables have considerable value for persons who are planning to start up a coal plant. A saving of $2000 a year which will last 10 years will justify an immediate expenditure of $14,877.49 figuring on six per cent. as the rate of interest. With the same increment it is profitable to pay only $306.56 for a piece of land which it would cost $1000 to buy after 20 years. There are endless other applications of these tables. If, however, the reader has bought some coal land and can't sell it for any price, he should keep away from such a book for it will spoil the serenity of his slumbers.

PROCEEDINGS OF THE COAL MINING INSTITUTE OF America, 1913. R. Dawson Hall, Editor, Tenth Ave. and 36th St., New York City. pp. 240; 6x8⅝ in. 7 ill. Price $2, cloth boards.

The proceedings are as usual belated and this year are not as long as has been customary, but the work of R. Baur & Son, the printers, is of exceptional merit. If we may be pardoned for so doing we will mention the principal papers according to our view of their value.

"Basic Coke," by J. K. Campbell is by far the best paper. The discussion on it is also quite valuable especially the remarks of Fred C. Keighley. H. H. Clark's remarks on "Portable Electric Mine Lamps" should be read by everyone. Harrington Emerson's talk on "Efficiency Thought as to Coal Mining" was good, but everyone present thought his discussion was even better. Thomas L. Lewis spoke on a threadbare subject—the way to advance the interests of the coal industry. Somehow when he sat down, his hearers discovered that he had found something entirely new to say. Where everyone else had merely deplored conditions, without finding a remedy, Mr. Lewis offered a not impossible solution.

These are the best parts of the book. As the discussion is given almost without excision much of the best material in the volume is not to be found in any other publication.

Discussion By Readers

Recognition of Bravery

Letter No. 9—The work of rescue in coal mining has many sides to be considered. I believe that most men have a natural ambition to be recognized and honored as a hero; but the opportunity for action does not present itself during the life of every man. Again, when the opportunity arises it is not every man that can master his own fears and, as previously stated, bring his courage up to the pitch that will enable him to chance the saving of the life of a fellow worker at his own risk.

The desire to achieve honor may, as has already been suggested, lead some men to make a desperate and foolhardy attempt to rescue another and to assume an unwarranted risk in such endeavor. Examples are frequent where a greater loss of life has been incurred, owing to the excessive zeal of would-be rescuers who rush into danger without thorough preparation and with little chance of doing effective work. By such hasty action they not only endanger their own lives, but greatly hamper the later work of rescue dictated by cooler judgment and a better knowledge of the conditions existing inside the mine.

Everything considered, it is readily recognized that the possibility of rescue is often difficult to determine. In some cases men that have been given up for lost have been rescued later by some timely occurrence; and this fact often leads rescuers to hope against hope. It must be remembered, also, that rescue is not always effected from the outside. Many brave deeds are performed by the cooler-headed and more self-possessed among those entombed in the mine. Many a brave man has thus given his life for others, whose self-sacrificing act performed in the dark recesses of the earth has never come to the knowledge of the world.

Mention has been made of the man who has established a record for bravery and has a reputation to sustain. This, in connection with the allurement that any substantial compensation for bravery would offer, may often induce unwise and hasty action in rescue work. Such is more apt to be the case than that, as was suggested, "the substantial recognition of brave acts might increase the efficiency of the work of rescue."

There can be little doubt that mine foremen, assistant mine foremen and firebosses, who are held responsible under the mining law for the safety of the men in their charge and the security of valuable property, perform acts almost every day that would class them as heroes, although such acts are incumbent on them in the faithful discharge of their duties in the mines.

It is seldom that any great good is achieved without some attending evils, and the proposed recognition of heroic acts and self-sacrifice will no doubt prove the truth of this. It might even happen that some worthless fellow, in the hope of securing a pension for life, would contrive a scheme in which he would pose as a hero and secure recognition, but such a possibility is extremely remote.

Permit me to say, in closing, that I believe it would be right and proper to establish a fund, which might be called the Mine Industrial or the Civil Hero Fund, to be supported by the state or by persons of wealth, in the name of humanity. While honorable mention, certificates and medals are well enough, they do not compensate for a crippled body or afford any consolation to loved ones bereaved by the accident.

H. R. K.

Curtisville, Penn.

Letter No. 10—Referring to the interesting and valuable discussion of the "Recognition of Bravery" that has recently appeared in Coal Age, I beg to call the attention of readers to the work that has been done along this line by the American Mine Safety Association.

This is a national association, the object of which is to promote the science of safety in mining by the adoption of logical methods of procedure in mine inspection and in rescue work; to recommend the adoption of approved types of first-aid and mine-safety rescue appliances; to obtain and circulate information on these subjects; and to secure the coöperation of its members in establishing proper safeguards to prevent the loss of life and property by explosions or fires or from other causes.

The American Mine Safety Association confers medals in recognition of acts of heroism, according to the following rules:

1. Medals of heroism will be issued to the most deserving persons who have participated in rescue work in mines, under conditions where their lives were endangered and when human life was saved.
2. Medals will be awarded, not for reckless courage, but for the heroic running of known risks, by the use of careful and scientific methods in conjunction with organized and trained rescue parties.
3. Medals will be awarded only to persons directly instrumental in saving life and under conditions where their own lives were endangered thereby.
4. Recommendations for the award of such medals must be accompanied by all the facts, duly certified by the mine superintendent or other person in charge of the mine-rescue operations and by witnesses personally cognizant of the facts, such data to be referred to the executive committee for recommendation to the president of this association.
5. If the candidate for such medal is deceased, the same will go to his wife or oldest male child, if any.

One of the association's medals was awarded to John C. Davidson, at Terre Haute, Ind., Sept. 12, 1914, for rescue service at Starkville, Colo., following the Starkville mine explosion of Oct. 8, 1910. Mr. Davidson is the first miner to receive this medal.

The form of certificate to be used in applying for the American Mine Safety Association medal of heroism is as follows:

CERTIFICATE OF HEROISM, AMERICAN MINE SAFETY ASSOCIATION

In furnishing the information necessary to the award of a medal of heroism, please fill out the following questions in full, giving names and addresses of as many eyewitnesses as possible:

1. Name and address?
2. Date or dates on which services were rendered?
3. Name of mine and its location?

4. A statement of the training previously received by you and under whose supervision and where?
5. Purposes for which the men engaged in rescue or recovery work?
6. Were any lives saved by the act of the above using breathing apparatus? Give names and addresses.
7. Were bodies of victims of disaster recovered by above using breathing apparatus?
8. Did the men wearing breathing apparatus endanger their own lives in the effort to rescue life?
9. A general statement of circumstances or conditions not enumerated above.
10. Names and addresses of witnesses.

I draw attention to the work of our association along this line in order that readers shall be acquainted with the same and that there may be no conflict in our several aims and purposes in so noble a cause.

AUGUST F. KNOEFEL,
President, American Mine Safety Association.
Terre Haute, Ind.

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Mining Laws, Legislation and Mine Regulations

Letter No. 42—I want to indorse the point so often overlooked but brought out clearly in Letter No. 41, COAL AGE, Apr. 3, p. 613, regarding the difference between gaseous and nongaseous mines and the requirements of the mining law in respect to the same. While I admit that the *gaseous* mine is far the more dangerous, I believe there is much room for legislation in respect to nongaseous mines.

For the past 27 years I have worked in mines of each of these classes, and I fail to see any reason why a nongaseous mine is exempt by law from a morning examination before the men are allowed to enter the mine for the day's work. In my opinion such an examination is as important in one case as in another.

All practical mining men know that great changes take place in roof conditions, especially in pillar workings, during the night. It is a common occurrence for a man who has left his place in safe condition the night before to find in the morning that it has been "working" during the night and that cracks and slips have developed in the roof, making the place dangerous for work. In a gaseous mine, when a fireboss finds such conditions in a place on making his morning examination the place is fenced off and reported as "dangerous," and the men are notified not to go to work until the danger can be removed.

It is true that Art. 25, Rule 1, of the bituminous mine law of Pennsylvania, compels each miner to "examine his working place before beginning work and take down all dangerous slate or otherwise make it safe by properly timbering it before commencing to mine or load coal." It must be remembered, however, that there is a wide difference in the way in which men regard danger. While some men habitually make a careful and thorough examination before commencing work, others neglect this precaution, and they are generally the ones to be caught.

I am sure that a glance at any conscientious fireboss' report book would show a far greater number of dangers from "bad roof" than from "gas." Mining statistics show that a much greater number of accidents occur from "falls of roof and coal" than from "gas." The morning examination of the mine would, moreover, prove a benefit in its daily operation, as it would reveal possible falls of roof on the haulage road, which could be promptly removed, and the necessary timbers set before it is time for the mine to start up. Such an examination is an absolute necessity in all mines to fully carry out the idea of "Safety First," which is the universal slogan today.

Art. 4, Sec. 14, of the same law requires the employment of shotfirers in mines "where explosive gas is being generated in quantities sufficient to be detected by an approved safety lamp, etc." The same article forbids the firing of shots in gaseous and dusty mines where locked safety lamps are used, "unless the entries and rooms which are dry and dusty are so thoroughly wetted as to prevent the existence of any dry dust for a distance of not less than 80 ft. from the hole to be fired."

Since the large number of experiments made by the Bureau of Mines at its Pittsburgh Testing Station and in other places in this country and in Europe have proved conclusively the explosibility of coal dust in the absence of explosive gas, it seems strange that this same law relating to shotfiring should not apply to nongaseous as well as to gaseous mines. I am glad to say, however, that I know of many mine officials who go farther than the requirements of the mining law and make these precautions obligatory in the operation of their mines.

CHAS. ADAMSON.
South Brownsville, Penn.

Letter No. 43—I have been much impressed and can heartily indorse all that has been said in regard to the peculiar position occupied by the mine foreman of a coal mine.

The law provides for his certification and makes him responsible for the ventilation and drainage of the mine and numerous other matters that relate to its safe operation. On the other hand, in order to hold his position with the company, he must *hustle for coal.* The law wants *safety,* while the company wants *coal.* To supply the demand for coal often necessitates putting men in dangerous places, and any objection from the mine foreman in this regard meets with little consideration from the mine superintendent. His terms are, "Get the coal or take your time and get out."

The point I want to urge is that the superintendent is not under any obligations to the state and is not responsible by law for the safe operation of the mine; while the mine foreman, who must take his orders from the superintendent, is made by law responsible for the safety of the operation. I want to say most emphatically that I am in favor of some law that will free the mine foreman from the curse of two masters.

The problem might be solved by the passage of a law providing for daily inspectors in mines, to be paid by the state a salary in proportion to the size of the mine and the number of men in their charge. On these men would devolve the duty of examining the ventilating apparatus and other safety appliances and to see that the mine is operated in compliance with the law. Their duties would not conflict with the operations of the company, provided these complied with the law.

It stands to reason that, by such a method, fewer risks would be taken and as a result there would be fewer accidents, and the mine foreman would not be in danger of losing his position or becoming liable to the law of the state. Beside the daily inspection of all ventilating apparatus and safety appliances, the safety inspector could check the men going in and coming out of the mine. If, however, he had charge of more than one mine, he could delegate an assistant to do this work for him alternately at one of the mines. Such daily inspectors should not be given charge of greater territory than they could cover regularly each alternate day. It seems to me that some such provision as this would solve the difficulty.

OSTEL BULLOCK,
Assistant Foreman.

Cleaton, Ky.

Letter No. 44—There is a point in the bituminous mine law of Pennsylvania to which attention should be called before this discussion is closed. It has reference to the legal standing and responsibility of the assistant mine foreman.

Art. 4, Sec. 1, of the bituminous law (Penn.) reads, in part, as follows:

> When the mine workings become so extensive that the mine foreman is unable, personally, to carry out the requirements of this act pertaining to his duties, he shall have the right to employ a sufficient number of competent persons to act as his assistants who shall act under his instructions in carrying out the provisions of this act.

By the provision of the last clause of the law quoted above, the personality of the assistant is eliminated. He is not permitted to act in his individual capacity, but the law compels him to act in accordance with the mine foreman's instructions. The law thus assumes that all orders issued by the assistant do not proceed from him as an individual, but emanate from the mine foreman, who is given by law all the authority of a personal command. The foreman thus simply uses his assistant as a mouthpiece. But the prosecution of this official, from time to time, would lead one to infer that the law does not intend to relieve the assistant foreman of his share of responsibility. If this is true, the law is a paradox and will undoubtedly require a legal mind to explain its meaning.

The question may well be asked, Can a person be held legally responsible for the results of an action that he has performed at the dictation of a legally authorized superior in office? In attempting to give a positive answer to this question it cannot be assumed that the assistant, in the performance of his duty, acts to a certain extent upon his own initiative. It cannot be assumed that he must do this because it is impossible for the mine foreman to be present to decide and give instructions in every particular case and for that reason the assistant becomes responsible for the result of his actions in carrying out the foreman's orders.

In answering this question regarding the legal responsibility of an assistant mine foreman, due consideration must be given to his relative position as determined by the law. The law seems to compel the assistant to act as the will and pleasure of the foreman dictate, and it seems reasonable to conclude, therefore, that the foreman and not his assistant is thus made the responsible party.

Any other interpretation of the law would provide a convenient way for the mine foreman of a large operation to shift the responsibilities of his position. It is unquestionably true that many mine foremen do take advantage of this means to blame an assistant for his own mistakes. The law has a tendency to make the foreman less efficient in the discharge of his duties, affording as it does a comparatively easy means of making an assistant foreman the scapegoat in case of accident or failure of the foreman's plans.

With an efficient corps of assistants, a mine foreman's work is greatly curtailed, and this doubtless is the object of the law with respect to assistant foremen; but the mine foreman should not be permitted to forget that *his* responsibilities cannot be curtailed or foisted on another.

If such a construction of the law as I have described is correct, the mine foreman can be held accountable for only a comparatively few of the accidents and violations that are features of coal mining. Many parts of the mine where accidents and violations are the more liable to occur are not under his personal daily supervision, and consequently the blame for such occurrences must be borne by the assistant.

The frequent action of mine inspectors in holding assistant foremen responsible and thereby relieving the mine foremen, I believe, has greatly assisted in fostering carelessness and negligence on the part of the latter official. These men are generally equally culpable with their assistants for a casualty that may be the result of their own lack of supervision and ability to safely direct the work. I believe that if a test case were to be made of this point no judge would uphold the validity of the law. A clear understanding of its meaning is an important factor in safe mining.

Assistant mine foremen have the right to be informed in regard to their legal status as provided by the law. If it is urged that this knowledge would result in greater negligence and carelessness of assistant foremen, it can be said with equal force that it will act as a greater stimulant to the *foremen* and make them more careful and watchful.

As I understand the law, in its present form, the assistant mine foreman is not and cannot be held responsible for any casualty that might occur in the discharge of his duty as assistant to the foreman; and, until his legal status is specifically defined, he remains immune from the law. If the law requires a victim for sacrifice, let it take the individual upon whom it distinctly imposes the responsibility for the safe operation of the mine.

I. C. PARFITT.

Jerome, Penn.

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Electrical Requirements in Mine Law

In the issue of COAL AGE, Mar. 20, p. 516, appears a query of Fred Vinton regarding certain rules in Art. 11 of the bituminous mine law of Pennsylvania (1911). The first rule mentioned is with respect to the use of high-voltage current underground, and the second has regard to the use of certain incandescent lamps in gaseous mines.

The use of electricity at high voltage in any mine introduces a certain hazard if not properly applied, and for this reason each installation should be surrounded with every reasonable safeguard. Reference to the mining laws of the different coal-producing states will disclose the fact that in many cases the use of high-potential current underground is not recognized. It is certainly a very liberal provision that will allow its use, and in order to render it reasonably safe certain safeguards have been provided in the bituminous law of Pennsylvania.

The minimum capacity of 5 kw. placed in this law, on any transformer connected to a high-potential circuit, is such as will meet every ordinary mine requirement; and experience subsequent to the framing of these rules has shown that this could have been made several times this capacity without working a hardship on anyone. All high-potential apparatus located underground should be placed in a substation; and, inasmuch as these substations are located at a central distribution point, there are few, if any, cases that would warrant the high cost of a substation switchboard equipment and wiring to take care of smaller units than that named in the law. The only possible objection that could be raised to this is that small transformers are required in connection with switchboard instruments; but, inasmuch as these transformers are mounted on and made part of the switchboard equipment, it is obvious that this rule would not apply to such cases.

In the case of high-voltage motors, it is not practicable to use motors of less than 15 b.hp. underground, and this minimum could safely have been increased to 50 b.hp. without working a hardship on anyone. Inquiry of the different manufacturers will develop the fact that few small high-potential motors are manufactured for use above ground, and certainly their use underground would be less practicable.

The rule referring to the use of electric lamps in gaseous mines is in keeping with the recommendations of the Federal Bureau of Mines, and their recommendations are based on the results of exhaustive tests on the performance of incandescent lamps when exposed to explosive gas.

Referring to the comments that appear in connection with Mr. Vinton's query, it is fully apparent that the author did not make a thorough "inquiry" as to what this rule actually meant in respect to motor capacity. The rule in no way prohibits or restricts the use of motors of less capacity than 15 b.hp. in mines, if the same are supplied with current at medium or low potential as defined in the law.

While some rules in the article referred to could be criticized because of recent developments, the rules governing the use of high-potential equipment are extremely liberal and not open to this criticism. If, on the surface, it is not considered safe and practicable to use motors of less than 15 b.hp. when wound for high potential, it certainly would be wrong to attempt to use them underground where they would be subjected to much severer conditions. The intent of this rule is to restrict the use of high-potential motors to proper locations, and it is not the intention that small equipment be tapped off indiscriminately along a high-potential underground circuit. If the character of the work warrants the cost of high-potential apparatus, no rule of this mining law is in any way a hindrance thereto.

C. M. MEANS,
Consulting Engineer.

Pittsburgh, Penn.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

INFLAMMABLE MINE GASES

The presence of combustible gases in the atmosphere of a mine is always an element of danger for three principal reasons. 1. The percentage of gas in the mine air may be sufficient to form an explosive mixture known as **firedamp.** 2. The temperature of ignition of most of these gases is lower than that of methane, which is usually the chief constituent of firedamp, and the latter is rendered **more readily ignitable** by reason of their presence. 3. The presence of the smallest percentage of a combustible gas assists to that extent the ignition of a **dust-laden atmosphere,** and increases the violence of its explosion when ignited.

The Inflammable Gases—The inflammable or combustible mine gases, in the order of their importance, are methane (CH_4), carbon monoxide (CO), ethane (C_2H_6), ethene or olefiant gas (C_2H_4), hydrogen (H_2) and hydrogen sulphide (H_2S). Each of these gases is not only combustible but forms an **explosive mixture** when mixed with air in certain proportions.

Inflammable Range of Gases—The combustion of an inflammable gas, under mining conditions, requires the presence of air or available oxygen. The relative proportion of air and gas in the mixture determines the character and completeness of the combustion and the range of inflammability of the gas.

The maintenance of flame throughout a gaseous mixture requires that the **heat of combination** between the combustible and the atmosphere supporting the combustion shall be equal to that lost by **radiation, conduction** and **absorption** by the air and gaseous products formed. Two conditions are possible.

1. The proportion of gas to air may be such as to give a low **rate of combination** and a correspondingly small generation of heat, which is insufficient to raise the adjacent gaseous molecules to an equal temperature, resulting in a still lower rate of combination and a lesser generation of heat as the action proceeds through the mass till it finally ceases.

2. Again, the proportion of air to gas may be such as to cause an **absorption of heat** greater than that generated when the condition will likewise be a falling one and there can result no general extension of flame throughout the mass.

The first of these two conditions (excess of gas) determines the **higher inflammable limit** of the gas, while the second condition mentioned (excess of air) marks the **lower inflammable limit.** Beyond these two limits the gaseous mixture is not inflammable. In mining practice, mixtures above the higher limit are more dangerous than those below the lower limit, as more air will make them explosive.

Explosive Range of Gases—A combustible gas is always inflammable in proportions of gas to air outside of the explosive range of the gas. In other words, the **range of inflammability** is wider than and embraces the **range of explosibility.** The same principles, however, apply in respect to each of these conditions.

The **degree of explosiveness** of a gaseous mixture is increased as the rate of combination is more rapid and the loss of heat less; or decreased as the rate of combining is slower and the loss of heat greater.

The Coal Age Pocket Book

Maximum Explosive Point—It is quite generally assumed that the maximum explosive force of a gas is developed when the proportion of air or oxygen is just sufficient for the **complete combustion** of the gas. While this is sufficiently close for all practical purposes, it is stated (Emich) that the inflammability is not necessarily greatest at this point.

Inflammable and Explosive Limits—The following table gives the lower and higher inflammable and explosive limits and the maximum explosive point of the three most important combustible mine gases, except only the higher inflammable limit of carbon monoxide, which has not been determined, but is probably about 80 per cent. The table shows the **percentage of gas** present in the mixture, at each of the five stages given. The lower inflammable limit and the maximum explosive point have been calculated for each of these gases, while the other data are the results of experiment. A normal condition of the air is assumed:

TABLE GIVING THE INFLAMMABLE AND EXPLOSIVE LIMITS AND THE MAXIMUM EXPLOSIVE POINT OF METHANE, HYDROGEN AND CARBON MONOXIDE

Gas	Lower Inflam. Limit	Lower Explo. Limit	Maximum Explo. Point	Higher Explo. Limit	Higher Inflam. Limit
Methane	2.5	7.1	9.5	16.7	29.5
Carbon monoxide..	8.4	16.5	29.5	75.0	...
Hydrogen	5.0	9.5	29.5	66.3	72.0

The same data, in reference to olefiant gas (ethene or ethylene), C_2H_4, are: Lower explosive limit, 4.0 per cent.; maximum explosive point, 6.5 per cent.; and higher explosive limit, 14.5 per cent. These, however, have only a relative importance in respect to mining, because the percentage of this gas present in mines is very small.

Peculiarities of Explosion—A peculiarity in the explosion of a mixture of **methane and air** is that, at the temperature of ignition (1200° F.), about 10 sec. are required before the gas will ignite (Mallard and Le Chatelier), while both hydrogen and carbon monoxide ignite at once, upon contact with the flame. The **time required** for the ignition of methane grows rapidly less as the temperature is increased.

The same authorities also claim that mixtures of methane and air in any proportion are explosive at **high temperatures,** and the same effect has been observed at **high pressures.** In other words, an increase of temperature or pressure has the effect to widen the explosive range of a gas.

A mixture of **carbon monoxide and air** will not explode in the **absence of moisture.** The explosion, in this case, seems to require two stages, the carbon monoxide taking the oxygen from the water, which is replaced immediately by the oxygen of the air, as represented by the following equations:

$$CO + H_2O = CO_2 + H_2$$

and

$$2\,H_2 + O_2 = 2\,H_2O$$

It has been argued that, since carbon monoxide, which is distilled from coal dust floating in the mine air, is not explosive in dry air, the safest condition is a dry mine atmosphere, which, however, is practically impossible

Inquiries of General Interest

Equalizing the Hoisting Ropes in a Shaft

I want to ask the opinion of COAL AGE and its readers in regard to a problem that has caused considerable discussion at our mine. We have a double-compartment shaft, there being two cages and two ropes that wind on a single drum. When either cage is at the lower landing, the other cage is about 1 ft. below the upper landing.

The question is, How much should each rope be shortened in order that both cages will reach their respective landings at the same time? The length of each rope is such that there are still two coils remaining on the drum when the cage is at the bottom landing.

To illustrate this I have drawn a rough sketch, which shows the lower cage at the landing at the bottom of the shaft, while the upper cage is about a foot below the landing at the surface. It would seem that if a foot is cut off of this rope so as to bring this cage to the upper landing, the difficulty would be overcome, as both cages would then be at their landings at the same time. If this is wrong, kindly set me right.

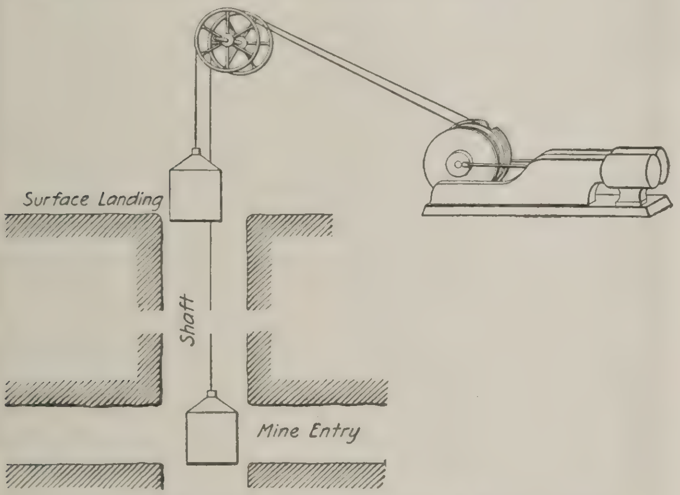

DIAGRAM SHOWING ELEVATION OF MINE HOIST

MARTIN SCHUBLE, Engineer,
Vandalia No. 8 Mine.

Linton, Ind.

It is true that cutting a foot off of, say the east rope in the shaft would bring that cage to the upper landing when the west cage is at the lower landing. If now the cages are reversed, the west cage being raised and the east cage lowered, it is clear that the east cage will have to be lowered 1 ft. further than before, in order to reach the lower landing; and in doing this, the west cage will rise to the desired height at the upper landing. Therefore it will not be necessary to cut anything off the west rope.

If it is desired, however, to cut an *equal* amount off each rope, only one-half of the amount that each cage falls short of the landing at the surface when the other cage is at the bottom should be cut off each rope.

This may be made clearer by supposing both ropes to be marked to correspond to a mark on the frame when the west cage is at the lower landing and the east cage is 1 ft. below the upper landing. Now, if 6 in. be cut off of the east rope, that cage will be 6 in. *below the upper landing.* Likewise, if 6 in. be cut off the west rope, that cage will be 6 in. *above the lower landing.* Now, if the engine is started and the drum rotated 6 in. by the mark on the rope, bringing the east cage to the upper landing, the west cage will at the same time be brought to the lower landing. Or, *vice versa,* if the drum be rotated so as to raise the west cage to the upper landing, the east cage will be lowered the same distance to the lower landing.

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Cost of Producing Coal in Iowa

In order to settle a controversy we would like to have the following questions answered in COAL AGE: What is the average cost of producing coal in Iowa and Missouri? Also, what are the relative percentages of lump coal and screenings produced at the mines in these states?

FRED. MORCK.

Tuscaloosa, Ala.

The only available figures showing the cost of production of coal in the different states are those given in the *Bulletin* of the 13th Census of the United States (1910). The "Census Report" for 1910 gives the following figures for Iowa: Coal production for the year 1909, 7,725,679 tons; value at mines, $12,679,225; total expenses reported to produce this coal, $12,816,076.

The same report gives the following figures for Missouri: Coal production for the year 1909, 3,596,691 tons; value at mines, $5,879,972; total expenses, $5,715,727.

In speaking of the cost of the production of coal in the several states, the report states that, while the figures for the entire United States show a profit of about 5c. per ton of coal produced, the figures for Arkansas, Iowa, Kentucky, Oklahoma, Oregon, Tennessee, Virginia and West Virginia all show the expense of production as exceeding the value of the product mined. The report advances the opinion that, while the figures given "cannot be taken as showing accurately the amount of profit or loss in the coal-mining industry of the several states, they do seem to indicate clearly that in many states the industry obtains only a very low rate of profit, if any." Correspondence with many coal operators on this point brought the statement that, "while there was a loss in their coal-mining business proper, this was more than counterbalanced by the profits from selling merchandise and renting houses."

No figures are available showing the relative percentages of screenings and lump coal produced. The mining laws of both Iowa and Missouri, however, require the weighing of the coal for the payment of miners before it is screened.

Examination Questions

Alabama First-Class Mine Foremen's Examination, Held Jan. 25-28, 1915

(*Selected Questions*)

Ques.—If when making an examination of a mine you found a large body of explosive gas, state what precautions you would take to prevent an accident from the same.

Ans.—If the gas is found in the morning examination, before the men have entered the mine, the matter should be reported at once at the shaft or slope bottom or the entrance of the mine, and adequate measures should be at once adopted to prevent anyone from entering that section or district in which the gas was found. If the accumulation is of such volume as to endanger other portions of the workings, the entire mine should be closed and no one permitted to enter, except those authorized to perform the work of removing the gas.

If, on the other hand, the gas is found when the men are at work, no change should be made in the ventilation—not a door should be opened or closed to alter the circulation of the air in the affected section, until the men in that section have been notified to extinguish their lamps and withdraw as quickly and quietly as possible. The work of withdrawing the men should be done promptly. If necessary, the men should be withdrawn also from the adjoining sections.

Having withdrawn the men, every entrance to the affected portions of the mine should be guarded to prevent anyone from entering. Competent firebosses should then be selected and equipped with safety lamps. None others should be employed in the work of removing the gas, which must be started from the intake end of the section. The circulation of air in that section should now be increased so as to provide an adequate air volume to effect the removal of the gas.

The work should proceed slowly and tests be made, from time to time, to determine the progress. All safety lamps should be carefully guarded against any outrush of air and gas caused by roof falls or otherwise. Ample time must be given for the current to sweep away the gas, and special brattices should be erected to deflect the current to the face of the workings and into any void places, where gas might find lodgment.

Ques.—If you were the foreman of a mine generating gas and an accumulation of firedamp had collected on the falls, what method would you adopt to remove it?

Ans.—First, withdraw all the men from the return of the air current in that section of the mine and in any adjoining sections that might be endangered by a possible roof fall that would drive out the gas into other workings. A strong air current will then be required to dislodge the gas above the falls, since, owing to its low specific gravity, the gas tends to rise into the cavity made by the fall of the roof. It will generally be necessary to erect a special brattice to drive the gas out of these cavities above the falls.

Ques.—State fully your opinion of the principal causes of explosions in mines, and give in detail any method you would recommend for their prevention.

Ans.—The causes chiefly responsible for gas and dust explosions in mines are the following: The permitted use of mixed lights in mines; insufficient or careless inspection of the workings while the men are in the mine; hurried and incomplete examination of the mine in the morning, before the men enter for work; permitting the accumulation of fine coal and dust in the workings and on the roads throughout the mine; the excessive use of black powder in blasting the coal; badly placed shots and failure to properly mine and free the shots before firing; the use of coal slack or other combustible matter for tamping the holes; failure to properly ventilate the abandoned workings of a mine; the use of defective or poorly designed or improperly cleaned safety lamps; the use of safety lamps by inexperienced men; carrying matches into a gaseous mine for the purpose of smoking; tampering with a safety lamp; fooling with safety lamps and with gas, or lighting the latter for fun. These, together with the numerous risks taken by many miners, are the chief causes of mine explosions.

Ques.—Will coal dust extend a mine explosion throughout the entire mine, in the absence of explosive gas?

Ans.—Coal dust allowed to accumulate on the roads, timbers and walls of a mine will extend any explosion of gas or dust in a mine when the explosion has been once started, whether or not gas is present on the roads or in the entries. The force of the explosion, which would otherwise extend itself but a short distance, throws the dust into the air and the flame of the explosion, feeding on this dust suspended in the air, is extended throughout the workings as long as there is dust to burn and oxygen to support the combustion.

Ques.—Give your opinion of the best method of humidifying the air in mines.

Ans.—As stated in Coal Age, Feb. 27, p. 386, there are many types of apparatus used for this purpose, and it is difficult to say that any single type will give the most satisfactory results under all conditions. In humidifying mine air, practically, it is absolutely necessary to heat the air entering the mine to a temperature somewhat above that of the mine workings, before introducing water vapor (steam) into the air current. This heating is necessary in order that the air shall take up as large a quantity of the water as possible.

This heated moist air will be slightly cooled in its passage through the mine and, as a result, some of its moisture will be deposited in the workings; while at the same time the saturated air is prevented from absorbing moisture from the mine and drying out the workings. However, under the varying conditions in mines, it is generally observed that the air current alternately deposits and picks up moisture in its passage through the workings. In other words, in actual practice, the air current serves as a carrier of moisture from one portion of the mine to another, and it is difficult to avoid this condition.

Coal and Coke News

Washington, D. C.

According to announcements made here, the question of higher rates on coal and coke moving over the lines in Western Trunk Line and Southwestern Tariff Committee territory will be heard before Interstate Commerce Commissioner Daniels in Chicago on Apr. 14-16. The entire new series of hearings, covering proposed advances on hay and broom corn, cotton piece goods, grain, rice, fruits and vegetables, packing house products, live stock and other products will extend to May 10.

Various statements on different phases of the case have already been filed, and are receiving study here. One of these presents the reasons of the roads for proposing an advance in the rates on coal and coke. According to the presentation of the roads' case in the written briefs, the basic reason for advancing rates on coal and coke is that the burden on shippers would be small while the aid to the carriers in the territory under discussion would be large.

This increment to railroad revenues from the proposed higher rates on coal and coke is estimated at $1,266,000 annually while the per ton cost to shippers would be less than 8c.; or, based on consumption per inhabitant, would be about 5c. per annum per person throughout the territory, assuming that the extra rates were added to the charge for coal to the consumer at retail.

From the traffic standpoint, it has already been orally argued in the hearings thus far held that coal at present rates of transportation brings no real income to the roads owing to the unsteadiness and uncertainty of the traffic and the frequent periodical strikes leading to suspensions of business—total or partial—which cut off tonnage and derange the whole freight adjustment.

The seasonal nature of the industry and the added uncertainly brought about, as just indicated, by labor troubles and strikes, differentiating it from many others, necessitates the maintenance of an unduly large supply of cars, and otherwise adds greatly to the cost and trouble of the whole trade. Hence, it is claimed, the justification for an advance.

Producers and shippers have seemed disposed to rebut these arguments in much the same way that was resorted to in the North Dakota coal rate cases—by showing that the roads are prosperous and able to make up on other commodities what they fail to earn on coal. Much the same point of view was developed in the Eastern hearings of last spring (a year ago) when it was clearly shown, in addition, that the bituminous coal operators had for some time been in most cases on so narrow a margin of profit that to add to the shipping expense would put some, at least, out of business by making it impossible for them to compete at the points where prices were most keenly contested.

Shippers' representatives generally are endeavoring to show that the roads are as well as, or better fitted than, the shippers, to bear the brunt of present conditions, and that the general state of business consequently affords no warrant for any effort to shift the load from the shoulders of the carriers to those of the public. It is understood that the entire series of hearings is to be finished by May 10 and that the briefs of the roads are to be in hand by the end of May and the answers of the shippers by the middle of June next. The whole case will, it is expected, be in by the beginning of the month of July and this, it is supposed, would render possible a verdict immediately after the summer recess.

PENNSYLVANIA

Anthracite

Pittston—The site of the former Ewen breaker of the Pennsylvania Coal Co., which was burned to the ground several months ago, is at present a busy spot with preparations going on for rebuilding. It will be replaced by what will be one of the most modern breakers in the entire anthracite region, absolutely fire-proof in every respect, and with modern equipment for the preparation of coal. The work is to be pushed rapidly so that the place may be running within a year.

Scranton—After two months of low production, the output of anthracite last month was slightly larger than that of March, 1914. This increase was due partly to the stimulus of the heavy April discounts and partly to the fact that three successive months of low production would cause a coal shortage later in the year that it would be difficult to make up. It is not possible to increase the number of railroad cars and the rate of output to any considerable extent to meet an increase in demand.

Edwardsville—Officials of the Woodward Colliery, of the Delaware, Lackawanna & Western R.R. Co., are proud of the record made on Mar. 29, when 2262 cars of coal were dumped at the breaker. R. M. Keifer, outside foreman, and Richard Thomas, assistant superintendent at the colliery, are receiving congratulations for the new record. The former record for this breaker made several years ago was 2143 cars.

Wilkes-Barre—A rather important and interesting case is being tried in the courts here, in the case of the Kingston Coal Co. against the Plymouth Coal Co., in which the courts are asked to make permanent a temporary injunction to restrain the Plymouth Coal Co. from stopping its fan at the abandoned Dodson Colliery. The Dodson Colliery adjoins the Gaylord Colliery of the Kingston Coal Co. and the barrier pillar between the two operations has been crushed or punctured at two or three points. Several months ago a suit filed by Plymouth Borough to restrain further mining by the Plymouth Coal Co., in Dodson Colliery, under charge that it would endanger surface property, forced the Dodson to be abandoned. The Kingston Coal Co. charges that the stopping of the fan would be dangerous to employees of the Galyord Colliery and testimony is being taken to determine whether the Dodson Colliery fan will have to be kept in operation, since the mine has been abandoned.

Lansford—The Lehigh Coal & Navigation Co. has suspended operations of the two steam shovels engaged in removing the huge culm banks between Lansford and Coaldale.

Jeansville—A forest fire in the vicinity of the Lehigh Valley Coal Co.'s breaker recently threatened the structure to such an extent that the officials of the concern ordered out all its employees to fight the flames, which were finally gotten under control.

Hazelton—It was recently decided by Judge George Gray, umpire for the Anthracite Conciliation Board, that electricians, electricians' helpers, watchmen, firebosses, stable bosses, engineers and other monthly men in and about the anthracite mines, are entitled to a wage advance of 10 per cent. in accordance with the amended agreement in effect between the operators and their employees since 1912. The contention of the employees of the G. B. Markle Co., who sought pay for brattice work, was not sustained since the complaints were not supported by evidence.

Pottsville—The Kaska William colliery, one of the largest operations in Schuylkill Valley, will resume work shortly. Owing to the dull condition of the coal trade, water was allowed to fill a portion of the workings, but orders have been issued to pump this out. This colliery is leased to the Lehigh Coal & Navigation Co., and during its period of idleness many improvements have been made, including the sinking of a new shaft.

It is reported that the coal mines of the Philadelphia & Reading Coal & Iron Co. will be operated full time until further orders. It is believed that 40,000 men engaged in the 50 collieries and washeries in Schuylkill and Northumberland Counties will have a summer of unusual activity.

Bituminous

Connellsville—The weekly production of coke is now in the vicinity of 285,000 tons as compared with about 200,000 tons for the beginning of January. Present increases are due almost entirely to merchant ovens.

Pittsburgh—River shipments of coal during the month of March have been the smallest for many years, if not for the coal industry. This is due to the low stage of the rivers.

Greensburg—The stable of the Berwind White Coal Co., at Herminie, was recently burned, entailing the loss of considerable live stock. The total loss is estimated at $20,000 and the origin of the fire is undetermined.

Leisenring—A safety first demonstration was recently held by the employees of the Leisenring No. 2 mine of the H. C. Frick Coke Co. This is said to be the first exhibition of its kind ever held in this section, and on account of its success similar demonstrations will be held at various other plants of the company.

Noblestown—The Fayette Coal Co. has closed its mine indefinitely.

WEST VIRGINIA

Huntington—Coal operators who recently returned from Washington where a meeting of coal men from West Virginia was in session for several days predict that a permanent state organization will be perfected in the near future.

Montgomery—It is reported that the mines of the Sunday Creek Co. will resume operation shortly after a shut down of several months. These mines are now under new management, and it is said that orders for Lake trade have been received which will keep all the operations running for some time. About 2000 men will be given employment.

Bluefield—It was reported here recently that the Lake Superior Coal Co., operating a shaft a few miles from Welch, which has been shut down for about two weeks on account of a cave in, would resume work shortly.

Charleston—Plans are being perfected for an extraordinary meeting of coal operators representing every field in West Virginia to be held in Huntington on Apr. 12, for the purpose of a thorough conference on the subject of the coal industry in general and a discussion of means for extending the trade. This meeting will be a sequel to the one recently held in Washington.

It has been announced that the Sunday Creek Coal Co. will make a number of changes in the preparation for market of the product of its mine. The production of the sizes formerly prepared will be discontinued and supplanted by new ones. A number of changes in the tipples, including the installation of new screens, will be made to conform to the new requirements.

According to Chief Mine Inspector Earl Henry, of the Department of Mines, violation of the mining laws of the state has been responsible for many of the recent accidents in the mines. This factor, in connection with elements of danger left to the inexperienced and ignorant, constitutes the greatest source of risk. Attention to detail, therefore, and strict compliance with the law, is suggested as the means of avoiding many accidents.

TENNESSEE

Petros—Large portions of the state's coal holdings at Petros, where the mines are worked by convict labor, are exhausted, according to the report of Dr. L. C. Glenn, of Vanderbilt University, to the chairman of the Tennessee Board of Control. Mine No. 3, he says, has a reasonable expectancy of about 10 years, unless the area of good coal west and northwest of the mine should prove large. The seam now being worked is the only one above drainage suitable for mining by convicts, and this seam in the western part of the property is too thin and too badly broken by partings to be of any value.

KENTUCKY

Lexington—Creditors of the bankrupt Wolf Valley Coal Co., of Roosevelt, Breathitt County, have elected F. B. Rodman, of Mt. Sterling, trustee and the property of the Wolf Trading Co., which conducted the commissary of the mining company, has been ordered sold.

Paducah—Work has begun here at the barge-building plant of the West Kentucky Coal Co. on 40 barges, and 150 men have been put to work. Each of the barges will be 125 ft. long, 26 ft. wide and 8 ft. deep. When completed they will be placed in the river trade of the company.

Wayland—A ruling is looked for before long in the case of Tandy Martin against the Elkhorn Mining Corporation on a demurrer filed by the defendant in the United States District Court at Catlettsburg where a $100,000 damage action is on trial. The action is for damages over alleged rights exercised by the coal company in developing and working its coal operations on land now owned by Mr. Martin. Several years ago, before the Elkhorn & Beaver Valley R.R. was built up Beaver Creek the coal companies bought the coal under most of the land in this section, and in taking deeds from the farmers the purchasers claimed numerous rights which the farmers now contend are inconsistent with the farming rights when the development comes. This is the first operation in Beaver Valley by any coal company and Mr. Martin contends that the coal company has gone beyond its rights, the suit being the outgrowth of the alleged infringements of the plaintiff's rights. Every landowner in the section who has sold his mineral rights is anxiously watching the outcome of the suit and many have volunteered to help defray the costs. If the demurrer should be overruled the case would probably be called for trial at the May term of court.

INDIANA

Vincennes—The Oliphant-Wasson Coal Co. is now shipping from its new Bruceville mine. The quality of coal is high. The plant is equipped to take out 5000 tons a day.

Petersburg—After a month's idleness, the Blackburn mines are preparing to begin operating again.

ILLINOIS

Murphysboro—The dismantling of the Harrison mine of the Big Muddy Coal & Iron Co. means the elimination of washed coal from the Big Muddy District. The washer, however, will clean up the huge pile of screenings, something like 100,000 tons, which were piled up on the ground last fall, and when this is completed, it will also be dismantled.

Benton—It is expected that the first coal will be taken out some time this coming month, from the new mine of the Middle Fork Mining Co. The electrical machinery by which the mine will be operated entirely is practically ready.

Hanaford—The mine at Hanaford recently acquired by a Chicago coal syndicate has been thoroughly reorganized, and put in condition, and will soon be one of the busiest spots in the country. This mine is owned by the John A. Logan Coal Co., and an effort is being made to change the name of the post office to Logan.

Greenville—Seven men are known to have been killed by an explosion of gas in the mine of the Shoal Creek Coal Co., near here, while 10 more are missing. The 7 bodies have been recovered. The explosion occurred 200 ft. underground, and ¼ mile from the main shaft. Only a small portion of the mine was damaged, and to this is attributed the small loss of life.

FOREIGN NEWS

London, England—The committee appointed by the Board of Trade to inquire into the cause for the rise in the retail price of coal for domestic use has recommended that if prices do not return shortly to a reasonable level that the government should consider a plan for assuming control of the output of the collieries during the continuance of the war.

Toronto, Canada—The anticipated trouble between operators and miners in the Crows Nest Pass mining district has been averted. There have been frequent industrial disputes and strikes in this district, and three years ago the Labor Department at Ottawa succeeded in getting an agreement settling all matters in dispute signed by both parties. The agreement expired Mar. 31, and the operators were anxious to reduce wages, while the miners claimed that they should be increased. Eighteen mines and about 6000 miners were involved. A compromise was effected on practically the same basis as the former wage scale, and a new agreement made for a term of two years, which has been duly ratified by the unions.

PERSONALS

George Crankshaw, assistant to Vice-President Ludlow, of the Lehigh Coal & Navigation Co., has been named as successor to Charles Dorrance, who recently resigned as superintendent to go with the Delaware & Hudson Co.

M. L. Trotter, foreman for the Empire Coal Mining Co., Empire, Ky., has resigned his position to take effect at once. It is not known where Mr. Trotter will locate. He is considered one of the foremost mining men in the Kentucky field.

Harry J. Burnett, who for some time has been employed by the Colonial Coal Co., at Dorchester, Va., has severed his connection with that firm, and accepted a position with the Algonquin Coal & Coke Co. at Algonquin as chief engineer. He has already assumed his new duties.

George F. Schwartz, who has been connected with the sales department of the Sunday Creek Co. for 13 years, has been made assistant general sales agent with headquarters in Columbus. Mr. Schwartz started to work for the company Apr. 1, 1902, and his latest promotion came on the 13th anniversary of that event.

John Evancho, a miner of Freeland, Penn., has the distinction of being the first anthracite coal miner to ride to and from his work in his own automobile. He is employed in the Lehigh Valley mine at Eckley, four miles from home. On Sundays he utilizes the machine in taking his family to church and on joy rides after dinner.

Lewis Peterson, aged 72, the oldest employee of the Central Coal & Iron Co., is suffering from a broken leg which he sustained when caught under falling coal. Some time ago he was retired on account of his advanced age but objected to enforced idleness and at his own request was restored to a place on the pay roll.

Paul B. Liebermann, formerly assistant chief engineer of the Sprague Electric Co. has joined the Hyatt Roller Bearing Co. as engineer of tests. In his new position he will have full charge of all tests, both laboratory and field, for the purpose of determining the exact saving to be effected by the adaption of the Hyatt roller bearing to all applications.

George Cochran, of the Cochran Coal Co., has installed a wireless station in his office, the first of its kind in Bessemer, Ala. He uses it more for pleasure than business, although he belongs to the wireless association, and has his call. The station has attracted much attention. It has a range of 350 miles for sending messages, but can catch them at a far greater distance.

OBITUARY

Adrian Bush Cather, late superintendent of the Bowood Mine of the Republic Iron & Steel Co., died at Smithfield, Penn., Apr. 2. He was buried from his home at Flemington, W. Va., Apr. 4. Mr. Cather was well known among a large circle of acquaintances throughout Fayette and Westmoreland Counties to whom his death was unexpected. He stood high in his chosen profession of mining in which he had made a proud record. He is survived by his father, J. B. Cather, a prominent resident of Flemington, his mother, four brothers and two sisters.

Robert L. Martin, 67 years of age, a veteran Connellsville coke operator, died at his farm near Princeton, N. J., Apr. 1. Mr. Martin was born in Philadelphia, coming to the coke regions in the '70s and locating at Fairchance where for some years he was manager of the furnace and coke plants of the Fairchance Iron Co. Later he became interested in the coke business, eventually becoming manager of the Bessemer Coke Co., one of the leading merchant interests of the Connellsville region. He retired as manager of the Bessemer plants when they passed into the control of the Hillman interests, and in 1913 moved to his New Jersey farm. He was of a genial disposition, and had many friends throughout Fayette County, Penn., to whom he was universally known as "Bob" Martin. He is survived by his widow, two sons, and three daughters.

RECENT COAL AND COKE PATENTS

Smoke Consumer. O. A. Schroeder, Lodi, Calif. 1,124,066 Jan. 5, 1915. Filed Oct. 25, 1913. Serial No. 797,273.

Grate Bar. L. G. Van Nostrand, Scranton, Penn. 1,122,338 Dec. 29, 1914. Filed Aug. 1, 1913. Serial No. 782,402.

Coal Loading Device. T. H. Smith, Decatur, Neb. 1,122,546 Dec. 29, 1911. Filed Feb. 24, 1914. Serial No. 820,639.

Furnace Grate. W. C. Armstrong, Springfield, Ohio. 1,124,252 Jan. 12, 1915. Filed May 20, 1912. Serial No. 698,366.

Mining Machine. S. M. Mavor, Glasgow, Scotland. 1,124,159 Jan. 5, 1915. Filed May 12, 1914. Serial No. 838,118.

Dumping Mine Car. C. Layton, Mount Pleasant, Penn. 1,124,147 Jan. 5, 1915. Filed Feb. 24, 1914. Serial No. 820,747.

Method of Handling Coal. G. D. Curtis, New York, N. Y. 1,122,577 Dec. 29, 1914. Filed May 18, 1912. Serial No. 698,089.

Fastening Device for Boxes for Mine Drilling Machines. G. Griffith, Des Moines, Iowa. 1,123,731 Jan. 5, 1915. Filed Mar. 9, 1914. Serial No. 823,360.

Fire Bridge for Marine Boilers. F. J. Blake and R. C. Caldwell, Southampton, England. 1,124,102 Jan. 5, 1915. Filed Apr. 8, 1913. Serial No. 759,727.

Smoke Eliminating and Draft Apparatus for Furnaces. L. W. Pietsch, Post Falls, Idaho. 1,124,513 Jan. 12, 1915. Filed Mar. 25, 1913. Serial No. 756,641.

TRADE CATALOGS

The Harris-Stevens Co. of Pittsburgh, Penn. "Modern Mine Cars." Eight pages, 6x9 in., illustrated.

The Hudson Machinery Co., New York. "Hudson Duplex Wagon Loader." Four pages, 6x9 in., illustrated.

The Combustion Engineering Corp., New York, Bulletin B-2, "Type E-Stokers." Nineteen pages, 6x9 in., illustrated.

The Link Belt Co., Philadelphia, Chicago and Indianapolis. "Link Belt Electric Hoist." Four pages, 6x9 in., illustrated.

General Electric Co., Schenectady, N. Y. Bulletin No. 48,014. "Mine Hoist Equipment." Illustrated, 32 pp., 8x10½ inches.

The Terry Steam Turbine Co., Hartford, Conn. Bulletin No. 19. "Centrifugal Pumps." Illustrated, 64 pp., 6x9 inches.

The C. O. Bartlett & Snow Co., Cleveland, Ohio. Bulletin No. 43. "The Cobasco System." Eight pages, 6x9 in., illustrated.

The De Mayo Coaling Co., New York City. "De Mayo Portable Elevators and Unloaders." Fifteen pages, 6x9 in., illustrated.

The Link Belt Co., Philadelphia, Chicago and Indianapolis. "The Wendell Centrifugal Coal Dryer." Four pages, 6x9 in., illustrated.

The General Electric Co., Schenectady, N. Y.—Bulletin No. 46,251. "Outdoor Metering Outfits." Four pages, 8x10½ in., illustrated.

The Electric Service Supplies Co., Philadelphia, New York and Chicago. "Never-Creep Guy Anchors." Six pages, 3½x8¼ in., illustrated.

Felt & Tarrant Mfg. Co., Chicago, Ill.. "The Comptometer as Applied to Engineering Calculations." Twenty-three pages, 6x9 in., illustrated.

The Roberts & Schaefer Co., Chicago, Ill. "Locomotive Coaling Plants." Eight pages, 9x11 in., illustrating and describing large locomotive coaling stations.

Justrite Mfg. Co., Van Buren and Clinton St., Chicago, Ill. "Acetylene Lamps, Chemical Fire Extinguishers, Safety Oil and Oily Waste Cans, Etc." Illustrated, 16 pp., 3½x6 inches.

The Harrison Safety Boiler Works, Philadelphia, Penn.—Engineering Leaflet No. 17. "Reducing Boiler Room Cost by Heating and Softening the Feed Water." Twenty pages, 6x9 in., illustrated.

The Cambria Steel Co., Philadelphia and Johnstown, Penn. "The Slick Mine Tie." Forty-one pages, 6x9 in., illustrating and describing the advantages of the Slick steel mine tie as applied to coal mines.

The T. L. Smith Co., Milwaukee, Wis. "First Lessons in Concrete Work." Forty pages, 6x9 in., illustrated. Although this book might be termed a catalog, it contains much information and valuable suggestions concerning small concrete jobs.

NEW PUBLICATIONS

Department of the Interior, Bureau of Mines—Bulletin 84, "Metallurgical Smoke," by Charles H. Fulton. Ninety-four pages, 6x9 in., illustrated.

Department of the Interior, Bureau of Mines; Technical Paper 76; "Notes on the Sampling and Analysis of Coal," by Arno B. Fieldner; 61 pages, 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. Bulletin No. 589. "The Chalcite Marble and Dolomite of Eastern Vermont." By T. N. Dale; 67 pp. 6x9 in.; illustrated.

Department of Labor and Industry, State of Montana, First Biennial Report 1913-1914, W. J. Swindlehurst, Commissioner. Three hundred and fifty pages, 6x9 in., unillustrated.

Department of the Interior, U. S. Geological Survey. Bulletin No. 559. "Results of Spirit Leveling in Michigan, 1911-1913." By R. B. Marshall, Chief Geographer; 79 pp. 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. Bulletin No. 572. "Results of Spirit Leveling in Nebraska, 1896 to 1913 inclusive." By R. B. Marshall, Chief Geographer; 57 pp., 6x9 in., illustrated.

Illinois Coal Mining Investigation, State Geological Survey, Department of Mining Engineering, University of Illinois—Bulletin 9, "Coal Mining Practice in District Three," by S. O. Andros. Thirty pages, 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. Water Supply paper 330. "Surface Water Supply of the United States, 1912. Part X. The Great Basin." By F. N. Henshaw, E. A. Porter and G. C. Stevens; 275 pp. 6x9 in., with numerous tables.

INDUSTRIAL NEWS

Chicago, Ill.—The Roberts & Schaefer Co. has been awarded a contract by the Oliphant-Wasson Coal Co. of Vincennes, Ind., for equipment for a Marcus patent coal tipple for installation at the mine at Braceville, Ind.

Philadelphia, Penn.—The federal grand jury on Mar. 31 returned three indictments against the Philadelphia & Reading Coal & Iron Co. for violation of the interstate commerce law in connection with coal shipments to and from Philadelphia.

Columbus, Ohio—The general and executive offices of the Hocking Valley Products Co. have been moved from the Harrison Building to a remodeled structure near Town and High St. One entire floor is now occupied, giving additional space.

Denver, Colo.—The Denver office of the Sullivan Machinery Co. announces that following May 1 it will be located at 837 Equitable Bldg., and that it will continue to carry the same stock of repair parts and complete machines at Denver as heretofore.

Youngstown, Ohio—The Republic Iron & Steel Co. recently let a contract to the H. Koppers Co. of Pittsburgh, for 92 byproduct coke ovens to be erected at a cost of one million dollars. The company already has a byproduct plant of 68 ovens in operation.

Columbus, Ohio—The Lorain Coal & Dock Co. has awarded a contract to the Roberts & Schaefer Co. for the designing and building of a large Marcus patent coal tipple of steel construction complete with screening and picking facilities for installation at the mine at Craneco, W. Va. The contract price is $45,000.

Pittsburgh, Penn.—Attorney George H. Calvert was recently appointed in Common Pleas Court, master, to sell the properties of the Pittsburgh-Buffalo Coal Co., which are included in the foreclosure proceedings of the Union Trust Co. Six coal mines of the defendant are to be sold according to the decision of Judge Thomas J. Ford.

Birmingham, Ala.—By Apr. 15 the gates in the $3,750,000 lock (17) in the Warrior River will be placed and barges loaded with coal, lumber, etc., will be plying regularly between Cordova and the Gulf. This will mark the completion of the $12,000,000 job of giving 6 ft. of water all the year round from Sanders Ferry to Mobile.

Grafton, West Va.—Instructions have been issued by officials of the Albright Smokeless Coal Co. to immediately complete the work on the plant of that company started last year. This plant, it is said, will be in operation by May 1. The Kingwood Colliery Co., it is understood, expects to open its mines at Snider near Kingwood shortly.

Buffalo, N. Y.—Secretary of War Garrison has instructed the Delaware, Lackawanna & Western R.R. Co. not to moor Lake vessels at the north pier, where the company's shipping trestle has stood for many years. A request that the company be allowed to move the dock back 60 ft. has been denied. Just how the company is to supply coal to vessels during the coming Lake season is in doubt.

Allison, Penn.—Orders have been received by the Allison plants Nos. 1 and 2 of the Rainey interests near Uniontown, to fire all ovens and the two plants are operating to capacity with something like 300 ovens burning. The No. 2 plant is of recent construction and for some time past only a part of the block of 100 ovens has been burning. The ovens at these two plants are of the square type.

Philadelphia, Penn.—Through its attorneys, the Pennsylvania R.R. Co. on Mar. 31 entered a plea of "not guilty" before Judge Dickinson in the United States Court to two indictments of 5 counts each charging it with the granting of rebates to the Glen-White Coal & Lumber Co. on the transportation of bituminous coal and coke from Kittanning Point, Penn., to points in New Jersey and New York.

Scranton, Penn.—The sinking fund of the Nay Aug Coal Co. was drawn upon recently to satisfy collateral trust notes due this year, and all of the notes thus due were retired. Additional money of the sinking fund was used to redeem some of the 1916 notes although they were not yet due. The total of the obligations thus redeemed amounted to $6000. This coal company has a small colliery on Meade St., Dunmore.

Ashtabula, Ohio—The Pennsylvania R.R. Co. now has stored in its yards at the north end of the city at least 30,000 tons of coal which are awaiting shipment to Canada as soon as navigation is open. The Pennsylvania yards are now operating on a 4 yard engine basis, and it is probable that the number of these engines will be increased within the next few weeks or as soon as Lake transportation opens sufficiently.

Pittsburgh, Penn.—A permanent injunction was refused by Judge Thomson of the District Court of the United States for the Western District of Pennsylvania on Apr. 4, and the preliminary injunction dissolved, restraining John H. Jones, one of the receivers, from taking an appeal against the final decree previously handed down by Judge Ford in foreclosure proceedings by the Union Trust Co. against the Pittsburgh-Buffalo Co., and an appeal was taken.

Lewes, Del.—It is believed that the crews of the Consolidation Coal Co.'s barges Nos. 6 and 9, bound from Baltimore to Boston with coal, were drowned when their craft foundered near Cape Henlopen and went to pieces in the gale of Apr. 3. These barges were in tow of the tug "Cumberland" and broke adrift early in the day. Despite great efforts the Cumberland's crew was unable to get another line to the barges which drifted for some time, finally going aground, where they broke to pieces and sank with all on board.

St. Louis, Mo.—The new $50,000,000 barge-loading and unloading trestle on the east side of the Mississippi River, opposite Utah St., owned by the Alton & Southern R.R., was opened for business the past week. Several cars of coal can be handled at one time, it being the intention to ship coal south and bring back other cargoes. This coal will come chiefly from the Belleville District on connections of the Alton & Southern. This is the largest barge-loading device on the Mississippi River, with the exception of those at the extreme southern end.

Pottsville, Penn.—The Supreme Court recently upheld the Schuylkill County Court in refusing to interfere with the mine inspectors' examining board on charges that it refused a certificate to Thomas Reese, although the records showed that he had answered correctly 90 per cent. of the questions asked him. It was held that the Board of Examiners is not only entitled to but is required to exercise sound discretion in issuing inspectors' certificates. It was pointed out that the powers of the mine inspector are great, his responsibilities enormous, and both lives and property were trusted to his keeping. Therefore, under the act creating the Board of Mine Examiners the duty of that body was judicial and not ministerial alone. The Board is, therefore, justified in using its discretion in the awarding of certificates to inspectors. There were no allegations of fraud or conspiracy on the part of the members of the Board to deprive the plaintiff of his rights.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., APR. 1, 1915,

of Coal Age, published weekly at New York, N. Y., required by the Act of August 24, 1912.

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C. W. Dibble, Vice-President,
HILL PUBLISHING COMPANY.

Sworn to and subscribed before me this 31st day of March, 1915.

RICHARD L. MURPHY,
Notary Public.
(My commission expires March 30, 1917.)

Coal Trade Reviews

General Review

Heavy movement of anthracite but the outlook is not encouraging. Bituminous slightly firmer, though purchasers predict a further recession. Some large contracts still open. No improvements in the prospects for the Lake trade.

The cold weather and storms that marked the beginning of the month served to stimulate activity in the anthracite trade for the time being although it is clear that the pace is slowing down. The industrial depression is causing consumers to hesitate about investing heavily in stocks, and the effects of this are reflected back through the dealer, wholesaler, and up to the operator. Orders are dispatched with greater promptness than is ordinarily obtainable during the lowest price period of the year. Indications point to a dull summer succeeded by an exceedingly active fall trade.

The more conservative of the bituminous interests are becoming unusually cautious about committing themselves on long-term contracts, and the month of April is progressing somewhat better than was anticipated. The tonnage for April is running slightly ahead of the March movement which is a rather unusual condition. On the other hand there are still some large contracts to be closed, and these buyers are expressing every confidence in a general break in the market later. It is also a fact that a number of shipments are being either postponed or canceled on current business, and this extra pressure has developed a receding tendency in prices. The export and bunkering tonnage keep up in excellent shape and it is becoming evident that certain interests are making preparations to place large tonnages permanently in the foreign markets.

It is estimated that less than half the normal amount of contract business in the Pittsburgh district has been closed to date, even with the additional inducement of low prices. There has been a slight increase in the demand on current business, but it is still insufficient to absorb the production with the result that there is considerable free coal on the market. Canadian business is especially light. There has scarcely been any negotiations at all on Lake contracts, and it is evident that the opening will be late and the early movement light. The situation is generally indeterminate although rather mixed.

Much the same conditions prevail in Ohio. There has been some stir in railroad contracts but steam users generally are exceedingly backward about accumulating any stocks and generally content to confine their purchases to the open market, for the time being at least. The colder weather toned up the Middlewestern market on certain grades, but caused no decisive change. The retailers have generally experienced a satisfactory winter, due to the low prices prevailing in the wholesale circles, and also to the reduced cost of labor, and easy deliveries as a result of the mild weather.

BUSINESS OPINIONS

Bradstreet's—Progress in distributive trade, notwithstanding the existence of some retarding factors, speedier operations in industrial lines, large foreign buying of steel, relatively heavy trading in stocks, remarkably heavy exports of wheat, good wheat crop advices, and evidences of a disposition to embark in new enterprises, are the preëminent factors in this week's news.

Dun's Review—Domestic trade gains slowly, but war orders and food exports continue very heavy and in all branches of business, and in all sections there is a distinct growth of confidence.

The Financial Chronicle—There is substantial reason for the more confident tone that is gradually spreading through trade and financial circles, even though the end of the European war does not yet appear to be in sight.

Boston News Bureau—There is no doubt but that every day sees a greater degree of confidence the country over. Improvement in general domestic trade is slow, but unless every sign fails, it will be a feature before many months have passed. People are still extremely cautious, which of course strengthens the situation. The grain and cotton markets continue strong and active.

American Wool and Cotton Reporter—The wool market continues quiet, although a large supply of South American and Australian wools arrived during the week. Less business is being transacted than a few weeks ago but prices remain firm.

Engineering News—Returns from building inspectors in 21 cities of the Eastern States show an increase in the contemplated building operations in March of this year compared with the same month last year. While the gain is small the progressive improvement which has continued since the first of the year is highly satisfactory. In the same cities the three months' building operations show a gain of $7,000,000.

The Iron and Steel Industry—Operating to about 70% of capacity, the steel mills are in much better shape regarding orders than on Jan. 1. Recent business has been well above that booked in the first quarter of the year, and while it is estimated that 600,000 tons of pig iron were sold in March, the total sales from merchant furnaces for the first quarter aggregate only 1,000,000 tons. The Steel Corporation is operating at 72% of capacity, and some of the smaller independents are running nearly full. The pig iron movement has eased off slightly in the last ten days, but stocks have been greatly reduced. It is probable that Northern furnaces have 60,000 tons less unsold iron than at the beginning of the year, and the heavy stocks held by Alabama furnaces have been materially reduced. Locomotive works and car builders have both profited by large orders from foreign governments for munitions of war.

ATLANTIC SEABOARD

BOSTON

Slightly firmer attitude toward long-term contracts the only new feature. Pocahontas and New River shippers continue to close small contracts at 1914 basis or less. Georges Creek in excessive supply. Disastrous gale. Anthracite movement seasonable.

Bituminous—While no improvement can be reported in the spot situation the week has developed a somewhat more cautious attitude on the part of Hampton Roads shippers with regard to long-term contracts. Opportunities to name prices for two and three years have been passed over and even on yearly contracts that involve large tonnages there is a disposition to adhere more closely to a remunerative price than has been the case for several weeks. Buyers, on the other hand, are simply waiting for what they call the "inevitable break" later on. In other words, some of the large contracts still open will not be closed until buyers secure the low offerings they count on. Contracts for smaller tonnages continue to be made on last year's figures, or less.

Meanwhile, trade is still very slack. There is no spot business worth mentioning and contractors are inclined to postpone shipments on account of the large stocks. Even cancellations have been made of shipments en route and this has thrown an extra supply on the market inland and prices have receded under the pressure.

There has been little change in Georges Creek. Arrivals here are still in excess of demand and are likely to continue so until output is materially curtailed.

The choicer grades from the Pennsylvania districts are actively competing against Pocahontas and New River and here and there instances are heard of their securing contracts as a result of favorable tests. Buyers are learning to discriminate and there are several good Cambria and Somerset coals that are apparently in this market to stay.

Water Freights show no change. Shippers who have barge transportation of their own are chartering now and then on the open market and there is more than a sufficient supply for all current needs.

The storm of Saturday last took heavy toll of the coal fleet. The Philadelphia & Reading Transportation Line lost three light barges off Cape Cod, and the Consolidation Coal Co. two barges with their crews near Cape Henlopen. The schooner "M. D. Cross" is also reported a total loss near Diamond Shoal.

Anthracite—Ample supplies of all sizes at the loading piers assure prompt dispatch to barges as fast as they report and March and April together will probably be a record period for receipts at this end. Dealers are disposed to take on all they can store but when that point is reached it is realized there will be a long dull season. An unusual number of cargoes sent forward by individual shippers are on the market here. No marked concession in price, however, has so far been heard.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*	2.15@2.65	2.40@2.85	2.92@3.02	
New York*	2.45@2.95	2.70@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.50@2.75
Boston†	....	....	....	3.60@3.73
Providence†	....	....	....	3.50@3.78

* F.o.b. †On cars.

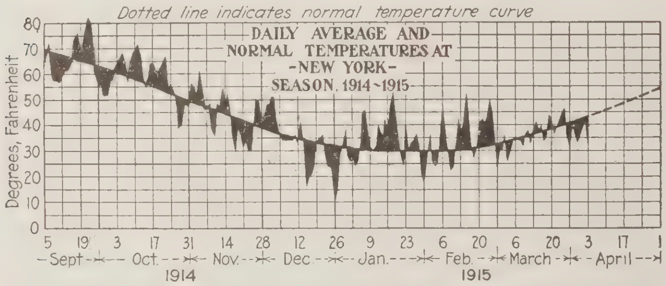
NEW YORK

Current bituminous business quiet but there are indications of an improvement. Anthracite shows signs of slowing down. Light output for this month.

Bituminous—April business shows indications of being better than during March, which is encouraging in view of the fact that the current month is ordinarily one of the dullest of the year. Coal is being rather closely held at the mines, and the supplies at Tidewater are reduced to a point where a temporary shortage occasionally develops. This has had a tendency to stiffen up prices in the spot market, $2.25 being the very best that can be done at the moment on western Maryland as compared with some forced sales of Clearfield coal on demurrage at $2.05 several weeks ago.

The general market continues relatively dull with no indications of any change in sight, although it is not at all likely that the situation through the summer will be any worse than during the past winter. The current month has undoubtedly started off notably better than is ordinarily the case. Bunkering trade is fairly lively. There are reports to the effect that the Berwind-White Co. is assuming a more aggressive attitude; it is commonly understood that they are pounding prices severely on best Miller grades in order to move tonnage and it is also stated that their mines had a full week operations of seven days on special off-shore business that suddenly developed several weeks ago.

Prices on the better grades are somewhat easier, the market now being quotable on the following basis: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.05@3.10; Georges Creek, $3.15.



Anthracite—The unexpected cool weather that marked the opening days of the new coal year, proved an additional inducement to buyers and the April business has opened up actively. The demand is generally strong in all directions but close observers believe that the pace cannot be maintained throughout the month. The unsatisfactory conditions in financial circles is either preventing the consumer from stocking at all or making a substantial reduction in his tonnage; this is naturally reflected in the wholesaler's business and so on back to the operator. The indications now are for a rather slack, if not notably dull summer, succeeded by an extremely active fall market, when the situation may even become acute, should there be much severe weather.

The demand so far seems to be about equally distributed among all grades. The individuals are cutting prices on the steam coals, with the result that the companies are finding these sizes exceedingly difficult to move, and considerable is accumulating at some points. Large distributors are showing some anxiety over shipments for the month, which will undoubtedly be very light, because of the numerous holidays. Practically all the mines shut down on Apr. 1, and were closed until the morning of Apr. 6. Eliminating the Sundays in the month and one or two additional holidays, it has been estimated that the mines will only work 20 full days during the month. With a normal April demand it is doubtful if the requirements could be satisfied on such a curtailed schedule.

The anthracite market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.60	$4.60	$4.55	$4.55
Egg	4.85	4.85	4.80	4.80
Stove	4.85	4.85	4.80	4.80
Chestnut	5.10	5.10	5.05	5.05
Pea	3.55	3.35@3.55	3.50	3.15@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.30@2.40	2.00@2.25	2.10@2.35
Barley	1.80	1.60@1.80	1.75	1.40@1.75

BALTIMORE

Storm caused delays and the sinking of coal laden vessels. Bituminous market flat. Exports continue large.

The heavy storm caused much trouble in the coal trade. Shipments by water were delayed, two coal barges owned by the Consolidation Coal Co. went down off the Chesapeake Capes with their crew of ten, communication by telegraph and telephone out of Baltimore was badly crippled, and delivery work Saturday was stopped. All the South and many parts of West Virginia and western Maryland were cut off from wire communication over Saturday and Sunday.

Bituminous conditions remain flat. Low grade Pennsylvania coals were offering around 85 to 95c., and the poorer grades from West Virginia and western Maryland were offering at from 75 to 85c. in many cases. Fair to best coals in all regions were freely offered at $1.10 to $1.25, with but few takers. Contracting continues the main feature of the trade; most of the mining centers are apparently anxious to get a larger tonnage covered.

Export business continues good. During March a total of 76,888 tons was exported, according to government figures. This makes a total of nearly a quarter of a million tons for the first quarter of the year.

The following coal charters were announced here the past week:

Vessel	Nationality	To	Rate
Vancouver	British	River Plate	$9.48
Ruth E. Cobb		Kingston, Jamaica	
Breynton	British	La Plata	9.60
Farringford		Buenos Aires	
Modiva		Guantanamo	
Sowell	British	West Coast Italy	12.00
Rothley	British	Bordeaux	13.80
Camilla	Norwegian	Bocas del Toro	
Josey	Danish	Port Limon	
Astoria	British	Augusta, Sicily	
Competitor	British	River Plate	

Note—Steamers are indicated by **bold face type**, all others being schooners.

PHILADELPHIA

Anthracite continues on about the same basis as last week. Domestic sizes well taken care of but steam grades are inclined to drag. Bituminous trade listless, with occasional favorable reports.

Anthracite—After almost a week of holidays, mining operations were resumed the early part of the week, and will doubtless continue on full time for the balance of the month, providing the market will absorb the steam sizes. The lack of facilities to store these small sizes may compel some of the companies to curtail operations as it is understood that they are pretty well filled up, though at the present time, the market is absorbing the output.

It is understood the dealers are placing comparatively few orders for April shipment, stating that they do not expect a heavy demand. They also state they are receiving offers from some of the operators to protect them at the April price until September, and in some cases later. The price of pea coal has been further reduced on a slow market; it is being freely offered at $2, and while there may be some sales at $2.25, this is undoubtedly on contracts. Broken size, on full mining, seems to be easier. Egg is short of the market requirements; the opening month of the new coal season invariably finds a shortage in this size, and this year is no exception. Stove is also well taken care of, as well as chestnut.

The Tidewater business to New England continues heavy, barges being loaded as fast as they are returned. Lack of egg coal is seriously handicapping the prompt loading of barges, in some instances, although, as a general rule, there is little or no delay.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.25	$4.25
Egg	4.50	4.50
Stove	4.50	4.50@4.60
Nut	4.75	4.60@4.75

HAMPTON ROADS

Shipments for the week heavy. Demand increasing. March tonnage reaches a total of 1,073,227 tons.

Dumpings at all piers during the week have been heavy. Large shipments have gone coastwise to New England ports and the export movement also shows up well. One cargo has been loaded by the Government for San Francisco, amounting to about 6600 tons. The demand seems to be improving for both coastwise and export shipments and while a large percentage of the movement is on contract, a few large spot sales are being made. The largest export shipment was loaded into the steamer "Cristobal" for the Canal Zone and amounted to about 10,000 tons.

As was expected the dumpings for the month of March ran considerably in excess of the February figures, totaling 1,073,223 tons. The Norfolk & Western Ry. from Lamberts Point dumped 516,141 tons, the Chesapeake & Ohio Ry. at Newport News came second with 315,799 tons and the Virginian Ry. from Sewalls Point dumped 241,287 tons. The Norfolk & Western Ry. dumped as much as the Chesapeake & Ohio and Virginian combined.

Vessels clearing from Hampton Roads during the week of March 26 to April 2, 1915, were:

Norfolk			Newport News		
Vessel	Tons	Destination	Vessel	Tons	Destination
Juno	3,000	Barbados	**Harald**	4500	Bridgetown
Vesuvio	6,000	Italy	**Stromboli**	7000	Naples
Huayna	1,848	Para	**Albergen**	2767	Port Au Spain
Salaminia	3,988	Buenos Aires	**Newton**	7250	Cuba
Buckhausen	2,200	Port Au Spain	**Iolo**	5000	Rio De Janeiro
Cristobal	10,000	Canal Zone			
Maude Palmer	2,457	Para			
Tyskland	2,330	St. Georges			
R. P. Pendleton	1,478	St. Michaels			

Note—Steamers are indicated by **bold face type**, all others being schooners.

OCEAN FREIGHTS

Business quiet over Easter holidays. Market erratic and uncertain.

The Easter holidays have interfered very materially with business.

Early in the week we chartered a number of steamers for export coals, principally to South America, some at $9.36 to the Plate, and since then a large British boat has been closed by others for a similar voyage at $9.48 although it was thought that this market would decline rather than advance, as a number of steamers were offering for such business.

To	Rate	To	Rate
Havana	**$2 75**	Guantanamo	$3.25@3.75
Cardenas or Sagua	2.50@2.75	Demerara	5.50@6.00
Cienfuegos	**3 00**	Bermuda	3.50@4.00
Port au Spain, Trinidad	**3 75**	Vera Cruz	**3 50**
St. Lucia	3.50@3.75	Tampico	**3 50**
St. Thomas	**3 25**	Rio	**10 20**
Barbados	**3 75**	Montevideo, Buenos Aires or La Plata	**9 36**
Kingston	3.00@3.25	Mediterranean*	**10 80**
Curacao	3.50@3.75	Valparaiso†	8.40@9.60
Santiago	3.25@3.75		

Note—Rates noted in **bold face** type are only approximate.
* To a direct port not east of the West coast of Italy, Spain, excluded.
† With 800 tons per day discharge.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Farnham	British	Virginia	Lower River Plate	1934	$9.36 9.60
Farringford	British	Baltimore	Buenos Aires	1995	
Stanley Dollar		Baltimore	Seattle	955	
Modiva	Norwegian	Baltimore	Guantanamo	778	
Astoria	British	Baltimore	Augusta, Sicily	2743	
Sif	Norwegian	Newport News	Fort de France, Martinique	1959	
Josey	Danish	Baltimore	Port Limon	1671	
Mary L. Baxter		Norfolk	Portland	826	
Competitor	British	Atlantic Range	River Plate	2216	
Lewiston		Norfolk	Manaos, Brazil	711	
Ellen Little		Norfolk	Para	807	
Barbara		Norfolk	Bermuda	746	
Ella L. Davenport		Philadelphia	Cardenas	470	

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

PITTSBURGH

Demand scarcely increased, and much free coal depressing market. Contracting has been very light. Lake business still in abeyance.

There has been a slight increase in manufacturing demand, but domestic demand has decreased further and railroad consumption has experienced scarcely any increase. On the whole the demand is quite insufficient to absorb the present production, and there remains much free coal, which is going at all sorts of prices according to the exigencies of individual cases, $1 for mine-run not being minimum in isolated cases.

Contracting for the twelvemonth is also unsatisfactory. By this date nearly all the regular contracts should be closed, yet it is doubtful whether one-half the expiring contracts have been signed up again. Many buyers seem to have concluded that as long as free coal can be purchased at considerably lower prices than can be done on contracts it is no time to enter into contracts. The fact that contract prices are about 15c. lower than prevailed a year ago does not seem to be sufficient to bring them in line.

Prospects for the Lake trade continue poor. No contracts are reported as yet, except in isolated instances, and it certainly cannot be said that buying for the Lake trade has commenced. The opening of shipments will be unusually late, and the early movement will be confined to coal produced by the shippers or due on long-term contracts. Contracts for the twelvemonth are supposed to be on the basis of about $1.15 for mine-run, but the figure seems to have been shaded more often than not in contracts made thus far.

For free coal the regular asking prices, frequently shaded, can be quoted the same as in last report: Slack, 90c.@$1; nut and slack, 95c.@$1.05; nut, $1.05@1.10; mine-run, $1.05@1.10; ¾-in., $1.15; 1¼-in., $1.25, per net ton at mine.

BUFFALO

Continued dullness in bituminous trade. Prices show the effect of much competition. Contracts closed at low figures. Anthracite trade has good April orders; movement by Lake will be delayed.

Bituminous—General dullness still prevails in the Buffalo market due largely to the lack of Canadian orders, though Seaboard conditions are also depressed. Business is just about the same as a month ago and very few lines are working at anywhere near normal. The lack of orders is depressing prices and spot shipments are being picked up at figures that show little profit. Operators are continuing their plan of keeping down the output. Contracts are few and show up rather poorly as compared with last year's prices, being quite often 5 to 10c. lower and even occasionally 15 cents.

The opening up of the Lake trade in bituminous may relieve the situation to some extent and cause a resumption of activity, but the outlook is as yet uncertain. There is no demand for early Lake shipments, as a good deal of coal was carried over from last season.

Prices are unchanged and weak at $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley grades about 25c. lower than Pittsburgh.

Anthracite—The amount of April business is less than normal, though one or two companies report that their trade is holding its own as compared with last year. Dealers have been finding their collections running behind and are forced to buy less than usual. The Lake movement of anthracite may not start until about May 1. Ice conditions remain unsuitable for sailing and the weather has been too cool to allow any breaking up of the ice fields, which extend as far west as Toledo. About 30 cargoes are now afloat here.

COLUMBUS

Trade is still dull. Lake prospects are not good. Production heavily restricted.

The market has continued inactive. On the whole it is in bad shape and immediate hopes for improvement are not bright. Prices are still low, although the new Apr. 1 circulars are no lower than current quotations.

The chief activity of the market has been trading in West Virginia fine coal. With the more general use of mechanical stokers and the curtailed production of lump in Ohio, users of the small sizes have been compelled to look to West Virginia for their supply of fuel. As a result prices on these grades are still strong, ranging from 65 to 75c. and in some instances even higher.

Domestic lump is selling only in small orders. Dealers' stocks are apparently sufficient for the future and they are not ordering in any large quantities as they do not wish to carry over any surplus. Retail prices are still at the winter levels, though a reduction is usually made Apr. 1; dealers believed that it would not stimulate the market to make reductions and consequently they are charging the same prices as formerly.

Steam business is quiet in all directions. Some activity has developed in renewing railroad contracts and sales managers have been working along that line. Steam users are not buying any great tonnage, being loath to accumulate stocks. Many of the manufacturers are content to buy in the open market instead of entering into contracts.

Production has been at a low point all week. In most districts it is estimated at 25% of normal; in the Pomeroy Bend it has been about one-third of the average.

Uncertainty still prevails in the Lake trade. It is believed that fully 5,000,000 tons of coal have been carried over on the docks of the Northwest and this means a late opening. Practically no bottoms have been chartered as yet because of the uncertainty.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	...
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.60
Coarse slack	0.55	0.60	0.50

CLEVELAND

The spot market is offering bargains and sales are only fair. Retail dealers are taking anthracite, but are not stocking as heavily as usual. Some Lake coal is being made.

The spot market is showing some very good bargains. Pan Handle three-quarter has been sold at $2 the last week, slack at $1.70 to $1.75 and mine-run as low as $1.80, with a liberal supply to be had at $1.85. The receipts and left overs Monday totaled 300 cars, half of a normal supply. The coarse coal market is only nominal as buyers are loaded up and selling companies are making prices to suit. There is some Youghiogheny slack on the market with Middle district and Fairmont ample for all needs.

The demand is 5 to 10% stronger than a month ago, but the supply of coal still exceeds the demand.

Anthracite here amounts to 500 to 600 cars. The larger retailers are taking all they can store as the April price is the lowest of the year. Some of the smaller dealers are not in position to dock much hard coal, and as the total consumption in this city is only 100,000 to 125,000 tons the shipments never are very large.

Lake Trade—A few Youghiogheny operators are making Lake coal. Cambridge district is shipping some though not in cargo lots. The outlook for Lake trade does not change, and operators are looking forward to very little business until well into June or July 1. What little Lake coal is being made is also producing slack and accounts for Youghiogheny being shipped into Cleveland with prices as low as they are.

A few ships will sail when navigation opens, Apr. 15, but by May 1 not more than 150 of the 450 bulk freight carriers will be in operation. Unless the shipping business materially changes from the present prospects, it will be late in the summer before many boats will be put in commission. The selling price of iron ore has not been established, and no sales have been reported subject to the 1915 price. The total business for the coming season has been estimated at 40,000,000 tons as compared with 32,000,000 tons in 1914.

Quotations on coal for shipment are:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$2.95	......	......	......	......
Lump, ¾ in.	......	2.20@2.25	2.00	$1.90	$1.90@2.00
Egg	2.95	......	......	......	......
Mine run	2.45@2.50	2.10	1.90	1.80	1.75@1.90
Slack	......	1.80	1.75	1.70	......

CINCINNATI

Lack of domestic demand affects the market. Scarcity of screenings and a surplus of prepared grades and mine-run. Producing conditions are excellent.

Relatively cool weather has benefited the retailers to some extent, but now that winter is over they will not replenish their supplies. Moreover, the Lake movement is not due to open up for some time, even under normal conditions, and the present season bids fair to be very backward. The demand for domestic coal, which has kept the market stiff for nut and slack has ceased; very little is being produced, and that is made only at the expense of the prepared grades, which have to be sacrificed. The resulting tendency is to market straight mine-run, of which there is a plentiful supply. Good nut-and-slack is worth more than mine-run of a corresponding grade.

Hopes of an industrial revival are still expressed, though without much foundation. The railroads refuse to enter the market to any great extent. The Lake movement is expected to relieve things appreciably, when it begins, but hold-over stocks are large, and the movement may be sluggish.

LOUISVILLE

Inclement weather stimulates domestic consumption slightly. Operations still curtailed and prices low.

The expected improvement in the demand has not developed and prospects for the future are indefinite. Continuation of the cold, raw weather, past the usual period, is causing a moderate demand for domestic coals, though there is not enough of this business to keep the mines going. Very few are running full time and the rule is from two to four days a week, depending largely on the grade of coal produced.

Prices are practically unchanged, with the best classes of block coals ranging in the neighborhood of $1.35 and $1.40, egg coals at from $1.15 to $1.25, for 2x4-in. and with the best grades of nut and slack firm at around 70c. There are some price cutters who are going considerably below these figures but these are the nominal quotations.

BIRMINGHAM

Market quiet, with prices low. Steam grades the best.

Business on lump coal seems to be at an absolute standstill, with only a few cars moving; prices are at least 50c. per ton less than the average for this period, and even then, dealers are not stocking much. Steam coal, while in a slightly better condition than lump, is far from satisfactory, though the prices are holding up well under the circumstances.

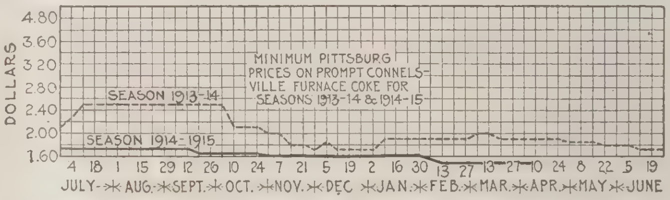
COKE

CONNELLSVILLE

Demand for merchant coke very light. Prices unchanged. Production and shipments slightly increased.

The merchant coke market has been practically without incident in the past week. Here and there tentative inquiries appear for furnace coke but nothing of importance has been closed. Practically all the coke needed to operate furnaces now in blast is provided, and any further activity in merchant coke must depend upon idle furnaces going into blast, something that will hardly occur until there is more activity in the pig iron market. Nothing appears to have been done in the matter of the Pittsburgh Steel Co.'s inquiry for about 20,000 tons of coke a month for the twelvemonth beginning July 1. The market is quotable about as follows: Prompt furnace, $1.50@1.60; contract furnace, to July 1, $1.60@1.65; contract furnace to Dec. 31, $1.75; prompt foundry, $2@2.35; contract foundry (nominal) $2.10@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 27 at 285,237 tons, an increase of 5795 tons, and shipments at 284,713 tons, an increase of 3328 tons.



Buffalo—No improvement in the coke market is visible, although reports are received from the ovens of a stiffer market. The same dullness prevails here as for several months. Prices are low and unchanged at $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—The demand for furnace and foundry coke has slightly improved, with prices the same as last week. More inquiries are being received for domestic coke, and it is felt that the retailers will soon commence to stock domestic sizes. Quotations are as follows: Byproduct, $4.45@4.75; Connellsville, $4.65@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4@4.10; furnace, $4.40@4.65.

MIDDLE WESTERN

CHICAGO

General situation apathetic. Buyers holding off on contracts. Screenings slightly easier. Eastern coals dull.

Slightly colder weather has toned up the demand for some of the Eastern coals in this territory, but it has not caused any decisive change in the situation. Contract business still drags, and it is quite apparent that manufacturing and industrial purchasers are inclined to wait for later developments. Some quotations are being obtained apparently more for comparative purposes with those found in the open markets than with the desire to close. It is clear that some industrial plants are going to take their chances on buying next season in the open market.

Very little activity has been displayed in Hocking coals. A few sales have been made below list, but apparently there is no spot coal on track or in transit.

Prices on eastern Kentucky grades are still demoralized. Some of the Kentucky companies have been crushing mine-run and the coarser sizes in order to supply the steam demand. Eastern Kentucky operators make little progress in placing tonnage of any moment in this territory at the present time.

Improvement is shown in the smokeless situation, and some of this coal is being stored by the retailers. Very little contracting has been done. Splint coals have been rather active, but there has been some consignment coal sold at sacrifice prices. Towards the end of the week, prices were a little firmer after the surplus coal had been eliminated.

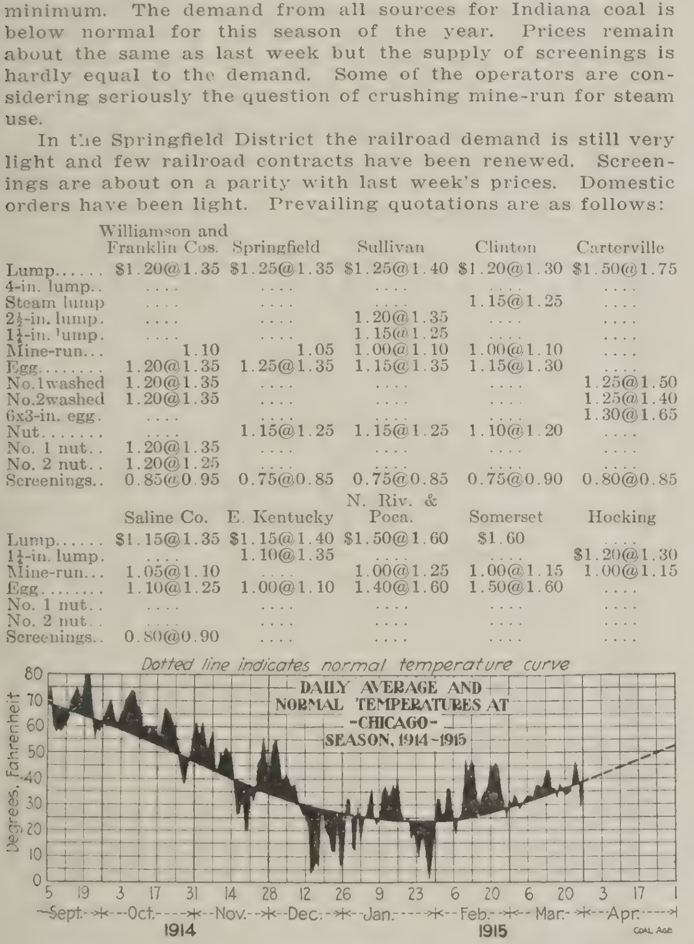
A new circular covering Franklin County lump, egg and nut has been issued at $1.35. The Franklin County operators are still maintaining prices, and restricting production in accordance with the demand. Slightly increased orders resulted from the cold snap recently. Some of the Williamson County operators have been crushing the coarser sizes to meet the steam demand. Screenings from southern Illinois mines are still active, and in good demand at the prices of last week.

The weather in Indiana has been against retail sales, so that the operators have only been called upon to ship enough tonnage to meet contract requirements, which are at the minimum. The demand from all sources for Indiana coal is below normal for this season of the year. Prices remain about the same as last week but the supply of screenings is hardly equal to the demand. Some of the operators are considering seriously the question of crushing mine-run for steam use.

In the Springfield District the railroad demand is still very light and few railroad contracts have been renewed. Screenings are about on a parity with last week's prices. Domestic orders have been light. Prevailing quotations are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.20@1.35	$1.25@1.35	$1.25@1.40	$1.20@1.30	$1.50@1.75
4-in. lump..	....	....	....	....	....
Steam lump	....	....	....	1.15@1.25	....
2½-in. lump.	....	....	1.20@1.35	....	....
1¼-in. lump.	....	....	1.15@1.25	....	....
Mine-run...	1.10	1.05	1.00@1.10	1.00@1.10	....
Egg........	1.20@1.35	1.25@1.35	1.15@1.35	1.15@1.30	....
No.1washed	1.20@1.35	....	....	....	1.25@1.50
No.2washed	1.20@1.35	....	....	....	1.25@1.40
6x3-in. egg.	....	....	....	....	1.30@1.65
Nut.......	....	1.15@1.25	1.15@1.25	1.10@1.20	....
No. 1 nut..	1.20@1.35	....	....	....	....
No. 2 nut..	1.20@1.25	....	....	....	....
Screenings..	0.85@0.95	0.75@0.85	0.75@0.85	0.75@0.90	0.80@0.85

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.15@1.35	$1.15@1.40	$1.50@1.60	$1.60	....
1¼-in. lump.	....	1.10@1.35	....	....	$1.20@1.30
Mine-run...	1.05@1.10	....	1.00@1.25	1.00@1.15	1.00@1.15
Egg.......	1.10@1.25	1.00@1.10	1.40@1.60	1.50@1.60	....
No. 1 nut..	....	....	....	....	....
No. 2 nut..	....	....	....	....	....
Screenings..	0.80@0.90	....	....	....	....



ST. LOUIS

Larger tonnage moving but prices are low. Conditions generally unsatisfactory.

The tonnage moving is better than for the past week or two. The continued cool weather stimulated the demand for the domestic coals and this kept the market in a fairly healthy condition. Prices, however, are as low as they can go, and there is no chance at all of any improvement now for several months, unless it be with the steam sizes. Manufacturing conditions in the St. Louis territory are depressed, and there is nothing to indicate that the demand for steam coal will be great enough to cause any record breaking prices this season, which means that such operations as may continue will have an extremely difficult time in making expenses.

Anthracite threatens to be slow during April and May, and the greatest tonnage this year is likely to move in during June and July. Smokeless is a dead issue.

There was no change the first of April in the retail coal prices in St. Louis.

INDIANAPOLIS

Weather still cool enough to keep up a fair demand for domestic lump. Screenings sell readily. Mines making about four days a week. Contract season opening fairly good.

The nights are cold so that coal fires are kept going and fair trade continues in domestic lump. This helps retailers to clean up stocks but is not benefiting the mines appreciably. However, operators are better able to meet the call for screenings, which are commanding relatively the best price, at 85 to 90c. Mine-run No. 4 is selling at $1.10 to $1.20. Mines are making about four days a week.

The contract season has opened fairly good. It had been predicted in some quarters that there would be some hesitation in making or renewing contracts, but operators say they are being signed up about as usual. The retail yards have not yet made the cut in prices that usually follows the close of winter. The factory demand is improving slowly if at all.

PRODUCTION AND TRANSPORTATION STATISTICS

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports of the United States for January, 1914-15, and for the seven months ending January, 1913-14-15, in long tons:

	Seven Months			January	
Imports from:	1913	1914	1915	1914	1915
United Kingdom	7,218	4,913	21,112	2,120	1,923
Canada........	843,962	579,071	639,686	84,092	99,808
Japan..........	30,004	74,306	58,287	11,385	5,946
Australia and Tasmania....	98,308	141,284	120,219	14,626	25,597
Other countries	448	1,967	1,323	80	801
Total.......	979,940	801,541	840,627	112,303	134,075
Exports:					
Anthracite					
Canada........	2,812,753	2,242,101	2,109,323	191,968	188,781
Brazil.........	....	....	6	....	....
Uruguay.......	....	84	....	....	....
Other countries.	50,358	41,677	38,547	5,447	1,518
Total.......	2,863,111	2,283,862	2,147,876	197,415	190,299
Bituminous					
Canada........	7,002,875	8,516,274	6,005,140	563,848	354,210
Panama........	269,759	241,054	144,219	30,075	28,069
Mexico.........	155,216	182,973	252,138	38,373	44,128
Cuba..........	706,776	685,759	595,328	94,499	59,197
West Indies.....	329,436	337,271	253,390	72,737	13,797
Argentina......	....	52,801	151,419	10,480	7,259
Brazil..........	....	170,521	201,483	27,357	19,375
Uruguay.......	....	16,858	30,494	....	...
Other countries.	563,114	675,118	1,051,287	86,391	107,110
Total.......	9,027,176	10,878,629	8,684,898	923,760	633,145
Bunker coal....	4,230,690	4,575,059	3,949,914	607,652	528,418

VIRGINIAN RAILWAY

Shipments over this road for January of the current year amounted to 344,139 short tons as compared with 276,015 during the preceding month.

FOREIGN MARKETS

GREAT BRITAIN

Mar. 26—Values are strong for all descriptions. Outputs are very short and stemming difficult of arrangement for April positions. Quotations are approximately as follows:

Best Welsh steam.......	Nominal	Best Monmouthshires....	$7.80@7.92
Best seconds...........	$8.16@8.40	Seconds...............	7.56@7.80
Seconds...............	7.68@7.92	Best Cardiff smalls......	4.92@5.05
Best dry coals.........	7.68@7.92	Cargo smalls..........	4.32@4.44

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is still quiet owing to stemming difficulties. Rates are easy for prompt and steady for forward positions. The following are approximately the current values:

Gibraltar.........	$4.08	Naples..........	$4.56	Las Palmas......	$3.60
Malta...........	....	Venice, Ancona...	9.60	St. Vincent.......	4.80
Marseilles........	5.02	Alexandria.......	6.24	Rio Janeiro......	5.52
Algiers...........	4.63	Port Said........	6.00	Monte Video.....	5.76
Genoa...........	4.56			River Plate......	6.00

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

+Indicates contracts regarding which official information has been received.

+**No. 220—Richmond, Va.**—Bids will be received until 2 p.m., Apr. 14, for furnishing the U. S. Post Office with 400 tons of bituminous coal (p. 446). Address Custodian H. T. Thornton, U. S. Post Office, Richmond, Va.

+**No. 221—Columbus, Ohio**—Bids will be received until 2 p.m., Apr. 14, for furnishing the U. S. Post Office with 700 tons of bituminous coal (p. 446). Address Custodian S. A. Kinnear, U. S. Post Office, Columbus, Ohio.

+**No. 262—St. Louis, Mo.**—Bids will be received until Apr. 14 for furnishing and delivering 360 tons of bituminous coal to the Federal Building (p. 447). Address Custodian Fountain Lorthwell, Federal Bldg., St. Louis, Mo.

+**No. 292—West Point, N. Y.**—Sealed proposals in triplicate will be received until noon, Apr. 15, for furnishing and delivering charcoal, smithing and gas coal, as required at this post for the fiscal year 1916 (p. 487). Address Depot Quartermaster Maj. E. J. Timberlake, West Point, N. Y.

+**No. 363—Toledo, Ohio**—Bids on this contract, which provides for furnishing 10,000 tons of bituminous and 5000 tons of anthracite coal to the local water-works (p. 566), were as follows, per ton:

BIG FOUR COAL CO.—High Service Station, 14,850 B.t.u., $2.05; 13,700 B.t.u., $1.90; 14,445 B.t.u., $2.05; 14,662 B.t.u., $2.10. Low Service, Dorothy Nut, $2.30; 13,800 B.t.u., $2.25.

A. G. BLAIR CO.—High-Service Station, Dorothy 2-in. nut and slack, $2.

CENTRAL STATES COAL CO.—High-Service Station, Dorothy 2-in. nut and slack, $2.05; Winifrede washed pea coal, $2.15. Low-Service Station, 14,750 B.t.u., $2.15.

W. A. GOSLINE CO.—High-Service Station, 12,761 B.t.u., $1.625; 14,312 B.t.u., $1.925; 13,326 B.t.u., $1.83. Low-Service Station, Hocking washed pea, 3x1¼-in. nut, $2.05; Ethel Logan, W. Va., 2x¾-in. nut, $2.19.

JEWETT, BIGELOW & BROOKS—High-Service Station, 13,500 to 13,600 B.t.u., $1.90; 13,300 B.t.u., $1.83.

GEORGE M. JONES CO.—High-Service Station, 12,523 B.t.u., $1.60. Low-Service Station, 13,514 B.t.u., $2.25.

PETER KOENIG COAL CO.—High-Service Station, 14,000 B.t.u., $2.10.

MANCOURT-WINTERS CO.—High-Service Station, 14,000 B.t.u., $1.95. Low-Service Station, 14,000 B.t.u., $2.35.

NEW RIVER & OHIO COAL CO.—High-Service Station, 14,000 B.t.u., $2.10; 13,500 B.t.u., $1.89. Low-Service Station, Coal Valley nut, $2.15.

OHIO & KENTUCKY COAL CO.—High-Service Station, Dorothy nut, pea and slack, $2.05; 13,188 B.t.u., $1.85. Low-Service Station, Dorothy nut, $2.35; 14,216 B.t.u., $2.35; 14,352 B.t.u., $2.50.

JOHN T. SOLON—High-Service Station, 14,443 B.t.u., $1.80. Low-Service Station, 12,086 B.t.u., $2.05.

WEST VIRGINIA POCAHONTAS SALES CORPORATION—High-Service Station, 14,300 B.t.u., $1.95. Low-Service Station, Panther nut and slack, $1.95.

W. H. WARNER COAL CO.—High-Service Station, 12,500 B.t.u., $1.54.

WEST CRESCENT FUEL CO.—High-Service Station, 14,100 B.t.u., $1.90; 11,250 B.t.u., $1.70; 14,250 B.t.u., $2.03; 14,100 B.t.u., $2. Low-Service Station, 14,100 B.t.u., $2.40; 13,560 B.t.u., $2.05. Address Supt. G. A. Gessner, Jr., City Water Department, Toledo, Ohio.

+**No. 367—Dunkirk, N. Y.**—Bids will be received until Apr. 13 for furnishing the Board of Water Commissioners with coal for the ensuing year (p. 566). Address Secy. Baumgartner, Board of Water Commissioners, Dunkirk, N. Y.

+**No. 382—New York, N. Y.**—Bids on this contract (p. 567), which provides for furnishing 1200 gross tons of No. 3 buckwheat coal and 400 tons semibituminous mine-run coal, at Amsterdam Ave. and 139th St., were as follows:

Bidders	Buckwheat	Semibituminous
C. D. Norton	$2.36	$3.34
J. W. Peale	2.39	3.41
Pattison & Bowns	2.53	3.43

Address Curator R. V. Davis, Room 114 Main Building, 139th St. and Convent Ave., New York.

+**No. 383—New York, N. Y.**—The bidders on this contract (p. 567), which provides for furnishing and delivering coal to Bellevue and Allied Hospitals, Departments of Correction, Fire, Public Charities, Parks, Bronx and Queens Parks, were as follows: T. R. Thorn, J. E. Donovan, A. J. J. McCullum, S. Trimmer & Sons, Wm. Brennen, Jos. Johnson's Sons, Pattison & Bowns, C. D. Norton, Bacon Coal Co., Burns Bros., A. D. Dreyer, E. Nichols & Co., G. D. Harris, C. Vanderbilt, S. Hore, Jamieson & Bond, Shrader Coal Co., J. F. Schmadeke, Gavin Rowe, M. L. Bird, J. W. Peale, William Farrell, Jergen Rathgen, Parksburg Coal Co., O. J. Stephens, J. E. Becker, Meyer, Denker & Sinram, J. S. Conabeer. Address Contract Clerk, Room 1226 Municipal Bldg., New York.

+**No. 395—Chicago, Ill.**—Bids will be received until 11 a.m., Apr. 15, for furnishing coal required at the posts of the Central Department during the fiscal year commencing July 1 (p. 567). Address the Depot Quartermaster, 566 Federal Building, Chicago, Ill.

+**No. 396—National Soldiers' Home, Va.**—Sealed proposals will be received until 1:30 p.m., Apr. 16, for furnishing 10,000 tons of bituminous coal to the Southern Branch N. H. D. V. S. National Soldiers' Home (p. 567). Address Treas. S. E. Skinner, National Soldiers' Home, Va.

+**No. 413—Albany, N. Y.**—Sealed proposals will be received until 10 a.m., Apr. 20, for furnishing and delivering the following:

No. 1—About 10,000 tons of No. 1 buckwheat anthracite and 2500 tons of bituminous slack coal at the State Power House.

No. 2—About 600 tons of grate and 50 tons of stove or chestnut to the State Hall, at the Agricultural and Geological Hall and the Executive Mansion. Address Supt. of Pub. Bldgs. William H. Storrs, Capitol, Albany, N. Y.

+**No. 422—Buffalo, N. Y.**—Bids on this contract (p. 568), which provides for furnishing and delivering about 500 tons of coal at the various bridges in the city, were as follows:

C. A. & M. KEISER—For grate size: April, $5.45; May, $5.55; June, $5.65; July, $5.75; August, $5.85; September to Mar. 31, 1916, $5.95.

BUFFALO FUEL CO.—Grate size: April, $5.47; May, $5.57; June, $5.67; July, $5.77; August, $5.87; September to Mar. 31, 1916, $5.97.

Address Asst. Engr. Frank E. Jackson, Bureau of Engineering, Municipal Building, Buffalo, N. Y.

+**No. 437—Boston, Mass.**—Sealed proposals will be received until 2 p.m., Apr. 14, for furnishing coal to the Post Office and Sub-Treasury Building during the fiscal year ending June 30, 1916 (p. 627). Address Custodian William F. Murray, U. S. Post Office and Sub-Treasury, Boston, Mass.

+**No. 439—Fort Sam Houston, Tex.**—Sealed proposals will be received until 11 a.m., Apr. 15, for furnishing coal to the Southern Department posts during the fiscal year commencing July 1, 1915 (p. 627). Address Depot Quartermaster G. S. Bingham, Fort Sam Houston, Tex.

+**No. 448—Springfield, Mass.**—Sealed proposals will be received until 10 a.m., Apr. 15, for furnishing coal to the armory for the fiscal year commencing July 1, 1915 (p. 627). Address Depot Quartermaster, Springfield Armory, Springfield, Mass.

No. 451—Chicago, Ill.—The American Sand & Gravel Co. will purchase throughout the coming year about 100 cars of Illinois or Indiana lump coal. The first purchase will be made about Apr. 15 (p. 627). Address Gen. Mgr. Fisher, American Sand & Gravel Co., Chicago, Ill.

+**No. 452—San Francisco, Calif.**—Sealed proposals will be received until 10 a.m., Apr. 15, for furnishing bituminous mine-run coal for the army transports and for the National Cemetery and Recruiting Office (p. 627). Address Depot Quartermaster Lieut.-Col. W. H. Hart, 1086 North Point St., San Francisco, Calif.

+**No. 466—Reading, Penn.**—Sealed proposals will be received until 10 a.m., Apr. 14, for furnishing coal to the Berks

County Prison (p. 628). Address County Controller D. K. Hoch, County Controller's Office, Reading, Penn.

+No. 475—Rock Island, Ill.—Sealed proposals will be received until 11 a.m., Apr. 15, for furnishing fuel to the Arsenal for the fiscal year commencing July 1 (p. 628). Address Lieut.-Col. Kenneth Morton, Rock Island Arsenal, Ill.

NEW BUSINESS

+No. 486—Boston, Mass.—Bids will be received some time during May for furnishing the various state institutions of the Board of Insanity with a year's supply of coal. The quantities involved and the price per ton of last year's supply were as follows:

Institution	Tons	Price	Delivery
Worcester Hospital	5500	$4.55	In bins
Taunton Hospital	2500	4.18	At siding or trestle
Northampton Hospital	2000	4.15	At siding or trestle
Danvers Hospital	6500	3.64	F.o.b. Salem
Westboro Hospital	4750	3.53	F.o.b. Providence
Boston Hospital (Main)....	6000	4.95	In bins
Boston Hospital (Psychopathic)	1500	4.92	In bins
Worcester Asylum	1600	4.10	At siding or trestle
Medfield Asylum	6000	4.28	At siding or trestle
Gardner Colony	800	4.35	At siding or trestle
Monson Hospital	4000	4.20	At siding or trestle
Foxboro Hospital	1300	4.38	At siding or trestle
Waverley (Mass. School for for Feeble-Minded)......	3000	4.05	F.o.b. Mystic Wharf
Wrentham	1500	4.28	Railroad station

Address Financial Agt. E. R. Libby, Room 6, State House, Boston, Mass.

+No. 487—Reading, Ohio—The Municipal Water Works & Electric Light Plant will be in the market about May 1 for 2000 tons of New River smokeless mine-run coal, the present contract being closed at $2.55 per ton. Address Supt. Barrett A. Burns, Municipal Water Works & Electric Light Plant, Reading, Ohio.

No. 488—Hartwell, Ga.—The Franklin Light & Power Co. of this place will be in the market about May 1 for 1500 tons of Brushy Mountain screened coal, the present contract being closed at $3.40, delivered. Address Mgr. Albert L. Couch, Franklin Light & Power Co., Hartwell, Ga.

+No. 489—Staples, Minn.—The Municipal Electric Light Plant here will be in the market about May 1 for 2000 tons of Youghiogheny screenings. The present contract was closed at $3.25 per ton. Address Supt. John Effinger, Municipal Electric Light Plant, Staples, Minn.

No. 490—Chicago, Ill.—The Armstrong Paint & Varnish Co. will contract for a year's supply of No. 5 washed Illinois or Indiana coal. The contract calls for about 18 carloads. Address Purchasing Agent, Armstrong Paint & Varnish Co., Chicago, Ill.

No. 491—Alexandria, Minn.—The Board of Public Works at this place will be in the market about May 1 for 1500 to 1800 tons of Elkhorn and Youghiogheny screenings. The present contract was closed at $3.75 per ton. Address Chief Clerk, Board of Public Works, Alexandria, Minn.

+No. 492—New Orleans, La.—Sealed proposals will be received until 11 a.m., May 1, for furnishing coal for the United States plant from July 1, 1915, to June 30, 1916. Address Maj. Edward H. Schulz, Room 325, Custom House, New Orleans, La.

No. 493—Yonkers, N. Y.—Bids are requested for furnishing approximately 400 tons of coal to be delivered at various apartments. Address J. Romaine Brown & Co., Real Estate Agents, 506 South Broadway, Yonkers, N. Y.

No. 494—Madison, Ill.—The Barber Asphalt Co. of this place usually contracts during April for a supply of standard 2-in. lump coal. The company consumes from 12 to 15 cars per month. Address Purchasing Agent, Barber Asphalt Co., Madison, Ill.

+No. 495—Paterson, N. J.—Bids will be received about May 1 for furnishing 4000 tons of anthracite coal in pea, stove and egg sizes. The present contract was closed as follows: Pea, $4.30; stove, $5.60 to $6.10; egg, $5.60 to $6.10. Address Secy. James F. Dunphey, Board of Education, Room 24, City Hall, Paterson, N. J.

+No. 496—Malden, Mass.—The Board of Education will contract about May 1 for 1600 tons of anthracite egg coal and 700 tons of bituminous New River coal. The present contract was closed at $5.80 for anthracite and $4.68 for bituminous. Address the Fuel Committee, High School Bldg., Malden, Mass.

+No. 497—Richmond, Va.—The local city government will be in the market during May for its annual requirements of coal, which amounts to about 250 tons of anthracite, and 2000 tons of steam coal. On last year's purchase, the anthracite was bought at $6.33 per ton, and the steam coal at $3.39 per ton, delivered in the cellar and weighed on city scales. The best New River mine-run steam coal and Pennsylvania anthracite are used. The call for bids is advertised. Address Clk. and Superv. C. P. Walford, Committee on Buildings and Furniture, School Board, Richmond, Va.

+No. 498—Grafton, N. D.—The local City Light & Water Plant will contract on the first Monday in May for its annual requirements of coal involving about 550 tons of screened lump Youiogheny. The business is let on a competitive basis, and last year brought $5.90 per ton, delivered in the bin. Address Supt. Karl H. Smith, City Light & Water Plant, Grafton, N. D.

No. 499—Chicago, Ill.—Birk Bros. Brewing Co. will purchase 500 tons per month of Illinois or Indiana mine-run. They will be in the market about May 1 for one month's supply, and will make subsequent purchases the first of each succeeding month throughout the year. Address, Purchasing Agent, Birk Bros. Brewing Co., Chicago, Ill.

No. 500—Louisville, Ky.—The Christ Brewing Co. will contract this month for a year's supply of nut and slack. The company usually consumes three or more car loads a month. Delivery to be by rail on L. & N. terminal. Address J. B. Rapier, Christ Brewing Co., 318 Baxter Ave., Louisville, Ky.

+No. 501—Sullivan, Ill.—The local City Government will contract for its annual requirements of coal about May 9. Last year 1200 tons of mine-run coal were purchased at $1.75 delivered in the power house. The business is let on competitive bids. Address Supt. Hugh Hoke, Sullivan, Ill.

+No. 502—Perry, Okla.—The local Water & Light Dept. will be in the market during May for about 1100 tons of bituminous coal. Slack is used almost exclusively, and the average price for all the requirements is about $2.20. The business is let on competitive bids. Address Supt. J. G. Cronin, Water & Light Department, Perry, Okla.

+No. 503—Evanston, Ill.—The local City Government usually contracts for its annual requirements of coal during May. About 1400 tons of both bituminous and anthracite are required and the purchase is made on a B.t.u. basis. The prices at which the business was concluded last year were: Pocahontas, $4.50; anthracite, $7.45. Bids are solicited from all the local dealers. Address the Board of Education, Haven High School, Evanston, Ill.

+No. 504—Dover, N. J.—Sealed proposals in triplicate will be received until 1 p.m., Apr. 26, for furnishing and delivering about 8000 tons of bituminous slack or mine-run coal at the Picatinny Arsenal on the Wharton & Northern R.R. Address the Commanding Officer, Picatinny Arsenal, Dover, N. J.

No. 505—Louisville, Ky.—The Finzer Tobacco Co., which usually consumes about 225 tons of nut and slack coal a year, will contract May 1 for a year's supply. Delivery by wagon as instructed. Address Purchasing Agent, Finzer Tobacco Co., 4019 Finzer Ave., Louisville, Ky.

No. 506—Chicago, Ill.—The Barrett Mfg. Co. will be in the market about Apr. 15 for 20,000 tons Illinois screenings. Contract for one year. Address Purchasing Agent, Barrett Mfg. Co., Chicago, Ill.

+No. 507—Allentown, Penn.—The Board of Education at this place will be in the market during May for its annual requirements of coal, which involves from 1600 to 1800 tons of pea, the price last year being $4.25 per ton. The call for bids is always advertised. Address Board of Directors, 540 North Sixth St., Allentown, Penn.

+No. 508—Philadelphia, Penn.—The Board of Education here will be in the market during May for its annual requirements of coal, bids for which are advertised in three papers for three weeks. The tonnage involved aggregates approximately 4500 tons of the best Lehigh or Schuylkill egg, stove, nut, pea and rice coal, prices ranging from $3.28 to $7.15 per ton last year. About 13,000 tons are bought under the B.t.u. system and the balance on specifications. Address Superintendent of Supplies, Board of Public Education, Room 392 City Hall, Philadelphia, Penn.

+No. 509—Chelsea, Mass.—The local city government will be in the market during May for its annual requirements of coal which aggregate about 1700 tons. The grades bought last year together with prices were: Broken $5.87, soft $4.40, egg coal $6.48. Address Superintendent of Public Buildings, City Hall, Chelsea, Mass.

No. 510—Chicago, Ill.—Darling & Co. is now in the market for two cars per day of Illinois or Indiana screenings. Contract for one year.

+No. 511—National Military Home, Ohio—Sealed proposals will be received at the office of the Treasurer, Central Branch, N. H. D. V. S., National Military Home, Ohio, for furnishing and delivering coal supplies. Specifications and blank proposals can be had upon application to the Treasurer. Bids close at 1 p.m., May 1, 1915. Address Treasurer W. H. Ortt, National Military Home, Ohio.

No. 512—Chicago, Ill.—The Barber Asphalt Paving Co. will be in the market about Apr. 25 for one car per day of southern Illinois screenings. Contract will run for one year. Address, Purchasing Agent, Barber Asphalt Paving Co., Chicago, Ill.

+No. 513—Pawnee, Okla.—The local city government contracts for its coal requirements during May. About 1500 tons of slack and mine-run coal is required and the customary price is $1.55 per ton. It is let on competitive bids. Address Clk. H. A. Beproul, Pawnee, Okla.

+No. 514—Springfield, Ill.—The local School Board will soon contract for its annual requirements of coal. During the season 1913-1914, the requirements covered 75,202 bu. of mine-run coal, for which $1.54 was paid, and 29,691 bu. of pea coal at $1.44; the respective prices for 1914-1915 were, mine-run, $1.74, and pea, $1.54. The call for bids is advertised and the business is let on the recommendation of the Committee on Supplies, approved by the Board. Address Committee on Supplies, Leland Office Bldg., sixth floor, Springfield, Ill.

+No. 515—Elmira, N. Y.—The Board of Education at this place will be in the market during May for its annual requirements of coal. The last purchase involved 687 tons of anthracite and 1167 tons of bituminous coal, the former costing $6 per ton and the latter $3.25 per ton. Address Board of Education, Elmira, N. Y.

+No. 516—Milledgeville, Ga.—Sealed proposals will be received until 10 a.m., Apr. 28, for furnishing about 10,000 tons of mine-run steam coal to the Georgia State Sanitarium. Delivery is to be made as required at sanitarium, on Milledgeville R.R. or Central of Georgia R.R. and at water-works pumping station. Address Steward L. J. Lamar, Georgia State Sanitarium, Milledgeville, Ga.

No. 517—Louisville, Ky.—The Jefferson Realty Co., which consumes about four tons of pea and slack a day, will contract on Apr. 10 for a year's supply of this coal at a cost not to exceed $1.50 per ton. Delivery by wagon. Address W. C. Dabney, Jefferson Realty Co., Paul Jones Bldg., Louisville, Ky.

No. 518—Chicago, Ill.—The Bowman Dairy Co. will be in the market about Apr. 15 for one year's contract for 30 cars per month of southern Illinois screenings. Address Pur. Agt. D. B. Peck, Bowman Dairy Co., Chicago, Ill.

+No. 519—Seattle, Wash.—Sealed proposals will be received until 11 a.m., Apr. 26, for furnishing bituminous fuel and steam coal as required by the Quartermaster Corps at Seattle and Tacoma, during the year 1916. Address Col. George B. Davis, Depot Quartermaster's Office, Seattle, Wash.

+No. 520—Jeffersonville, Ind.—Sealed proposals will be received until 10 a.m., Apr. 21, for furnishing the Depot of the Quartermaster's Corps with such quantities of bituminous coal as may be required during the period commencing July 1, 1915, and ending June 30, 1916. Address Depot Quartermaster Maj. Joseph T. Davidson, Jeffersonville, Ind.

+No. 521—Front Royal, Va.—Sealed proposals in triplicate will be received until 2 p.m., Apr. 21, for furnishing about 345 tons of anthracite coal to the Front Royal Remount Depot. Address Depot Quartermaster, Front Royal, Va.

+No. 522—Lorain, Ohio—Bids will be received until noon, Apr. 19, for furnishing coal for the school year 1915-1916. Address Clk. O. E. Bruell, Board of Education, Lorain, Ohio.

+No. 523—Xenia, Ohio—Sealed proposals will be received until noon, Apr. 22, for furnishing about 470 tons of Pocahontas mine-run coal and 150 tons of Hocking lump coal. Coal is to be delivered in the bins of the different schoolhouses and is to be weighed on scales designated by the Board. Bids should be made f.o.b. Xenia. Address Clk. B. Schlesinger, 33 East Main St., Xenia, Ohio.

+No. 524—Washington, D. C.—Sealed proposals will be received until 2 p.m., May 3, for furnishing and delivering during the fiscal year ending June 30, 1916, coal for use in the various branches of the Government of the District of Columbia. Address Comr. Oliver P. Newman, Room 320, District Building, Washington, D. C.

+No. 525—Washington, D. C.—The following are the bids received on Mar. 29 for furnishing to the Naval Service about 100,000 tons of coal. Coal is to be of good quality, steaming, semibituminous mine-run, with at least 40% lump, and must be dry and practically free from slate, dirt, sulphur and other impurities: Castner, Curran & Bullitt, $2.75; C. G. Blake Co., $2.85; William C. Atwater & Co., $2.80; Clinchfield Fuel Co., $2.50; Chesapeake & Ohio Coal & Coke Co., $2.75; Crozer-Pocahontas Co., $2.85; Gulf Smokeless Coal Co., $2.75; Maryland Coal & Coke Co., at the rate of not less than 8000 tons per month, $2.73; at the rate of not less than 5000 tons per month, $2.83; Archibald McNeil & Sons Co., $2.74; Pocahontas Fuel Co., $2.85; West Virginia Coal Co., $2.80; Wittenburg Coal Co., $2.80. Address Paymaster-Gen. of the Navy Samuel McGowan, Washington, D. C.

+No. 526—Easton, Penn.—Sealed proposals were received up to 4 p.m., Apr. 7, for furnishing the various school buildings with 50 tons pea, 100 tons nut, 550 tons stove and 50 tons egg coal. All coal is to be well screened and from either Highland or Jeddo collieries. Address Chn. Dr. F. C. Sandt, Committee on Supplies, Easton, Penn.

+No. 527—San Francisco, Calif.—Sealed bids will be received until 11 a.m., Apr. 23, for furnishing coal and coke as required at the Posts in the Western Departments during the fiscal year commencing July 1, 1915. Address Col. H. S. Wallace, "Chronicle" Building, San Francisco, Calif.

No. 528—Boston, Mass.—The Boston Elevated Ry. Co. recently requested proposals for its coal requirements for one-, three- and five-year periods, and expects to close the business shortly. Address Pur. Agt. Edward Mahler, Bureau of Purchase, Boston Elevated Ry. Co., 101 Milk St., Boston, Mass.

No. 529—Freeport, Ill.—The Freeport Gas Co. will soon be in the market for about two cars per month of northern Illinois egg coal. Bidders should state the location of their mines and give the freight rate to Freeport. Address Mgr. E. D. V. Dickey, Freeport Gas Co., 156 Stephenson St., Freeport, Ill.

+No. 530—Muscatine, Ohio—Sealed bids will be received until 5 p.m., Apr. 12, for furnishing about 300 tons of 1½-in. or 2-in. screened lump coal. Specifications are on file with the County Auditors in Muscatine and Louisa Counties, also the Harman Engineering Co., Peoria, Ill. Address County Audr. H. C. Shoemaker, Muscatine, Ohio.

No. 531—Frankfort, Ky.—Awards by the State Prison Commission for furnishing 12,000 tons of coal for the State Reformatory and 7000 for the School of Reform are expected to be made shortly. Address State Prison Commission, Frankfort, Ky.

No. 532—Cincinnati, Ohio—Sealed bids will be received until noon, Apr. 14, for furnishing and delivering coal for the River Pumping Station and Water-Works Department. Proposals must be accompanied by a bond for $1000 or a certified check. Bids must be submitted on printed forms, which will be furnished on request. Address Dir. of Pub. Service Philip Fosdick, City Hall, Cincinnati, Ohio.

No. 533—Chicago, Ill.—The Cole Manufacturing Co. here purchases 10 to 14 cars of Indiana mine-run coal per year for heating purposes only. The company does not contract. Address C. C. Cole, Cole Manufacturing Co., 3218 South Western Ave., Chicago, Ill.

CONTRACTS AWARDED

Note—Successful bidders are noted in **bold face** type.

+No. 312—Chicago, Ill.—The awards on this contract (p. 448), which provides for furnishing and delivering coal to the various pumping stations, were as follows, per ton:

Bickett Coal & Coke Co.—Chicago Ave. (lump), $2.301; 14th St., (lump), $2.394; Springfield Ave. (screenings), $2.02; Rogers Park (lump), $2.92; 68th St. (screenings), $1.59; Lake View (nut), $2.61.

Edner Coal & Coke Co.—Central Park Ave. (lump), $1.97; Roseland (screenings), $1.583.

Pilsen Coal Co.—22d St. (lump), $2.168; Harrison St. (screenings), $1.96.

Address Comr. of Pub. Wks. L. E. McGann, Room 406, City Hall, Chicago, Ill.

No. 331—Springfield, Mass.—This contract, which provides for furnishing 8000 to 10,000 tons of anthracite and bituminous coal (pp. 527 and 566), has been awarded as follows:

Maynard Coal Co.—250 tons Lackawanna stove or nut coal for Outside Poor; 55 tons Lackawanna stove or nut for Soldiers' Relief; delivery to be in ¼- and ½-ton lots as called for, at $7.24 per ton.

Ehrlich Coal Co.—600 tons of Lehigh stove for Departments of Streets and Engineering, delivery to steam rollers, etc., in any part of the city, 500 tons prior to Sept. 1, 1915, 100 tons after Sept. 1, at $6.78 per ton; 507 tons egg, 45 tons nut, 22 tons stove, for Fire Department; 12 tons Lehigh nut or stove for Board of Health; 25 tons Lehigh stove for Police Station No. 2; Indian Orchard, egg and stove, $6.90; nut, $7.10.

Converse Coal Co.—3300 tons bituminous for various schools; 700 tons for Almshouse; 900 tons for Municipal Heating Plant, at $4.43 per ton; 1475 tons of Lackawanna egg and stove for various schools, at $6.83 per ton.

Tait Coal Co.—1930 gross tons grate coal for various schools, at $6.50 per gross ton.

+No. 332—Buffalo, N. Y.—This contract (p. 528), involving 35,000 tons of ¾-in. slack coal, has been awarded to the **Frick Coal & Coke Co.** at $1.88 per ton. Address Comr.-Colonel Francis G. Ward, Department of Public Works, Buffalo, N. Y.

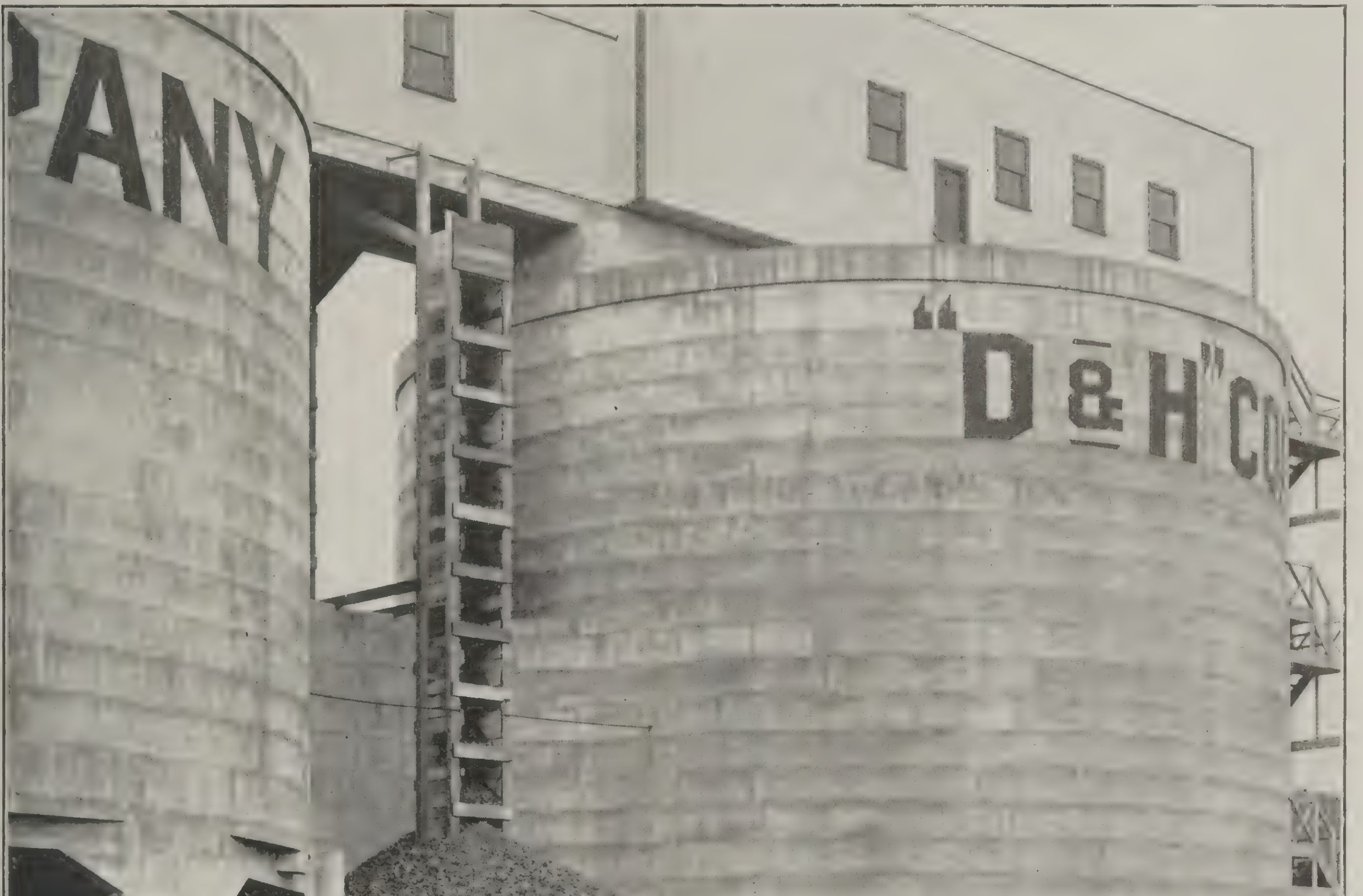
STATE GEOLOGICAL SURVEY.

COAL AGE

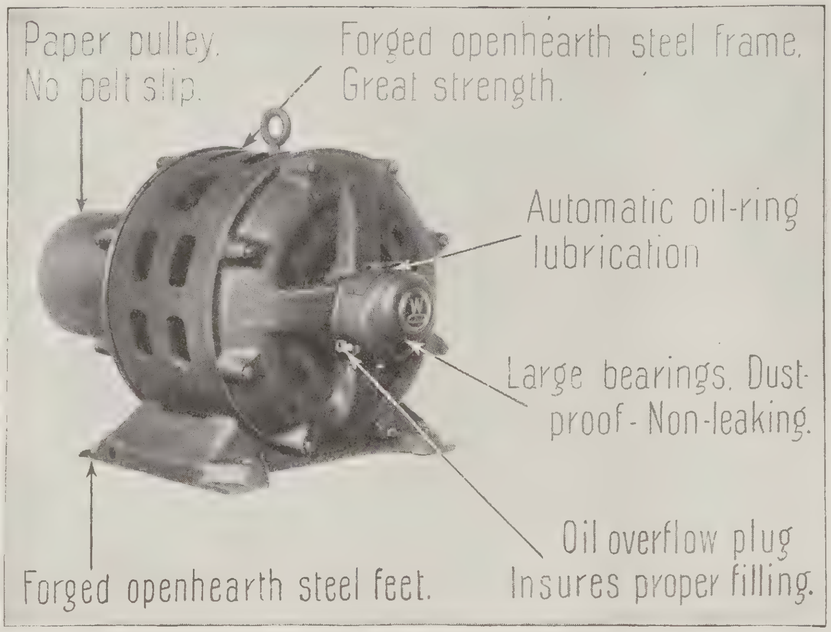
Volume 7, No. 16
Issued Every Saturday
Hill Publishing Company

NEW YORK, APRIL 17, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page



Cylindrical Concrete Storage Bins of the Delaware & Hudson Coal Co., Springfield, Mass.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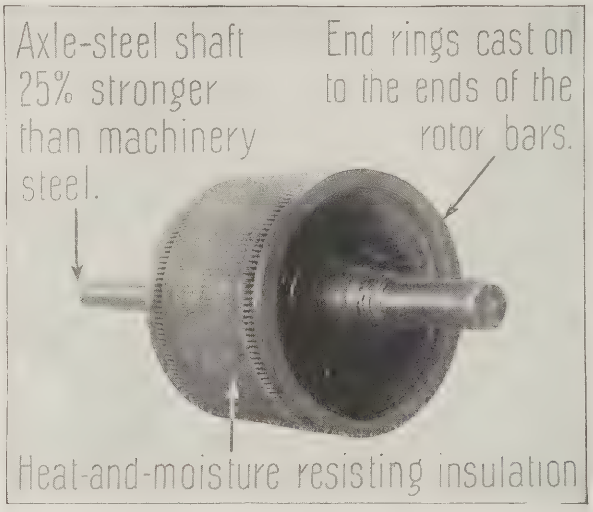
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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 11,000
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

Seven Letters from Illinois

NELS G. JOHNSON, Mine Manager of the W. P. Rend Collieries Co., Rend, Ill., writes:

"I have read Coal Age for the last three years and have found it to be a great help in my work as it gives me the ideas of all the greatest mining men in the United States and the old countries. The advertising is certainly of the very best and no Superintendent can very well do without it."

* * *

A. H. SHAW, Superintendent of the Western Coal and Mining Co., at Bush, Ill., writes:

"The advertising features of Coal Age are especially good. We find practically all of the foremost companies engaged in the manufacturing and selling of mining supplies represented in the advertising section. Your magazine is especially useful at requisition time, as we look to the advertising columns and make recommendations for purchases from the many advertisers found therein."

* * *

HENRY D. THOMPSON, Superintendent of the Big Muddy Coal and Iron Co., at Herrin, Ill., writes·

"I have been reading Coal Age since the first copy was published and while there have been many articles published in it that were helpful to me, I must say that the advertising section has been equally helpful. It has kept me posted on new and up-to-date machinery and equipment, especially so with regard to coal cutting machines and haulage locomotives. The kind of advertising shown in Coal Age is reliable and very interesting to mining men."

W. B. MILLER, Manager of Madison Mine, No. 9, of the Madison Coal Corporation at Dewmaine, Ill., writes:

"I have been a subscriber to Coal Age for nearly two years and I read everything from cover to cover. I consider your paper very instructive to the Mine Manager or Superintendent and must say that I am especially impressed with your advertising columns."

* * *

B. SCHETTLER, General Manager of the Benton Coal Co., Benton, Ill., writes:

"We have found the advertising in Coal Age to be of great assistance to us in the purchase of supplies. We have also found in your advertisers only the most reliable firms in the country whose advertisements are always worth their face value."

* * *

LEE HASKINS, Superintendent of the Marion County Coal Co., Centralia, Ill., writes;

"Whenever I am in need of any equipment for the mine I look over the advertising pages of Coal Age."

* * *

JOHN BURKE, Mine Manager of Buxton Mine, of the Breese-Trenton Mining Co., at Beckemeyer, Ill., writes:

"I go through the advertising section of Coal Age as much as I do the editorials, and recommend the purchase of articles as advertised whenever in need of same."

Wise coal mine officials do their buying through Coal Age ads—they save time and eliminate taking chances.

COAL AGE

ONE OF THE HILL ENGINEERING WEEKLIES

Vol. 7 NEW YORK, APRIL 17, 1915 No. 16

What Is a Coal Operator?

The coal operator is an integral part of a coal mine, or rather, the coal mine might be called the product of the operator. To get a coal mine in operation you procure the component parts, which are as follows, figuratively speaking:

One tipple, one more or less complete line of mechanical equipment, one ditto electrical equipment, one hole in the ground, some capital and one large bonded indebtedness. After being carefully proportioned, mix, and add one labor union, and season with strikes. (Most operators prefer a very light seasoning.)

Some operators think labor unions are not at all essential; others who have labor unions wouldn't do without them—for the same reason that Bill Jones wouldn't do without the wart on his nose. The only way to get rid of the wart was to yield possession; that is—cut off the nose. The only way to get even with a labor union is to give 'em the mine; that would be about all from the labor union. Some operators think that's going too far.

Operators are both "homogeneous" and "cavernniverous—"homogeneous" because they have homes like real folks, and "cavernniverous" because they are supposed to dig millions out of a cavern or coal mine.

There was once an operator who made real money operating a coal mine. His coat sleeves were torn off and his arms yanked out of their sockets by brother operators who sought to lead him aside that he might tell them exactly how he did it.

Operators abound in Ohio and other valleys. They don't care much about abounding on the Ohio side—not in eastern Ohio anyway — they'd rather abound in West Virginia. Most of them that had car-fare are abounding down that way since "the little unpleasantness." Some one told them a mine in West Virginia would make a noise like a dividend.

Ohio operators are strong for Jimmy Cox—he's henchman and legislature. You know, they presented the operators with the "Run-of-Mine System."

Operators have unique forms of amusement. Among the more popular games is that of "Making an Agreement with the Miners." This game is not so popular in some sections as it is in others. They don't play it at all in Colorado. Someone tried to introduce it out that way, but after it had been censored by the Rockefeller Foundation it didn't look like the same old game. Another pleasant little game is called, "Going into the Hands of a Receiver"—very popular in Ohio since April 1, 1914. In Pennsylvania, they have for amusement a sport entitled, "Our Mines are Idle because the Men Don't Have their Buttons"—a very exciting little game. In Arkansas they play "Tipple, Tipple, Who Burned the Tipple?"

Some time ago a friend pointed out to me what he thought was a very typical specimen of the Genus Operatacuss. Much impressed, I approached and asked if I might have the privilege of propounding a personal question.

"Sure," replied the Operatacuss. "Shoot!"

"What is an operator?" quoth I.

"An operator, my boy, is the man who pays the bills. Most any one wins sometimes, but an operator—never!"

—By C. P. Shockley

Ideas and Suggestions

Value of Co-operation among Coal-Mine Employees

By George S. Brackett*

Coöperation at a mine means the united efforts of all employees working jointly to produce coal with a minimum waste of labor.

When real coöperation exists, an employee working by the hour will complete his allotted work and go home before the day is over on short time. If the services of a workman on day labor are not necessary, the man will promptly say so. Coöperation means further that employees at a mine take special pride in satisfying the consumers of the coal and in the prompt filling of the orders.

Most operators know what their coal is costing them under present conditions; but how many can even estimate what the cost will be under the above system of supposedly ideal coöperation? I have known small coal mines which approached such a coöperative plan, but I never saw that system in operation at a large mine.

Let us assume two average mines embodying the general run of mining difficulties, the only exception being that one mine has a force of day-men working efficiently and contentedly, saving in their supplies and tools and endeavoring to render the company a fair day's work in return for their wages. It is further assumed that these men act in every way as if they were working for themselves. In the other mine, the day laborers think only of doing as little work as possible.

The Mining Cost Differs

At the two mines in question the payroll cost will differ considerably, and the management of the first-mentioned mine has effected a great economy by having constructed an organization which will operate the mine successfully under adverse difficulties. Labor-saving machinery and modern appliances are undoubtedly paying investments; yet a force of men who have a fair conception of real honest coöperation and a genuine desire to do their duty will operate a mine successfully, even though handicapped by a lack of proper equipment.

Welfare work of all description is the honest effort on the part of operators to produce satisfaction and coöperation among their employees. It has called for the expenditure of large sums, and the result has been a sad misunderstanding in many cases. These expenditures appear to the miner to be monuments to excessive profits, while in effect they are a vain attempt on the part of the operator to produce a favorable spirit among the employees so that dividends may be declared some time in the future. It is a case where employer and employee are misunderstood to their mutual disadvantage.

Few men can put the proper energy into their work when they imagine that they are being imposed upon, and profits can be realized for long periods only where the employees are contented. These conditions may be brought about without expenditures on welfare work, and the operator's personality, fairness and fellowship may be his most valuable asset; for we find coöperative principles in small mines with crude houses and poor equipment.

An Interesting Question

I have asked many practical coal men the following question: "If you owned a small coal mine fully equipped and developed, ready to ship a small output, so arranged that you could with your own hands haul the coal, dump it, sharpen the miner's picks, trim the railroad car, clean the ditches, lay the track and do everything yourself that needed to be done other than the actual loading of the coal in the working places, how many tons of coal could you put on the railroad car per day? Remember that you are the only man on the job except the miners." The answers average 25 tons. This means that the actual value of all the work around a coal mine (excepting the miners') should follow the proportion of 25 tons per day-man per day. In order to confirm this base, the following are selected from a list of 454 mines in two states:

1. Averaged 42 tons per day for one year with two day employees, or 21 tons per day-man per day.
2. Averaged 365 tons per day for one year with 16 day employees, or 22.7 tons per day-man per day.
3. Averaged 429 tons per day for one year with 17 day employees, or 25 tons per day-man per day.
4. Averaged 218 tons per day for one year with eight day employees, or 27.2 tons per day-man per day.
5. Averaged 131 tons per day for one year with five day employees, or 26.2 tons per day-man per day.

The average of these is 24.4 tons per day-man per day, and these mines were selected for their unusually efficient operation. There are very few of them in the list of 454 mines, and they are given to show that this grade of efficiency has been reached by the willingness of the employees. The aggregate production and the number of day-men employed at all of the 454 mines show their average efficiency to be 11.4 tons per day-man per day. These figures and the following tabulation include all the employees inside and outside the mine:

	Tons per Day-Man per Day	Cost per ton (Labor Averaged at $2.20 per Day)
Five mines	24.4	$0.0902
454 mines	11.4	0.1930

In the 454 mines the labor work cost 10.28c. per ton more than it ought to have cost on a fair valuation.

Although I started out under an imaginary hypothesis the evidence that is brought to bear upon the subject points toward its realization in some cases. The saving of 10.28c. per ton is a minimum, as many of the 454 mines are operated with a very efficient force of men, and they include the five mines.

Looking at the question from another point of view, we have:

	Tons per Day-Man per Day	Cost per Ton (Labor Averaged at $2.20 per Day)	Saving
64 efficient pick mines	16.76	$0.1313	
100 inefficient pick mines	9.66	0.2277	$0.0964
139 efficient machine mines	13.44	0.1637	
151 inefficient machine mines	8.29	0.2654	0.1017

The average of the saving in these two classes of mines is 9.90c. per ton, which is practically the same result obtained before.

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*Flemington, W. Va.

Another interesting observation is the fact that in mines approaching labor troubles there is invariably a low efficiency, while in mines where these troubles are not active and peace reigns we find the best production per day-man. Again the 10c. per ton saving must be a minimum, as all the mines are included in the averages and a great many just border on the line drawn between efficient and inefficient. If only the extremes were taken, the saving would run close to 20c. per ton. This variation can only be due to one or more of the following reasons: 1. Natural mining difficulties. 2. Plant deficiencies. 3. Inefficiency in day labor.

Waste of Labor Due to a Lack of Desire

I have had intimate knowledge of plants operating under many natural difficulties with a day force as economical as any of the averages above quoted; also, I am acquainted with mines having many natural advantages and yet running with a day force capable of handling double the tonnage that is now obtained. A long driver's haul, a poorly located motor sidetrack, a bad roof or dip workings are expensive difficulties, but it is almost impossible for them to have any material effect on the average of so many mines under such able management.

Fundamental contentment and happiness produce an effect on the miners themselves; a less number are required for the same tonnage, fewer working places are needed, less extensive mine tracks are required, and a more compact organization results. This all tends to effect an additional saving.

Twenty per cent. of the supply and material expense at a mine may be eliminated if all the employees have the interests of their employers at heart. The detective and guard systems may be abandoned. Full efficiency can never be realized until there is the inherent desire among all employees; its essential part is goodwill from the management down to the lowliest trapper. If followed energetically the idea here discussed will work to the mutual advantage of both employer and employee.

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How One Company Solved the Question of Credits

That the operator often complains of the slowness with which many retail coal dealers pay their bills is well known to the creditman. There are large retail dealers who discount bills, and there are some small ones too; but the retail dealer frequently is slow and loses not only the advantage of discounts and favorable prices, but also suffers when suffering is needless.

A study of retailers' methods might throw some light on the situation that would be surprising. Not long ago a retail dealer in a Middle-Western city added two large automobile trucks to his delivery equipment. These trucks were larger than any he had used previously and reduced the cost of delivering several cents a ton, but he placed the few cents saved at the bottom of his footings. He even remarked that he could go back to the old wagon, scoop shovel and day labor and make a profit. Why?

That question was promptly asked, and credits was the reply. The credit-man of that company refuses to accept an account just because an order has been given. He asks many questions, calls for credit reports and then passes upon the financial standing of the prospective customer.

Two classes of accounts are not accepted on credit: First is the boarding- or rooming-house customer. Experience in a large city has shown that these consumers are likely to move, have very little ready capital as a rule and are without assets. A few who own property and have proven their ability to pay their bills promptly may be allowed a limited line of credit. But when they are, they are not in the class known as boarding-house or rooming-house proprietors.

The second class of poor credit is the apartment house. Though large consumers of coal, the responsibility of the average owner is small. In the first place the buildings are almost without exception heavily mortgaged. Frequently a second mortgage stands against the property, and the income is held to satisfy the second mortgage. Another serious feature is the speculation that develops in the real-estate business. The buildings are frequently sold, and the owner, having obtained his money, is not interested in old bills. The new owners dodge the bills by referring the collector to the former owner.

The known deadbeat is never given credit, and the man who owns large property, but lets his bills run four to six months, is promptly checked off the books of this company.

Limited credit is extended to home-owners who are paying for property on the monthly-payment plan. It has been found by experience that those who have bought homes with a few hundred dollars to pay down and are paying off the balance on monthly payments against land contracts will let every bill go rather than fall in arrears on their home-purchase payments.

Credit not to exceed 60 days is allowed any customer, and those who do not pay their bills within 30 days are not given large lines of credit.

Refuses Credit on Small Orders

This particular coal dealer makes it a rule to refuse a customer credit on orders for half a ton and a ton, unless the order is from an old customer of approved credit. Fully 50 per cent. of the retail coal business in a large city is half-ton and ton trade, and the smallness of the accounts makes collecting and losses such a large expense that there is no profit left.

The company that follows this strict plan of extending credit has grown from a single horse-and-wagon business to the largest trade in northern Ohio. The success of the venture has been in proportion to the extreme care exercised in extending credit. For one customer who is lost through careful inquiry into his paying quality and ability two have been gained. The company tries to purchase the best quality of coal it is possible to get, pays for it at discount terms and carefully grades prepared sizes in its own yards, and the trade appreciates the advantages thus obtained.

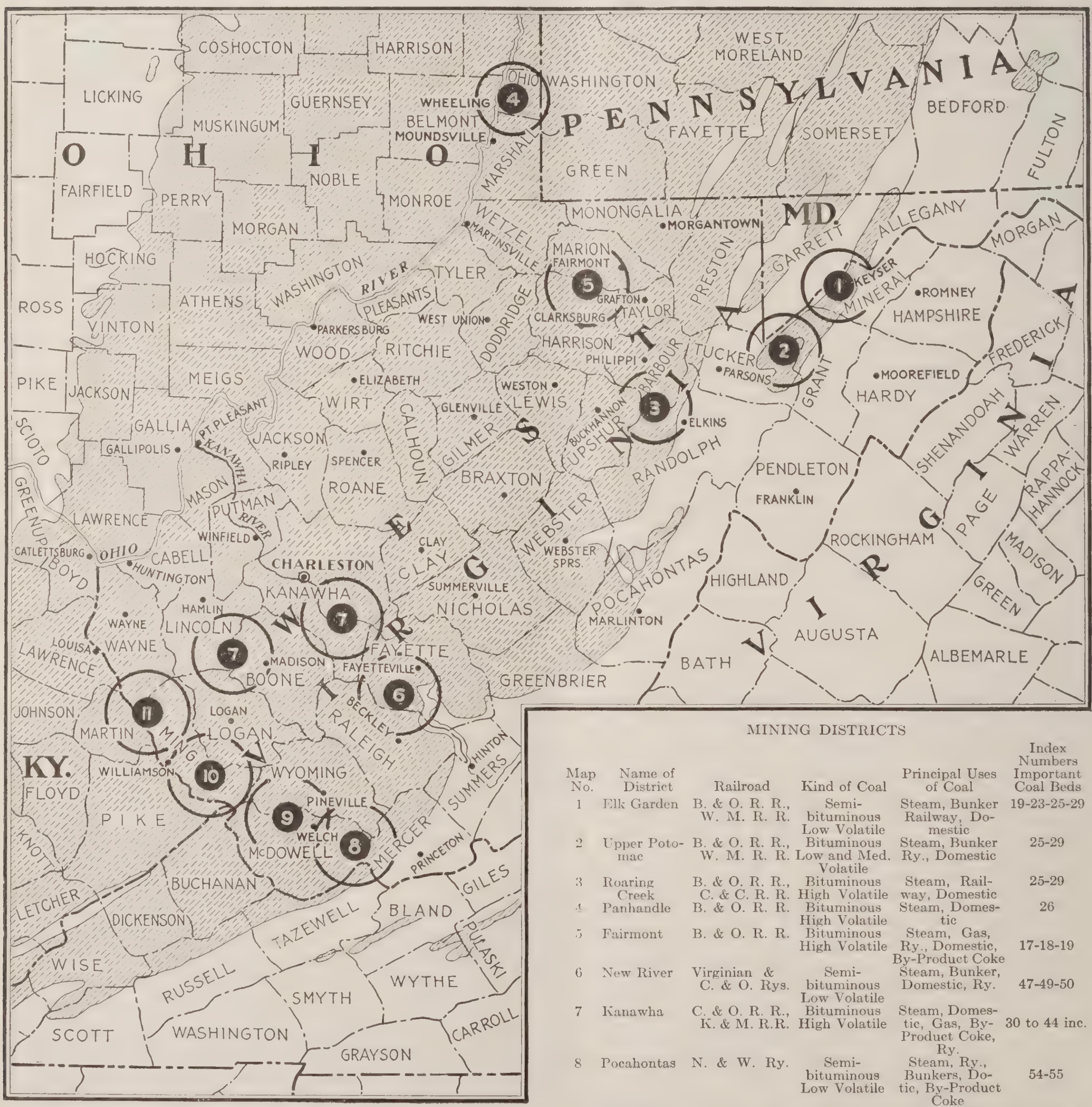
The credit-man takes the view that it is just as proper to require statements from retail customers as it is for the wholesale dealer to make inquiry of the large buyer. This is explained to the customer seeking credit, and except to those who are unable to stand investigation it seldom proves offensive. The system has been so carefully worked out that the retail business of the company is considered and has been proved less hazardous than its wholesale trade.

The Coal Fields of West Virginia

By J. S. Burrows*

SYNOPSIS—Description of the coal fields of West Virginia, showing the location of the important districts and the geology of the coal-bearing measures. A brief sketch of the commercial importance of the different seams is given and the principal railroads in the various districts.

Coal mining is by far the most important industry in West Virginia and in fact the only industry in that state in which any considerable proportion of the population is engaged. Out of a total area of slightly more than 24,000 sq.mi., 17,000, or more than 70 per cent. of the state, lies in the coal fields which form a part of the Appalachian region. Among the coal-producing states of the country, West Virginia now holds second place, having contested this position (next to Pennsylvania) with Illinois for a number of years. As the last of the important coal-producing states to open and develop its coal resources, West Virginia's rapid advance is truly remarkable. While a large proportion of Pennsylvania and Illinois coal is used within the borders of these states, almost the entire



Principal Districts of West Virginia

MINING DISTRICTS

Map No.	Name of District	Railroad	Kind of Coal	Principal Uses of Coal	Index Numbers Important Coal Beds
1	Elk Garden	B. & O. R. R., W. M. R. R.	Semi-bituminous Low Volatile	Steam, Bunker Railway, Domestic	19-23-25-29
2	Upper Potomac	B. & O. R. R., W. M. R. R.	Bituminous Low and Med. Volatile	Steam, Bunker Ry., Domestic	25-29
3	Roaring Creek	B. & O. R. R., C. & C. R. R.	Bituminous High Volatile	Steam, Railway, Domestic	25-29
4	Panhandle	B. & O. R. R.	Bituminous High Volatile	Steam, Domestic	26
5	Fairmont	B. & O. R. R.	Bituminous High Volatile	Steam, Gas, Ry., Domestic, By-Product Coke	17-18-19
6	New River	Virginian & C. & O. Rys.	Semi-bituminous Low Volatile	Steam, Bunker, Domestic, Ry.	47-49-50
7	Kanawha	C. & O. R. R., K. & M. R.R.	Bituminous High Volatile	Steam, Domestic, Gas, By-Product Coke, Ry.	30 to 44 inc.
8	Pocahontas	N. & W. Ry.	Semi-bituminous Low Volatile	Steam, Ry., Bunkers, Dotic, By-Product Coke	54-55
9	Tug River	N. & W. Ry.	Semi-bituminous Low Volatile	Steam, Railmestic By-Product Coke	46-47-48-49
10	Thacker	N. & W. Ry.	Bituminous High Volatile	Steam, Domestic, Railway	32-33-35 36-37-38 42-43-44
11	Kenova	N. & W. Ry.	Bituminous High Volatile	Steam, Domestic	32-33-36-38

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*Fuel expert, Castner, Curran & Bullitt, Inc., Norfolk, Va.

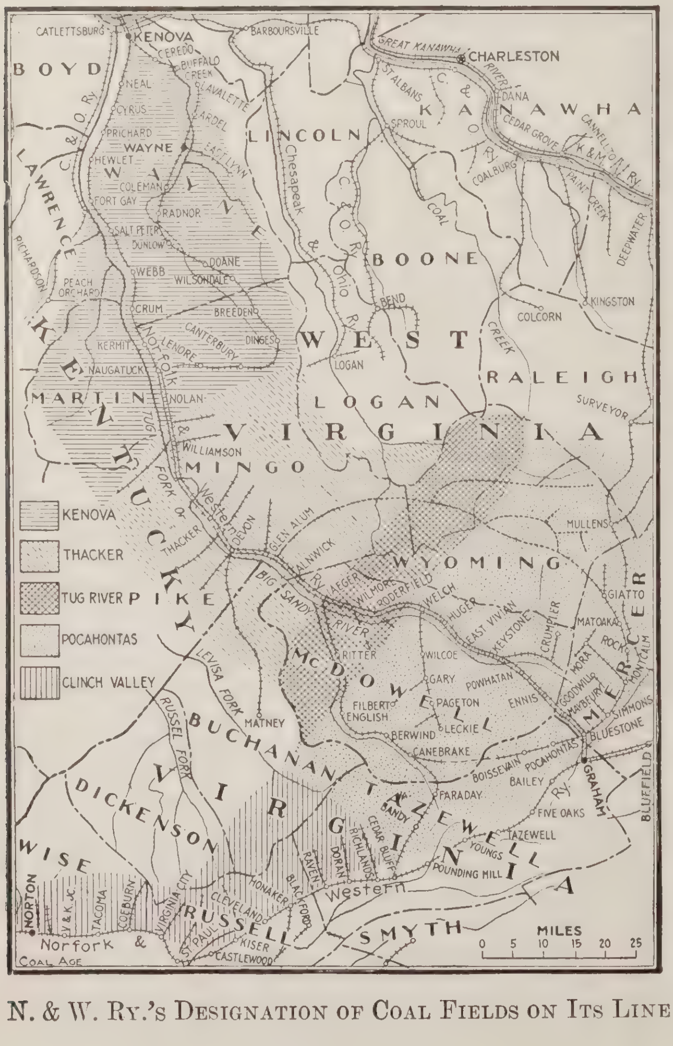
The Bituminous Coalbeds of West Virginia

Index No.	System	Series	FORMATIONS	NAMES OF COAL BEDS	LOCAL NAMES OF COAL BEDS	COMMERCIAL VALUE AND IMPORTANCE
1	(Upper) Carboniferous	Permian	Dunkard XVI	Windy Gap		No commercial value but of interest as the highest known coal, geologically, of the Appalachian field. Found near Belltown, Marshall Co.
2				Gilmore		No commercial value.
3				Ninevah		No commercial value.
4				Hostetter		No commercial value.
5				Fish Creek		No commercial value.
6				Dunkard		No commercial value.
7				Jollytown		No commercial value.
8				Hundred		No commercial value.
9				Washington A		No commercial value.
10				Washington	Hobson, Chestnut Oak coal, Hickory coal.	The only coal bed of this formation with any possible but doubtful value. No present commercial value.
11				Little Washington		No commercial value.
12				Waynesburg B		No commercial value.
13				Waynesburg A		No commercial value.
14		Pennsylvanian	Monongahela (Upper Productive) XV	Waynesburg		Dirty coal of doubtful value, mined for local use.
15				Little Waynesburg		No commercial value.
16				Uniontown		No commercial value.
17				Sewickley	Mapletown	Valuable along Monongahela River and Marion counties and mined for shipment to a small extent.
18				Redstone	Century coal.	High-volatile coal widely distributed south of the Fairmont region and mined to a considerable extent in the vicinity of Century.
19				Pittsburg	Fairmont coal, Clarksburg coal.	One of the most valuable coal beds in the United States occupying a large area in the northern part of the state where it is extensively mined in the Fairmont district and yields both high grade gas and coking coal.
20			Conemaugh (Lower Barren) XIV	Little Pittsburg		No commercial value.
21				Elk Lick	Threefoot bed, Jacksonville coal.	Mined to some extent on the C. & C. R. R. and on the Maryland side of the Upper Potomac region but generally of little value.
22				Harlem	Friendsville, Crinoidal	No commercial value.
23				Bakerstown	Fourfoot coal	Mined to some extent in Upper Potomac Region.
24				Brush Creek (Mahoning)		No commercial value; mined for local use.
25			Allegheny (Lower Productive) XIII	Upper Freeport		Of value only in northern counties. It is mined to some extent in the Upper Potomac district, where it yields a semi-bituminous coal and along the Morgantown & Kingwood R.R. as well as along the C. & C. R. R. where it yields medium and high-volatile coal.
26				Lower Freeport	Roger Vein	Found in the northern counties but of little or no commercial value except in the Panhandle where it is mined to some extent.
27				Upper Kittanning	Mahoning coal	Irregular coal of comparatively little commercial value mined for local use in northern part of the state where it is of the high-volatile type.
28				Middle Kittanning		No commercial value.
29				Lower Kittanning	Davis coal, Roaring Creek coal, North Coalburg coal, No. 5 Block coal, Mason coal.	One of the important coals of this state. Widely persistent throughout coalfields. Very extensively mined in northern part of the state where it yields a large tonnage of semi-bituminous coal in the Upper Potomac district, and high-volatile coal in the Roaring Creek district and vicinity. It has been traced southward as far as the Kanawha district where as the No. 5 Block it supplies considerable tonnage.
30				Clarion		No commercial value unless the No. 5 Block should prove to be at this horizon.
				Brookville (Possibly No. 5 Block)		
31			Upper Pottsville Kanawha Group	Stockton-Lewiston	Big bed of Mingo and Logan Counties	High-volatile bed of wide persistence in and to the northward of the Kanawha district. It has also been identified in the Thacker district and is mined on a commercial scale in both regions. Locally it yields a good cannel coal.
32				Coalburg	Twin seam; Buffalo Creek bed of Mingo Co.	One of the valuable coals of the Kanawha series. Extensively mined in the Kanawha district and although mined to a less extent in the Thacker district where it is sometimes known as the Buffalo Creek coal, it is also of great commercial importance there. This coal is of the high-volatile type and yields both gas and splint coal.
33				Winifrede	Black band coal	One of the most valuable beds of the Kanawha and Thacker districts. It has been mined for years in the former and is being extensively developed in the latter district. It is a high-volatile bed and yields a large tonnage of high grade splint coal.
34				Chilton		Irregular impure bed in the Kanawha district and of no commercial value.
35				Thacker (Possibly Cedar Grove)		The most important coal of the Thacker district, where it is mined on a large scale. It is a high-volatile coal and yields some splint.
36				Cedar Grove		Thin (high-volatile) coal mined to some extent in the Kanawha district and locally the source of high grade cannel coal. The Thacker coal may belong to this horizon.
37				Peerless	Alma in Thacker District	Comparatively unimportant high-volatile bed in the Kanawha district but as the Alma coal (provisional correlation) of the Thacker district it has considerable value.
38				No. 2 Gas	Island Creek coal in Logan Co.; Ansted in Fayette county; Warfield and Rawl coal in Thacker district.	The most widely distributed and important coal of the Kanawha series. Stands first in production in the Kanawha district and as the Warfield coal (provisional correlation) is extensively mined in the Thacker district. It is generally high-volatile in character but locally of the medium-volatile type and yields both gas and splint coal with occasionally some cannel.
39				Powellton		High-volatile bed somewhat extensively mined in the Kanawha district to which its workable area is practically confined.
40				Eagle		One of the important coals of the Kanawha series mined at a number of places in the Kanawha district and probably in the Thacker district where the Upper War Eagle may prove to be at this horizon. A typical high-volatile coal.
41				Little Eagle		Thin (medium-volatile) bed found in the Kanawha district, but not mined at present on a commercial scale.
42				Upper War Eagle (Probably Eagle)	War Eagle No. 2; Coking seam in Wyoming Co.	Medium and high-volatile bed. Mined somewhat extensively in Thacker district and locally in Wyoming County.
43				Middle War Eagle	War Eagle No. 1; Middle Warfield	Medium and high-volatile coal. Mined somewhat extensively in vicinity of Alnwick Thacker district and found also in Raleigh and southern Fayette County.
44				Lower War Eagle	War Eagle No. 0	Thin semi-bituminous bed found on southern margin of New River-Pocahontas districts and not mined on a commercial scale.

(Table continued on following page)

THE BITUMINOUS COAL BEDS OF WEST VIRGINIA—(Continued)

Index No.	System	Series	FORMATIONS		NAME OF COAL BEDS	LOCAL NAMES OF COAL BEDS	COMMERCIAL VALUE AND IMPORTANCE
45	(Upper) Carboniferous	Pennsylvanian	Lower Pottsville	New River Group	Hughes Ferry (Sharon Coal horizon)		No commercial value. Persistent over southern Nicholas and western Greenbrier County.
46					Iaeger		Thin dirty semi-bituminous coal. Possibly a split from the Sewell coal. Known area limited to Tug River district in the vicinity of the town of Iaeger, where it is mined to some extent.
47					Sewell	Davy, in Tug River district	The most extensively developed of the three important semi-bituminous beds of the New River district where it has held first place in production for many years. The Davy coal of the Tug River district is believed to represent the Sewell coal in McDowell County where it is extensively mined over a small area and yields an exceptionally pure soft coal which is used principally for by-product coke purposes.
48					Welch	Tug River seam; Hemphill; Lambert.	Provisionally considered a distinct bed. May be part of Sewell above. Found in McDowell County where it is semi-bituminous in character and where it is extensively mined in the Tug River district.
49					Beckley	War Creek in Tug River District; Whitestick.	One of the three valuable semi-bituminous beds of the New River district. The newest mining operations are in this bed, large areas having been made accessible in Raleigh County through the building of the Virginian Railway, on which the principal operations are located many of which also have a C. & O. Ry. connection. This bed is destined to take first place in the production of New River coal.
50					Fire Creek (Quinnimont)		The lowest of the three valuable semi-bituminous beds of the New River field. The first bed to be mined along New River and for many years the premier seam of this region. Partial exhaustion has relegated it to third place in production. Principal operations are on the C. & O. Ry. in the New River district.
51					Little Fire Creek		No commercial value.
52				Pocahontas Group	Pocahontas No. 6		Small areas of semi-bituminous coal of considerable value in McDowell County where at present it is occasionally mined on a small scale.
53					Pocahontas No. 5		Limited areas of semi-bituminous coal in McDowell County, not mined at present but has a possible future value.
54					Pocahontas No. 4	Thin Vein Pocahontas	Second in importance to the Pocahontas No. 3 coal and now mined extensively in the western end of the Pocahontas district and in the Tug River district with important undeveloped areas of good semi-bituminous coal in Raleigh, Wyoming, McDowell, and Mercer counties.
55					Pocahontas No. 3	Pocahontas Thick Vein Pocahontas Flat Top	One of the most valuable coal beds in the United States and the source of the well-known brands of Pocahontas semi-bituminous coal. The present operations in this bed are confined almost exclusively to the Pocahontas district of the N. & W. Ry. The workable areas are confined within Mercer, Raleigh, Wyoming and McDowell counties with a small adjoining area in Tazewell County, Virginia.
56					Pocahontas No. 2		Thin coal of no commercial value.
57					Pocahontas No. 1		Thin coal of no commercial value.



N. & W. Ry.'s Designation of Coal Fields on Its Line

output of West Virginia is shipped to markets beyond the state's boundaries and is used in a larger territory than the coal of any other state in the country.

The principal mining districts are shown in the accompanying table, which gives particulars as to kind of coal, railroads, etc. The index of important coals being mined in each district refers to the table of coal beds; as will be seen, this gives a complete list of all the coals recognized in the state, arranged in their geological sequence from the lowest to the highest. The arrangement of this table is the same as those I prepared for the states of Pennsylvania and Ohio, which have already appeared in Coal Age.

Of special geological interest in the West Virginia coal measures is the importance of the Pottsville formation. While this formation is of little or no commercial value as a coal-bearing horizon in Ohio and Pennsylvania, in West Virginia it carries the most important seams of the state and is probably the most valuable coal-bearing horizon in the United States if not in the world.

* * *

Recovery of Excessive Freight Charges—Suit cannot be maintained in a state court to recover against a railway company on the theory that freight charges collected on interstate shipments were excessive, if the rates charged conformed to published tariffs, and no order for a refund or reparation has been made by the Interstate Commerce Commission. (Nebraska Supreme Court, F. A. Foster Lumber Co. vs. Union Pacific R.R. Co., 151 Northwestern Reporter 168.)

* * *

Statutory Safety Requirement not Controlled by Custom—The requirement of the Kentucky Mining Law that miners select their own caps and props and mark them, cannot be controlled by a custom to the contrary in a particular mine, so as to charge the operator with liability for death of a miner in a suit based on claimed failure of the operator to furnish caps and props under a custom requiring the foreman to furnish them on mere request. (Kentucky Court of Appeals, Palmer's Administratrix vs. Empire Coal Co., 172 Southwestern Reporter 97.)

The Successful Use of the Chain Grate Stoker

By T. A. Marsh*

SYNOPSIS—For many years the use of the chain grate stoker was confined to the high-volatile, high-moisture, and high-ash but noncoking coals of the West and Middle West. More recently a type of this machine has been devised which successfully handles the low-ash coking coals of the East.

The type of stoker most extensively used in the districts tributary to the bituminous coal fields of the West is the chain grate, and the extensive development of this machine has been made in the Middle West where the free-burning bituminous coals are obtained.

An average analysis of the free-burning bituminous coal of the Middle West is as follows:

Moisture	5 per cent.
Volatile matter	30 per cent.
Fixed carbon	55 per cent.
Ash	10 per cent.
B.t.u. per lb. of dry coal	12,000

On account of the simplicity of operation, low maintenance and particularly the ability to obtain high efficiency in operation, this type of stoker has become more and more widely used until the Green Engineering Co. alone has over two million horsepower in service.

The successful results so generally obtained caused the demand for chain grates to broaden, and the ability to burn the semibituminous coking coals of the East, and also the high-ash and high-moisture coals of the West, has become a very important matter.

Previous to three years ago, the chain grate was considered absolutely inapplicable to the coking coals of the Eastern seaboard, and the Green Engineering Co. did not attempt to place its standard chain grate stoker in any locality which involved the use of a coking fuel. The characteristics of such a coal and its action when subjected to heat make it impossible to uniformly ignite, coke and consume this fuel unless it is treated by auxiliary means to an extent which the standard chain grate does not and cannot provide.

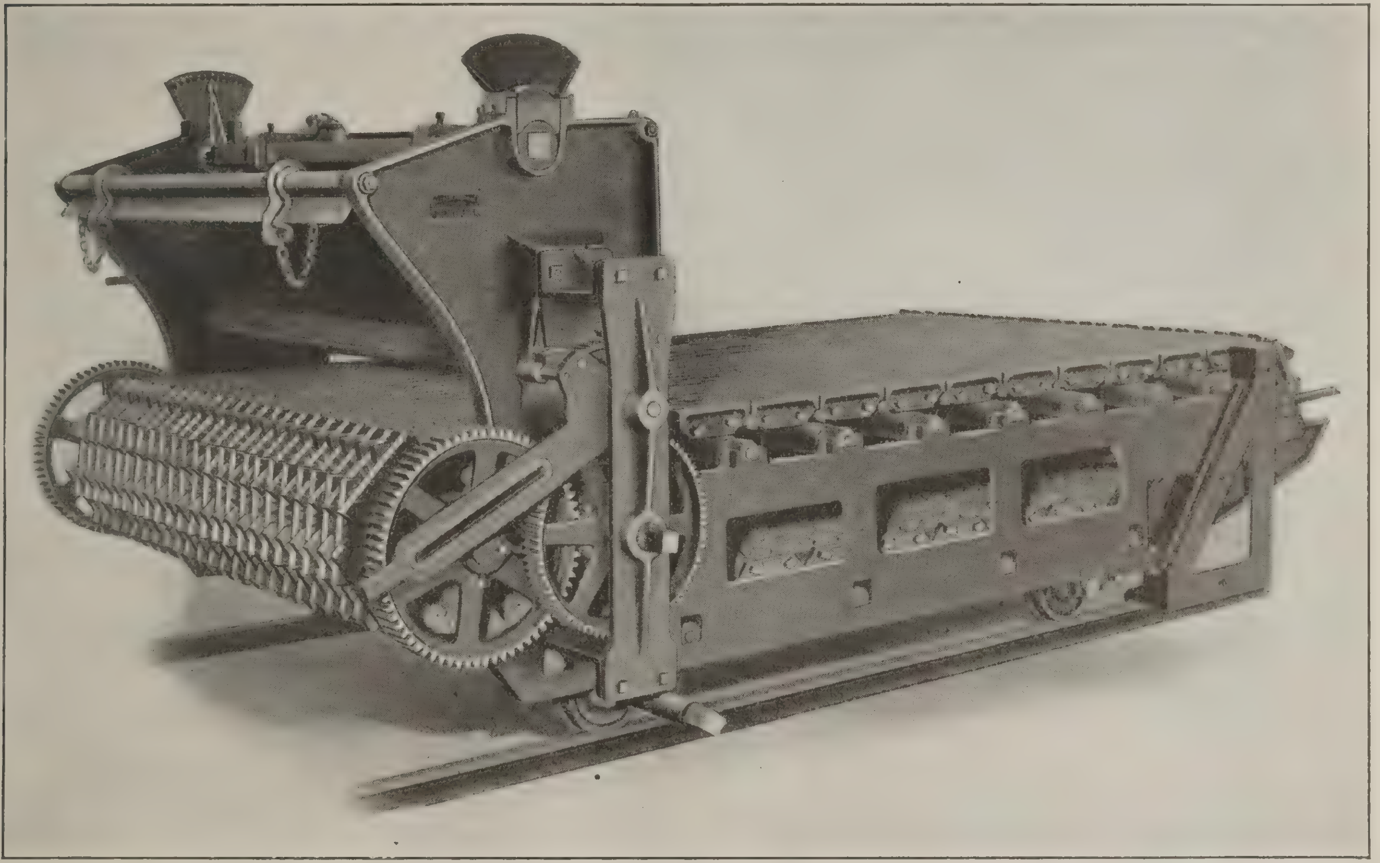


Fig. 1. A Standard Green Chain Grate Stoker Removed from the Boiler Furnace

Increase in the draft only serves to accentuate the difficulties which are found to be present in such cases, causing holes to develop in the fuel bed, permitting a marked short-circuiting of the free air and seriously diluting the furnace gases. Even though the fuel can be successfully ignited, it has a tendency to draw together into solid masses of coke which burn only on the surface. These masses will then remain almost indefinitely as coke and either form an undesirable accumulation at the bridgewall or pass into the ashpit unconsumed.

In addition to this unavoidable characteristic of this fuel, it forms a practically impervious layer near the front of the stoker and does not permit of the passage of air under the influence of the furnace draft. It is, therefore, most difficult to ignite if undisturbed and almost equally difficult to consume even if the ignition is successful and the draft sufficient to furnish oxygen.

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*Chief engineer, Green Engineering Co., 28 East Jackson St., Chicago.

The Eastern coals do not as a rule carry much ash, but the intensity of the heat which results from the combustion of clean fuel is such that the impurities contained readily melt in the furnace, and those types of stokers which disturb the general formation of the fuel bed inevitably produce clinkers by the fusing of the ash. There is but one proper method of burning bituminous coal and that is to allow it to remain quiet during the latter stages of combustion. Ash is naturally formed first at the grate surface where the oxygen supply is greatest and where the combustion is therefore earliest completed. An inversion of the fuel bed brings this ash layer to the surface with the incandescent carbon below, and the fluxing of the ash is inevitable. There is no getting away from the fact that this action is objectionable to an extreme degree, it being the primary cause of both the brick and metal deterioration in the furnace of the stoker which inverts or mixes the fuel.

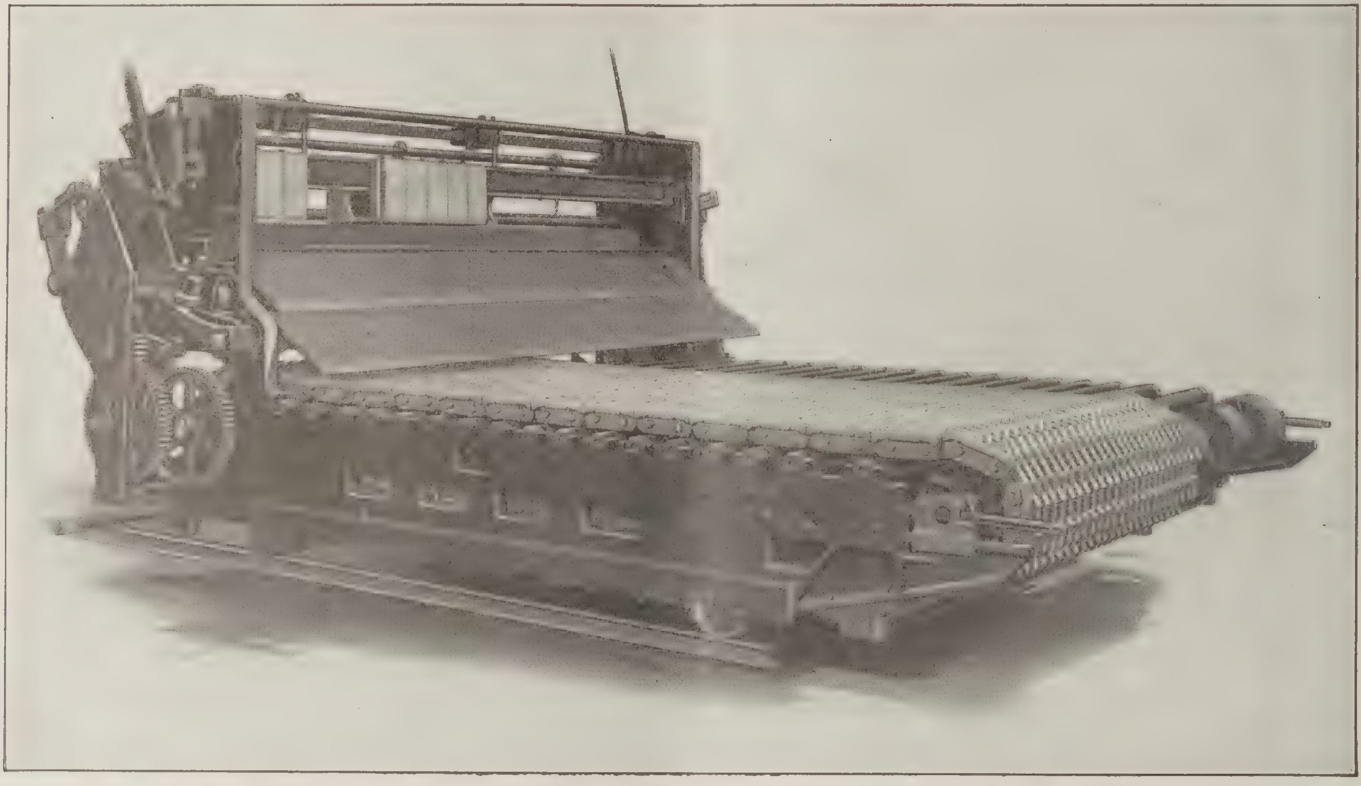

Fig. 2. The "L" Type of Chain Grate Stoker, Showing the Oscillating Inclined Coking Plates at Front End

Two Combustion Zones Are Provided

The "L" type of chain grate stoker manufactured by the Green Engineering Co. provides for two distinct zones in the combustion process—the first being for the distillation and ignition of the combustible volatiles; the second for the combustion of fixed carbon. The inclined coking plates, over which the fuel flows in its descent from the hopper to the chain grate surface, are agitated to a sufficient extent to keep the fuel particles in constant motion relative to one another. The binding substance which exudes from the particles of coal is thus not permitted to "set" so as to cement such particles together.

The length of the incline and the extent of its agitation are sufficient to provide for the complete distillation of the combustible volatiles. This precludes further caking of the material and produces a resultant fuel bed in the form of uniform coke of comparatively small size. The fragmentary and porous nature of such a fuel bed in turn permits the carrying of unusually thick fires and the nearly complete extraction of the oxygen from the entering air.

With this arrangement it is quite possible to develop 14 to 16 per cent. of CO_2 in the furnace gases under conditions of commercial operation.

The efficient burning of high-ash and of high-moisture coals is entirely a question of furnace proportions and design, and the individual fuels must be studied and treated on the basis of experience.

It is not generally known that the lignites of Colorado as well as the coals of Texas that contain more than 25 per cent. of moisture can be burned with excellent results. Figures given below are from actual tests and were obtained in plants burning these fuels regularly. These figures can be depended upon as reliable.

TEST NO. 1

Fuel—Colorado lignite.	
Fuel analysis—	
Moisture	23.73 per cent.
Volatile matter	33.23 per cent.
Fixed carbon	35.25 per cent.
Ash	7.79 per cent.
B.t.u. per lb. dry	11,160
B.t.u. per lb. as fired	8,520
Type of boiler—Babcock & Wilcox.	
Type of stoker—Green chain grate.	
Horsepower of boiler	400
Grate surface	103 sq.ft.
Pounds of coal burned per square foot of grate surface per hour	28
Horsepower developed	512
CO_2 at damper	12.1 per cent.
Combined efficiency of boiler and furnace	69.7 per cent.

TEST NO. 2

Fuel—Texas lignite.	
Fuel analysis—	
Moisture	29.8 per cent.
Volatile matter	31.34 per cent.
Fixed carbon	25.71 per cent.
Ash	13.15 per cent.
B.t.u. per lb. of coal dry	9,838
B.t.u. per lb. of coal as fired	6,906
Type of boiler—Babcock & Wilcox.	
Type of stoker—Green chain grate.	
Horsepower of boiler	600
Grate surface	132.5 sq.ft.
Pounds of coal burned per square foot of grate surface per hour	31.6
Horsepower developed	586
CO_2 at damper	12.2 per cent.
Combined efficiency of boiler and furnace	68 per cent.

TEST NO. 3

Fuel—Texas lignite.	
Fuel analysis—	
Moisture	30.93 per cent.
Volatile matter	30.96 per cent.
Fixed carbon	26.45 per cent.
Ash	11.66 per cent.
B.t.u. per lb. of coal dry	10,314
B.t.u. per lb.of coal as fired	7,124
Type of boiler—Babcock & Wilcox.	
Type of stoker—Green chain grate.	
Horsepower of boiler	600
Grate surface	132.5 sq.ft.
Pounds of coal burned per square foot of grate surface per hour	30.6
Horsepower developed	615
CO_2 at damper	11.3 per cent.
Combined efficiency of boiler and furnace	71.3 per cent.

Coals which contain a high percentage of ash require a materially different design of furnace from low-ash fuels, but in both cases the grate surface should be large and the igniting arch ample. Some results from high-ash coal from Texas and Arkansas are given below, indicating that with proper furnace design and proportions excellent results can be obtained. It should be noted that in all of these tests both the CO_2 and the boiler efficiency are fairly high.

TEST NO. 4

Fuel—Arkansas semibituminous.	
Fuel analysis—	
Moisture	3.74 per cent.
Volatile matter	14.71 per cent.
Fixed carbon	57.08 per cent.
Ash	24.47 per cent.
B.t.u. per lb. of coal dry	11,190
B.t.u. per lb. of coal as fired	10,771
Type of boiler—Babcock & Wilcox.	
Type of stoker—Green chain grate.	
Horsepower of boiler	600
Grate surface	132.5 sq.ft.
Pounds of coal burned per square foot of grate surface per hour	20.52
Horsepower developed	641
CO_2 at damper	11.6 per cent.
Combined efficiency of boiler and furnace	73.3 per cent.

TEST NO. 5

Fuel—Arkansas semibituminous.	
Fuel analysis—	
Moisture	1.77 per cent.
Volatile matter	15.91 per cent.
Fixed carbon	53.78 per cent.
Ash	28.54 per cent.
B.t.u. per lb. of coal dry	10,537
B.t.u. per lb.of coal as fired	10,351
Type of boiler—Babcock & Wilcox.	
Type of stoker—Green chain grate.	
Horsepower of boiler	600
Grate surface	132.5 sq.ft.
Pounds of coal burned per square foot of grate surface per hour	25.6
Horsepower developed	743
CO_2 at damper	11 per cent.
Combined efficiency of boiler and furnace	71.1 per cent.

TEST NO. 6

Fuel—Texas bituminous.	
Fuel analysis—	
Moisture	4.48 per cent.
Volatile matter	33.48 per cent.
Fixed carbon	35.38 per cent.
Ash	26.76 per cent.
B.t.u. per lb. of coal dry	10,255
B.t.u. per lb.of coal as fired	9,796
Type of boiler—Babcock & Wilcox.	
Type of stoker—Green chain grate.	
Horsepower of boiler	500
Grate surface	137
Pounds of coal burned per square foot of grate surface per hour	27.87
Horsepower developed	724
CO_2 at damper	10.6 per cent.
Combined efficiency of boiler and furnace	66 per cent.

* * *

Efficiency as Applied to Mining

By Hugh Archbald*

SYNOPSIS—The basis of efficiency work, which is the increasing of the amount of work of the individual and the proper arrangement of that work, is as applicable to mining as to manufacturing. The means used for accomplishing this is by keeping simple records and timing the details of each operation.

Gantt, in the opening sentence of his work entitled, "Work, Wages and Profits," makes the statement that "the greatest problem before engineers and managers today is the economical utilization of labor."

The greatest waste in mining is the waste of time. The proper balance between the efforts of each workman is not maintained, so that all suffer under unnecessary delays. As an instance a tracklayer may be sent to fix a certain piece of track without any definite instructions based on investigation as to how much work needs to be done and how long it is going to take. The result is that the man starts for his work and finds that someone has taken the rail-bender. He may first have to find out who took it. Then he must find that man to learn where he left it. Then he must get the rail-bender to the place where he is going to use it. Then he finds that he will need some ties; so he must hunt around for them and wait for a trip to get them to the place to be fixed. Finally after much wandering around he can get to work. A mine is a friendly place and one can get into a conversation at any time; so any man wandering around will stop often to chat. If he is being paid by the day, all these talks are at the expense of the company.

It is part of the duties of the supervisory force of a mine to see that the material needed on any job is at the place where it is to be used before the workman is sent to do it. Yet too often scorn is expressed for the workman who cannot do all his own planning. A separation should be made between the investigation of and the planning for the things that need to be done and the actual doing of them. No man should be turned loose in a mine to work out his own salvation. It is probable that the high rates which exist generally for piece-work in mines are due to this attitude of turning a man loose, combined with the attitude that as soon as a price is fixed for any piece of work it does not concern the interest of the company to help the man earn his living. On the contrary it is to the interest of the company just as much as seeing that a day's work is done for a day's pay. It is part of the organization of work.

COSTS MAY BE REDUCED

It is rather a delicate matter to suggest to any man that the organization which he has for accomplishing work is not the best. He is likely to be offended. And yet it is a fact that costs can be reduced and outputs increased in many places merely by putting into effect a better organization. It is a problem that has been successfully attacked in the manufacturing field by Taylor, Emerson and other leaders. Sooner or later the problem will be taken up as generally in mining as it now is in manufacturing, and the same results will be obtained.

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Many kinds of machines are manufactured and offered for sale, each one differing in some way from the others. The consequence is that much is written about machines, and they are the subject of many discussions. In contrast, organizations are not for sale, are not easily transportable and have not as great a variety.

The proper equipment of a mine is of primary importance. Work cannot be done without tools. And it is not to be recommended that supplies should be ordered without discussion and due consideration. But the material cost for mining coal is one-fifth or less of the labor cost, and yet it seems often as if it received *the majority of the attention*. There seems to be an idea, not alone in mining but in other lines of work, that men can be employed almost without limit and the work turned out in proportion to the number employed. It is not so; there is a certain balance between the number of men and the equipment even in the simplest of mines.

At one mine the number of loaders employed was reduced about 50, and yet the tonnage was increased 300 tons a day. Before that, the cars had been spread so thin over the number of men that the company had not been getting the full number of cars for a day's work. And when a limited number of cars is spread over too large an area, there is a loss in the efficiency of the transportation units. At another mine where it was desired to increase the daily tonnage over the 600 tons a day which *were being* mined, advertisements were run in the papers for loaders. On counting up the number of loaders, it was found that over 170 were already employed and that they were not getting enough cars to load to be able to earn a day's wage. The reason for the inability to increase the tonnage lay in a different direction from the number employed.

The simplest proposition in mining is that where the miner either digs and shoots the coal or, blasting it from the solid, loads it into the mine car himself, and where the car is taken by mule power over a short haul to the tipple. In this case as there are only two classes of work and so only one point of contact between classes, there is only one point that needs constant supervision—that between the miners and the driver to maintain the proper balance of work. Moreover, the miner has more than one thing to do. When he is not loading coal, he is getting coal ready to load, so that delays on the part of one set of men are not as important as where a greater subdivision of work exists.

It may seem like stating things with which everyone is familiar to call attention to some of the things in mining, but the true significance of some of the relations is not appreciated.

Work Must Be Planned

Efficiency work means the following up of each man and the arrangement of work so that each man can do his best. Under it, the management is expected to know all that goes on. The recommendation which was given for a track-layer—that all that was needed was to give him a job and he would find his work—does not prevail in efficiency work. That track-layer may have been exceptional, but for the ordinary man the work must be planned out.

When machinery is used to cut the coal, three elements are introduced, and even more than three, so that the supervision is not so easy a matter. With undercutting machinery it is necessary to watch that the haulage and the undercutting and the loading come out even in order to get good results. In this case there is more than one point of contact, as the number of classes of work is increased.

With pick coal mining, a miner can dig coal while the cars are being changed. With machine mining, the loader must lie idle between cars. Therefore it is best to have the cars changed quickly, for idleness breeds idleness. When there is a long time between cars and the men have to sit in the cold, moist air of the mine, they get stiffened up and do not load fast nor pitch into their work with vim.

It is a fact that where men have plenty to do they work better than where they do not have enough. One morning in a mine I passed two men playing checkers while four others sat around wrapped up in their overcoats, watching them. The mine foreman, who was along with me, commented after we had passed them upon the fact that it was easier to get men to load coal on another road in that mine where the men got more cars than on this road. On the other road the men would fight over cars and come in early in the morning and stay late at night loading coal, while on this road the opposite was true, the men going home as soon as they had loaded one or maybe two cars. In support of this remark, he told me that a few days before he had found two loaders fighting over a car, one of the men asserting his right to the car because, as he said to the other, "You had 13 cars yesterday and we had only 12." The men on the other roads were only getting twos and threes.

It is a result to be expected, for it takes a man about 20 min. to load one ton of loose coal. If he loads four tons in a day, he would only be loading 80 min. He might have to stand three props for these four tons. With split props in a 4-ft. vein it takes hardly 5 min., more likely 3 min., to stand one, so that the man might work 95 min. in a day. That would leave 385 min. in an 8-hour day for a man to loaf around doing nothing. If there is bottom to take up or roof to take down to make height for a car, this loafing time might be reduced by 30 min. at a maximum, but that would leave 355 min., nearly 6 hours out of the 8 that the man is supposed to work.

When a man has to loaf that long, it is no wonder that he goes home as soon as he feels inclined. It is not good for the man. It is not good for the company.

There is the assumption in this calculation that the man can load the coal directly into the car without turning it over. It is best to have the rooms of such width that this can be done. There is always the question, too, of how much a man can do. The answer is generally given on a guess without any study of what actually is being done. One foreman guessed that at his mine one could hardly expect a man to load more than 4 tons of pick coal in a day. On examination it was found that 60 per cent. of his men were loading 4½ tons or better.

Just as the place to begin the cleaning up of a mine is at the face of the workings, in order that all that is gathered may travel always toward the pit-mouth, so, too, the place to begin efficiency work is at the face. The essentials of mining are two things—shoveling and transportation. If there is no shoveling done, there will be no transportation; so the problem to tackle first is shoveling.

If there is any coal loaded into mine cars by machines, it is so small at present that it can be neglected. All coal is practically loaded by hand. The size and the shape of the shovel used by the men are subjects for consideration in efficiency work. At a mine where an attempt was being made to work a seam 27 in. in height and irregular to boot, all the men were paid by the day, the shovels being supplied by the company. No. 1 and No. 2 flat coal shovels were used, but as these seemed to have too long a handle to be convenient, a few shovels were specially obtained with a very short handle, one where the D-shaped part began almost at the end of the iron. In every other respect the shovel was the same. But these shovels did not work well, and so a return was made to the long-handled shovels that were first used.

The trouble was not in the length of the handle, but in the shape of the whole shovel. A man uses with difficulty a shovel in which the space between his hands is less than his shoulder width—preferably a little greater, about 22 in. What was needed in a low vein such as this, where it is hard for a man to crowd himself in and where he would have to shovel with the blade vertical, was a scoop-shaped shovel having a low lift and a quick rise from the blade to the handle, so that the man could get his hand near to the load. The shovel that was being supplied had all the faults it could possibly possess. With a scoop, the men could pitch the coal about 12 ft. as against 9 ft. with the flat coal shovel—a gain in shoveling efficiency.

TABLE 1. MARCH

Loaders*	Days														Total		Per-Day Cars, Tons	Car Weight	Attendance, %	Car Weight, Eff.	Tonnage, Eff.	Total, Eff.
	16	17	18	19	20	21	23	24	25	26	27	28	30	31	Cars	Tons-Cwt.						
126	2	7	3	5	4	3	3	4	6	2	6	10	3	4	62	99–00	4.43	1.59	100	96	101	97
128	1	7	4	4	5	3	2	4	7	0	5	1	4	4	51	82–05	3.92	1.61	93	98	90	81.7
127	4	4	4	4	5	5	2	3	5	5	5	2	5	5	58	86–10	4.14	1.48	100	90	87	78.3
145	4	4	4	3	4	2	4	4	5	4	5	3	5	4	55	87–04	3.93	1.58	100	96	89	85.4
143	0	4	4	3	2	3	3	4	4	5	2	4	5	3	46	68–15	3.54	1.49	93	90	76	63.7
144	0	3	5	4	1	3	4	4	0	4	0	4	5	3	40	61–09	3.63	1.53	79	93	80	58.8
130	4	5	4	4	4	4	6	3	7	5	0	4	6	7	63	92–17	4.85	1.47	93	89	102	84.6
149	3	7	4	3	4	2	2	6	8	2	0	6	4	6	57	83–16	4.38	1.47	93	89	92	76.2
139	3	5	3	4	4	4	3	4	9	3	7	5	4	0	58	93–02	4.46	1.60	93	97	102	92.0
140	3	5	4	4	3	4	4	1	0	3	0	5	3	1	40	66–15	3.33	1.67	86	101	80	69.5
129	6	5	5	3	3	3	4	4	1	2	1	4	4	6	51	75–11	3.64	1.48	100	89	77	68.5
141	6	4	6	3	3	3	3	5	0	3	1	5	4	5	51	77–08	3.92	1.52	93	92	85	72.7
132	3	5	4	4	4	3	4	4	5	5	7	4	2	3	57	84–11	4.07	1.48	100	89	86	76.5
133	2	5	4	4	4	4	3	3	6	7	6	3	3	3	57	84–18	4.07	1.49	100	90	94	84.6

* In fourth left heading.

Men Should Be Treated as Individuals

There is one idea to be got rid of in starting efficiency work, and that is the consideration of the workmen as a mass. When one goes to a mine and begins to ask questions, the answers are often in the form "the men this" and "the men that," without specifying which particular men. The men in the mine should be treated as individuals, and after records have been made of the work of each one, sum totals showing the whole work can be made. The results will often be different from the guesses upon which the work had been proceeding.

As an example of the kind of records which can be made, Table 1 is given, which is the record of one heading in a mine for a period of two weeks. At this mine, which is a bituminous mine, with a seam of coal about 4 ft. in height, the men are paid by the ton. In the first column is given the number of the loader. Opposite each number is recorded the number of cars which were dumped over the tipple on each day in the two weeks. In the total columns are given first the total number of cars for the two weeks and beside them the total tons. The next column gives the average cars per day; it is merely the total cars divided by the number of working days in the period—in this case 14. The third column is the car weight of the loader expressed in tons and decimals of a ton. This is merely the total tons divided by the total cars. The last four columns are the essential ones.

The first is the column showing the attendance of each man expressed in the percentage of the number of days he sent out coal. As the men did not report for work at this mine and no record was kept of their attendance, it had to be assumed that they were at work on every day that a car was dumped having their check.

The second column is the car-weight efficiency. It was assumed in this case that, as some of the men regularly loaded their cars with 1 ton 13 cwt. (1.65 tons) of coal, all could do the same. This was purely a machine mine. and all the men were working under practically the same conditions; so each man's car weight was divided by 1.65 tons and the efficiency expressed in percentage. The highest car weight efficiency at this mine was 104; the lowest 72, or 1 ton 3.6 cwt.

The tonnage efficiency was calculated on a basis of a task of 7 tons a day. As the price per ton was 42c., 7 tons would give $2.94 as the earnings per day. Since in other regions the union scale calls for $3 a day as the amount a miner should earn, it was considered that 7 tons was a good basis, giving, as it does, almost $3. The highest tonnage efficiency was 134, while the lowest was 48. Twenty men had 100 per cent. or better; that is, they sent out over 7 tons on each day they were at work.

On What Does Efficiency Depend?

As the total efficiency of a man is dependent upon the regularity with which he sends out coal and the manner in which he loads his car, the total efficiency is the product of the attendance, the car-weight efficiency and the tonnage efficiency. As these are here all expressed in percentage, the last column is the product of multiplication of the three preceding ones. One man at this mine had an efficiency of 112, while his next-door neighbor, who was in attendance an equal number of days, had 41—quite a contrast!

Tables 2 and 3 show a summing up of all the sheets of the individual workers for this two weeks at the same mine. Table 2 shows the division of results according to headings. It is self-explanatory, column 1 being the name of the heading; column 2, the total number of cars from that heading, this being divided in two cases according to the work; column 3, the total tons; column 4, the sum of the number of days that the various men worked; column 5, the product of the division of column 2 by column 4; column 6, the product of the division of column 3 by column 4; column 7, the average car weight for that road. The standard car weight at the bottom means that at this mine the men were not paid for any weight which they might have on their car above 1 ton 15 cwt. (1.75 tons). The purpose of making this sheet was to find out where the men were getting the most cars and where the tonnage was greatest per man, as well as the car weight. Tonnage might be low on account of a poor machine runner or some other cause which would be discovered after investigation.

TABLE 2. SECOND HALF MARCH, 1914

Heading	Cars	Tons-Cwt.	No. of Man-Days	Cars per Man-Days	Tons per Man-Days	Average Car Weight*
3C.........	1185	1887–17	.	....	....	1.59
3C pillars...	234	362–07	67	3.50	5.41	1.55
3C rooms...	951	1525–10	263	3.62	5.80	1.61
4C.........	837	1321–11	236	3.54	4.97	1.58
5C........	195	296–03	60	3.25	4.94	1.52
3L.........	1515	2248–17	343	4.42	6.56	1.48
3L pillars...	460	629–03	109	4.22	5.77	1.37
3L rooms...	1055	1619–14	234	4.52	6.92	1.53
4L........	746	1144–01	185	4.03	6.19	1.53
4R and dip..	298	452–17	87	3.43	5.20	1.52

* Standard car weight 1.75 tons.

TABLE 3. SECOND HALF MARCH, 1914*

Heading	Cars	Tons-Cwt.	Ave. Dist. Hauled	Tons—1000′	No. of Mules	Tons—1000′ per Mule†	Grade‡
3C.........	1185	1887–17	1500	2830	3	943.3	3%
4C.......	837	1321–11	1780	2350	2	1474	4½%
5C.........	195	296.03	2020	598			
3 Left......	1515	2248–17	1090	2450	2	1225	1%
4 Left......	746	1144–01	350	400	1	400	1%
4R and dip..	298	452–17	450	203	§	203	

* Fourteen days worked in the second half of March.

† The standard haul for a mule is 100 tons 1000 feet per day. One mule should haul 1400 tons 1000 feet on a level road.

‡ 1.2% grade in main heading.

§ 2½-ton motor.

Table 3 is a further summation of the work. This was made to give a comparison between the transportation units used in gathering the coal up to the point where it was taken by the main road motor. As the work of getting the cars to the men should not be judged by the number of cars that come from a road without considering the conditions under which the work is done, the grades encountered are marked.

The general standard for mule haulage is that one mule can haul 20 ton-miles in a day; that is, a power equivalent to that required to haul one ton 20 miles or 20 tons one mile on a level road. This is equal to hauling 100 tons for 1000 ft. It will be seen from this transportation sheet that the two mules hauling to 4C and 5C headings are exceeding this standard, hauling 1474 tons a distance of 1000 ft. for the 14 days, part of the haul being on a 4½ per cent. grade. This is good work. In contrast is the work of the motor, which was doing only 203. It showed that the motor was not being used to its full advantage, though needed for a dip heading, since it was doing less than a mule. As a side light on the motor, it was found that the son of the boss was running it.

The examples shown for a mine are given for only two weeks. The application of efficiency principles means the keeping of continuous records. There are many forms that can be used, but the essential is that they shall be the record of each individual and not the record of a mass.

They may seem so simple as to be hardly worth keeping, but good use can be made of them. Bookkeeping is done for all money expended, whereas little is done for labor expended, but it is just as necessary. These records should be in the form of journals and ledger accounts.

As to the saving in dollars and cents that can be made, it runs in all directions. Perhaps as simple as any is the saving in arguments. There is nothing so deadly to an argument put up by a poor workman that he cannot make a day's pay as the fact, which he soon learns, of there being a complete record of his work in comparison to the men around him.

Then, too, it will be frequently found that 75 per cent. of the coal is sent out by 50 per cent. of the men. If the other 50 per cent. of the men were brought up to standard, normal output, the total output would be increased 50 per cent., with a consequent reduction in cost. But when an attempt is made to increase the output, it is a good plan to know in what particular each man falls down. On the sheet shown in Table 1, loader No. 127 got out less coal than No. 145 though he loaded three more cars, because his car weight was 2 cwt. less. At that he was 0.17 below the standard. This equals 11 per cent. of the weight on the car. His loading of a full car would decrease the transportation cost on his cars 10 per cent. If the transportation cost is 15c. a ton, this is a saving of 1½c.

Continuous records are particularly useful in any mine where allowances have to be frequently made on account of the dead work due to irregularities in the coal. As to the labor involved in keeping up records, one such as is shown in Table 1 can be posted each day in about 15 min. for each 100 men. The compilations at the end of the two weeks take about half a day.

Of Interest to Miners

By John Majer*

I was conversing with a friend a few days ago, and in speaking about mining laws he stated that at the mine where he was employed they were "compelled to use only permissible powder for blasting the coal" and complained that it "broke the coal too fine," which meant a great loss to the miner because he was paid only for lump coal. Frequently, also, a shot would misfire and the miner must then go home without having any coal ready for the next day. But the "greatest trouble," he claimed, "was to keep sufficient earth on hand for tamping the holes." Each miner was "compelled to provide his own earth for tamping," which was a requirement of the mining law.

At this point I interrupted him, to tell an incident in my own experience that, I believe, will be of interest to all Coal Age readers. I had been working three years in the mine at the time the accident happened that I am abount to relate. Previous to that time I had worked continuously as a miner in gaseous mines. My experience of nine years in mining coal convinces me that there is little fear of danger if miners will stop fooling with gas feeders and obey the mining law.

The mine where I was working was well ventilated and operated in full compliance with the law. The coal was 3 ft. 2 in. high and overlaid with a solid roof. There was a "binder" near the bottom of the seam, varying from 1 to 4 in. in thickness, and beneath this was 5 in. of coal. I found that it always took more powder to break down the coal when the shot was mined below than when the mining was done in the top of the seam and the shot placed below. For this reason I mined all my coal in the top of the seam, which gave better coal and made it easier to pick out the binder, which was then easily separated from the coal in large pieces.

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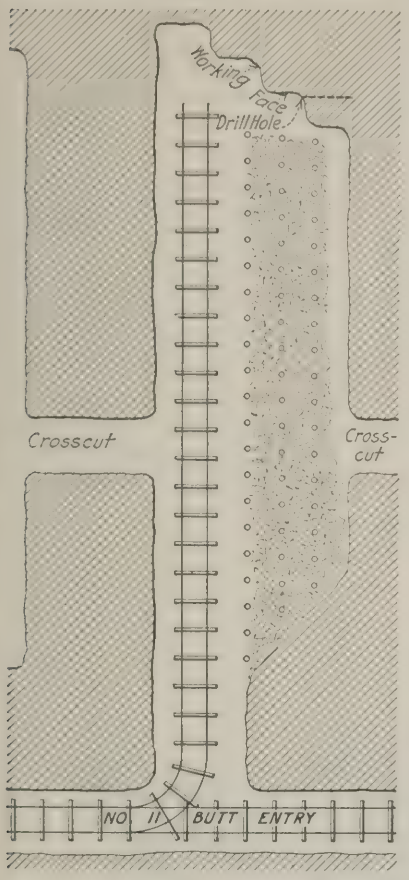


Plan of Room, Showing the Location of the Shot

In the accompanying sketch I have shown the condition that existed at the face of the room where we were working, at the time the accident happened. The room was driven about 50 ft. ahead of the crosscuts shown in the figure. We took out the coal, as indicated, in steps about 6 ft. wide and 3½ ft. deep, mining the coal at the top and placing the shots in the bottom of the seam. At this time, we had altogether about three cars of coal blasted down and ready to load when I suggested eating our dinner. My buddy, however, had drilled the hole shown in the right-hand corner, at the face of the room, and he wanted to shoot this hole and then take his dinner while the smoke was clearing away.

While I started to eat, he prepared a charge of 6 in. of a 4-F grade of black powder. I offered to assist him, but he preferred to do it himself; and when he was ready and called "Fire" we both hid in the crosscut between this room and the next and waited for the shot to go off. This shot failed to break the coal, however, blowing out the tamping with a whistling noise ("squealer"). I remarked that he had not used enough powder to break the binder. After eating our dinner, we examined the hole together, and I suggested that we load out the coal already shot down before shooting the hole again. My buddy was mad, however, and persisted in drilling and firing another hole in the middle of the seam.

While he was drilling this second hole, I prepared a charge of 7 in. of powder and after inserting this in the hole tamped it with coal slack. When this was done and the shot lighted we both hid, as before, in the crosscut. Whether the result was due to there being two holes or whether the first shot had sprung the coal I do not know, but the explosion filled the room with flame for several seconds, the flame extending to within 10 ft. of the crosscut. I shall remember the incident all my life as we were both terribly frightened. I want to urge, here, every miner never to fire a shot until all fine coal, slack and inflammable substances of any kind whatever have been cleared away, especially any powder remaining after charging the hole. I want to suggest, also, as a means of safety, that coal operators should furnish their miners with enough clay to tamp every shot. Coal-dust should never be used for this purpose.

Coal Used by Power Plants

R. E. Horton in *Engineering News* tabulates some computations of the yearly coal consumption in tons under various conditions and based on the use of 1 lb. of fuel per horsepower-hour:

COAL REQUIRED PER HORSEPOWER-YEAR, THE AMOUNT OF COAL USED WHEN RUNNING BEING TAKEN AS ONE POUND PER HORSEPOWER-HOUR

	Gross Tons, 2240 Lb.		Short Tons, 2000 Lb.	
Method of Operation	310 Days	365 Days	310 Days	365 Days
10 hr. per day, no banking.......	1.38	1.63	1.55	1.83
10 hr. per day plus ⅓ for banking	1.84	2.17	2.07	2.43
12 hr. per day, no banking.......	1.65	1.96	1.86	2.19
12 hr. per day plus ⅓ for banking	2.21	2.61	2.48	2.92
24 hr. per day, no banking.......	3.32	3.91	3.72	4.38

When the consumption per horsepower-hour is known or assumed it can be multiplied by the figures in the table. For example: A plant runs 10 hr. per day and 310 days per year, generating an average of 500 hp. It uses 2½ lb. of coal per hp.-hr. and needs an allowance of ⅓ for banking. Coal costs $3.50 per gross ton. From the table, the proper unit consumption per horsepower-year is 1.84 gross tons. Consequently

$$2.5 \times 1.84 \times 500 \times \$3.50 = \$7735 \textit{ annual cost.}$$

Sometimes it is necessary to know how many tons of ash will have to be disposed of each year; then the decimal proportion of ash in the coal can be substituted for the price per ton. For 15 per cent. ash the foregoing example shows

$$2.5 \times 1.84 \times 500 \times 0.15 = 345 \textit{ gross tons.}$$

Rhode Island Anthracite

Rhode Island anthracite has long been a puzzle to mining men and capitalists. Is it a fuel or can it be best used for making refractory linings for blast furnaces? After a study of the Rhode Island anthracite field, the character and qualities of the coal and the results of tests of its use in house and steam furnaces and in the making of briquettes and coke, the U. S. Geological Survey has published a preliminary report by George H. Ashley in Bulletin 541-F.

The coal has been known in Rhode Island for 150 years or more and during the last 100 years scores of attempts have been made to mine it commercially in many places. With one exception these attempts have not been successful, and most of the mines have been abandoned within three years.

In general it has been found that Rhode Island anthracite is difficult to handle, and that the cost of handling, on account of the large quantity required to produce a given amount of heat and the higher percentage of ash, will be greater than that of other coals; furthermore, when burned it can produce only from 40 to 80 per cent. of the heat units produced by the coals with which it necessarily must compete. In general it may be said to show about two-thirds the heat value of Pocahontas coal and when the extra cost of handling the coal and ash is reckoned it may be estimated that Rhode Island anthracite will yield not over one-half the heat afforded, dollar for dollar, by Pocahontas coal.

A Powerful Tractor for Heavy Delivery Service

SYNOPSIS—Description of the new Knox tractor, which embodies the latest ideas in heavy motor construction. The machine transports a load of 10 tons and is equipped with electric starter, a new type of direct and hydraulic brakes and several other novel features developed after considerable experimentation.

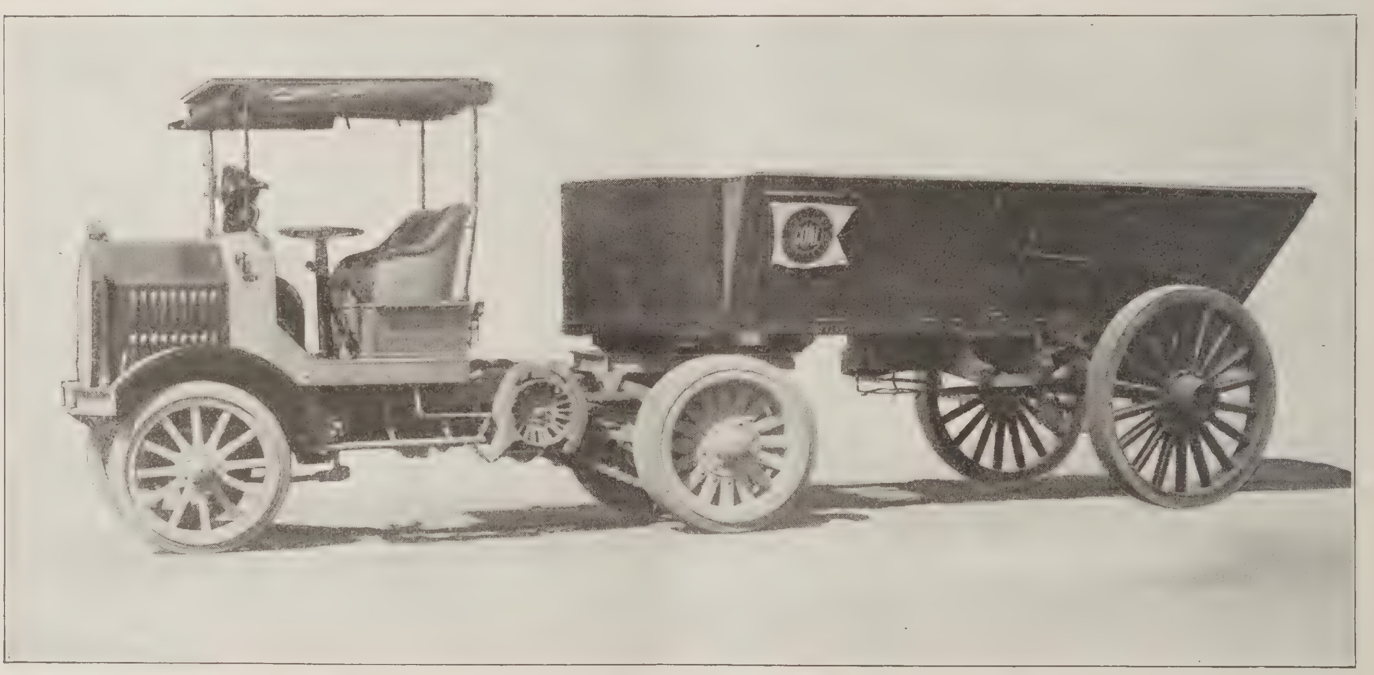
A motor vehicle capable of carrying a 10-ton load with 60% of the weight on large steel-tired wheels has just been put on the market by the Knox Motors Co., of Springfield, Mass. For several years this company has been manufacturing a three-wheel tractor in which the front end of an ordinary heavy truck was carried on a platform over the rear driving wheels of the tractor.

This machine has now been redesigned with two wheels in front instead of a single wheel and with a number of novel features. The illustration herewith shows one of the new type tractors equipped with a heavy truck as a trailer. The trailer vehicle may be of any type desired. The front end of the trailer vehicle rests on a turntable over the rear wheels of the tractor.

General Details of New Tractor

The new tractor, fully equipped but without a trailer, imposes a load on the front pair of tires of 3750 lb. and on the rear tires of 4700 lb. When the trailer is attached there is no increase of the load on the front tires, but with an ordinary truck about 40% of the weight of the trailer with its load is carried by the driving wheels of the tractor and 60% by the rear wheels. If the trailer carries a paying load of 20,000 lb. and its weight empty is 4000 lb., the total weight on the driving wheels of the tractor would be about 14,400 lb., and about the same weight would be carried by the rear wheels of the trailer. The wheelbase of the tractor itself is 108½ in.

The front wheels have 36x4-in. solid tires, and the driving wheels have 38x6-in. solid double tires. The width of the face of each section of the driving-wheel tires is about 4½ in., or 18 in. for the two wheels. Thus the total weight imposed on the road surface by the driving-wheel tires of the tractor when carrying a fully loaded trailer is about 800 lb. per in. of width. Notwithstanding the length of the whole vehicle when the trailer is attached, it can turn in very crowded quarters, as the front wheels are so designed that they can be skewed to a sharp angle, and the center plate on which the front end of the trailer rests is so designed that the tractor can swing to a sharp angle with the trailer and not foul anything.



Side View of the Tractor with Coal Wagon Attached

By an ingenious arrangement of springs, the tractor machinery and the driver are carried easily and smoothly over rough roads and left entirely free from the jar of the heavy load carried on the trailer and the driving wheels. The load on the center plate which supports the front end of the trailer is carried by very stiff and heavy springs to the driving-wheel axle, while flexible cantilever springs 48 in. long, entirely independent of the heavy springs, support the rear of the tractor chassis and have their rear ends resting in slideways under the rear axle. Thus the rear axle is isolated from the tractor chassis, and while it is maintained in line by strut rods it is free to move up and down, equally or unequally as to either of its wheels, without motion of the chassis. This construction should not only add materially to the comfort of the driver, but should be of advantage in relieving the engine and propelling machinery from the jar and vibration inevitable when a very heavy load is carried on a freight truck, besides relieving the tractor chassis from twisting stresses.

A very interesting feature in the design of the propelling machinery is the interlocking differential lock. As every driver of a motor car knows, the differential gear through which the rear axle is driven, while absolutely essential to enable the vehicle to turn corners, is a very serious drawback to the effective traction of the machine on slippery or muddy roads. If either driving wheel slips, the entire power is transmitted through the slipping wheel, while the other driving wheel remains stationary just at the time when its effective traction is most needed.

The differential lock is a mechanism by which the driver, by pressing down a lever in the floor of the cab, can lock the differential gears so that the two driving wheels are compelled to turn together as if the rear axle were one rigid piece. If, however, this lock were thrown into the gears with the engine running and one driving wheel slipping, perhaps at high speed, breakage of the gears would be inevitable. In order to prevent this, the mechanism by which the differential gear is locked is connected with sliding bars which move the transmission gears and throw the transmission into neutral position before the differential lock can engage. Of course, when the transmission gear is thrown to neutral, the slipping rear driver in contact with the road instantly stops. The mechanism by which this result is effected is quite similiar in its general design to the familiar mechanical interlocking apparatus for railway switches and signals. After the driver has locked the differential, he can then set the speed-change gear to any position he desires.

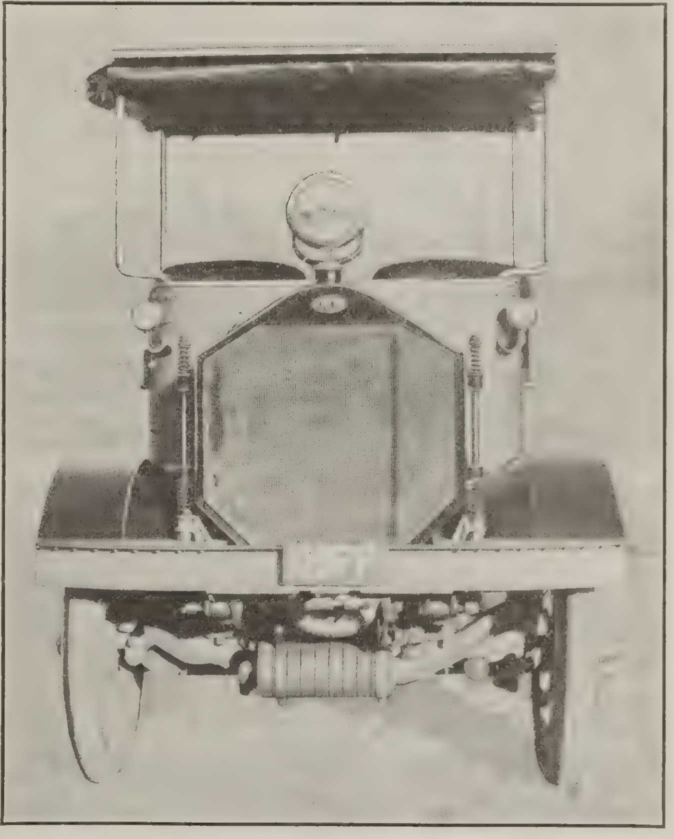
Brake Arrangement

A feature of truck design which has given much trouble with trucks operated in hilly country is the braking system. As every engineer knows, a brake is merely a mechanism for converting the inertia of a moving vehicle into heat. On an ordinary touring car weighing 1500 to 4000 lb. the usual type of brake, consisting of a contracting band on the exterior of a brake drum on the rear axle with an expanding band on the inner surface of the same drum, works satisfactorily. The amount of heat generated by the brake is not great enough to cause overheating of the parts, and on long and steep hills careful drivers generally use the engine to assist in retarding the car. When a heavily loaded truck is descending a long hill, however, the number of foot-pounds which must be converted into heat between the top of the hill and the bottom becomes so great that, unless sufficient surface is given the brakes and sufficient provision made for the dissipation of the heat, difficulty is apt to be experienced.

The service brake on the new Knox tractor is designed, not on the lines of the ordinary pleasure-car brakes, but on those of railway-car braking practice. A cast-steel drum, 14 in. in diameter and 4-in. face, is secured to each end of the jackshaft. A foot lever in the driver's cab enables him to bring a pair of cast-iron brake shoes in contact with the faces of this drum. The driver can automatically lock this brake lever in any position he desires. The inner surface of the drum has a large number of projecting ribs for radiating the heat developed. The cast-iron brake shoes are as easily removable and about as cheap to renew as the brake shoes on a railway car. As the jackshaft turns in fixed bearings and is not variable in position with reference to the chassis, as is the wheel of a railway car, the brake shoes can have a very close adjustment, so that very small motion of the foot lever is required to apply or release these service brakes.

In addition to this effective service brake, an emergency brake, operated by hydraulic power, is applied to the interior of two heavy drums 20 in. in diameter and 6½-in. face, secured to the rear axle, the driving spocket forming part of the same drum. The hydraulic pressure is transmitted by a flexible pipe from the pressure pump in the driver's cab to the brake-operating cylinder on the rear axle. Thus the rear axle may move as it pleases with reference to the chassis of the tractor without affecting in any way the adjustment of the brake.

The hydraulic pump applying the brakes is operated by a hand lever convenient to the driver's seat. Three or four quick strokes of the pump are sufficient to bring the expanding brake bands in contact with the drums on the driving axle. The ratio of the hydraulic pump plunger and of the brake-band setting plunger is 10 to 1, enabling the driver to exert an enormous braking force on the driving axle. This brake pressure is maintained until the handle of the hydraulic pump is moved forward to the end of its travel, when a valve is released, allowing the liquid to flow back to the reservoir, when the springs withdraw the brake shoes from contact.


Front View of Tractor

Speed Control, Oiling and Electric Starter

Another interesting departure from ordinary motor-truck design is the omission of the governor generally applied to motor trucks to limit the speed at which the vehicle may be run. Instead of applying a separate governor, the designers of the motor used on the tractor have adopted such proportions that at a speed of 1000 r.p.m. the horsepower of the motor begins to rapidly fall off, in whatever gear the transmission is running.

The gear ratios of the transmission are such that with the motor running at 1000 r.p.m. and the transmission in high gear, the tractor will run at 9.4 mi. per hr. In intermediate gear the speed of the tractor is 3.9 mi. per hr. In low gear the speed of the tractor is 1.6 mi. per hr.

Another interesting and important mechanical feature is the use of oil under pressure for lubrication. Lubricating oil is forced to the main bearings by a small gear pump which delivers the oil under a constant pressure of 30 lb. per sq.in. through holes drilled into the center of the main bearings. This is the system of lubrication now in use on the bearings of large marine naval engines, where the service is most severe. Experience has shown that under these conditions a constant film of oil under pressure is maintained between the shaft and its bearings, and wear is practically eliminated.

The truck is equipped with an electric lighting and starting system. There is little doubt that this will be considered an economic necessity in future motor-truck design. If hand-cranking must be used to start the motor, drivers will inevitably keep the engine running idle whenever the truck is standing rather than undergo the exertion of cranking it; thus idle running involves a constant waste of fuel and keeps the engine hot. With an electric starter the driver stops the engine whenever the truck stops, knowing that he can start it by pressing a button.

The motor of the tractor has four 5x5½-in. cylinders, cast in pairs and having the valves placed in the heads, which are bolted to the cylinders. The gasoline supply is contained in a 25-gal. reservoir and is fed by a vacuum system to the carburetor. Four gallons additional is carried as an automatic reserve supply.

Finally, it may be noted that the engine has been specially designed with a view to work in wet and muddy regions. The carburetor, magneto, generator and starting motor are all placed high upon the engine, at least 31 in. above the ground level, so that in case of necessity the machine can be run through water of a considerable depth without being put out of commission.

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Extracts from a Superintendent's Diary

When our lawmakers perfect and put into operation suitable laws covering minimum wages, employers' liability, old-age pensions, etc., they will have made it possible for a superintendent to follow the dictates of his conscience at all times without violating general company rules governing rates of wages, maximum number of employees in different departments, etc.

Company auditors in general offices far removed from the base of operations can think only in terms of averages, and they have perfected systems based on averages that enable them to pick out all force-account and payroll variations, no matter how small the variation in wages or number of employees may be.

But model cost sheets with all the deadheads eliminated make no provision for tiding over faithful men who through circumstances often beyond their control, such as sickness or accidents out of working hours, are obliged to live somehow without working, often for long periods of time; nor do they carry pensions for men grown old in the service, nor for widows and orphans of men killed through their own carelessness, but killed nevertheless, and at inopportune times, often with cupboards left bare.

When the time arrives, then, when no more cripples or pensioners can be carried on the roll without exceeding the maximum and thus attracting the attention of the auditors, the superintendent's troubles will begin; I know whereof I write because my troubles began last month.

There has never been a time since I was granted a superintendent's title that I have not been contributing out of my personal income a small amount at least toward some unfortunate family's support; lately the demands (all of them worthy of generous response) have become so numerous that I have stretched my conscience almost to the breaking point by throwing some of the burden on the company, just as if the company had made regular provision for such emergencies.

It's all very well to say that Dick Brown lost his life through his own carelessness and deserved just what he got, but so long as Dick Brown's family remains on the verge of starvation within our camp the manner of Dick's death can have little effect on our treatment of his family. Likewise it's a simple matter to say that Old Man Smith would not have been penniless if he had persistently saved a very small portion of his savings over a period of years and therefore deserves little sympathy, but so long as Old Man Smith remains in our camp we are not going to sit calmly by and watch him starve, sympathy or no sympathy.

Friends of unfortunates are always willing enough to head subscription lists and take them through the camp, and most of our citizens do subscribe liberally to all such appeals; but the necessity of aiding by private subscription men grown old in a company's service has never seemed just to me. It is possible to use a certain number of cripples and old men to replace boys employed as trappers, tipple hands and the like, but here again one's conscience asserts itself, and the man who can serenely watch a crowd of broken-down old men and cripples forced into service that they may drive away the wolf at their doors would soon bring his company into bad repute.

I have just been reading an article dealing with compulsory old-age pensions, and the author characterizes all such legislation as a blow aimed at personal liberty; he sees in such legislation nothing but the secret workings of soulless corporations.

Evidently the author of that article never had his conscience put to a test by being called upon to create positions on corporation payrolls to take care of derelicts.

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Coal Output of China

From a recent report of the Ministry of Agriculture and Commerce at Peking it appears that the output of coal in the various provinces of China during last year was 9,272,000 tons, says *Commerce Reports*, divided as follows: Manchuria, 840,000; Hupeh, 100,000; Chihli, 2,160,000; Anhuei, 60,000; Shansi, 2,500,000; Shantung, 932,000; Honan, 900,000; Szechwan, 300,000; Kiangsi, 800,000; Hunan, 500,000; Shensi, 50,000; Kwangtung, 50,000; Kansu, 50,000; Yunnan, 30,000.

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Assumption of Risk by Miner—Notwithstanding the legal duty of a coal operator to make safe miners' places of work, a miner assumes the risk of being injured or killed in walking under a defective roof in the main entry of a mine, after he has been warned against the danger and his attention has been specially called to the defect. (United States Circuit Court of Appeals, Eighth Circuit; Pearson vs. Rocky Mountain Fuel Co.; 219 Federal Reporter 496.)

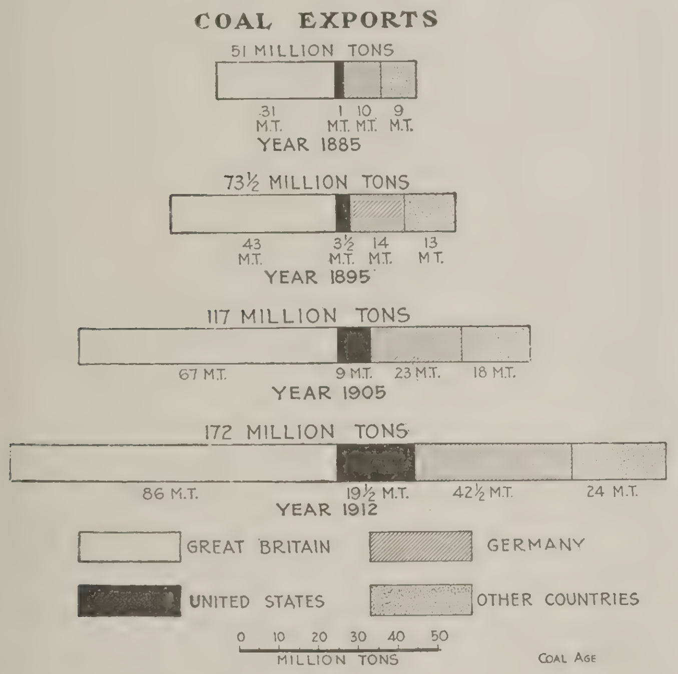
A British View on Our Export Opportunities--II

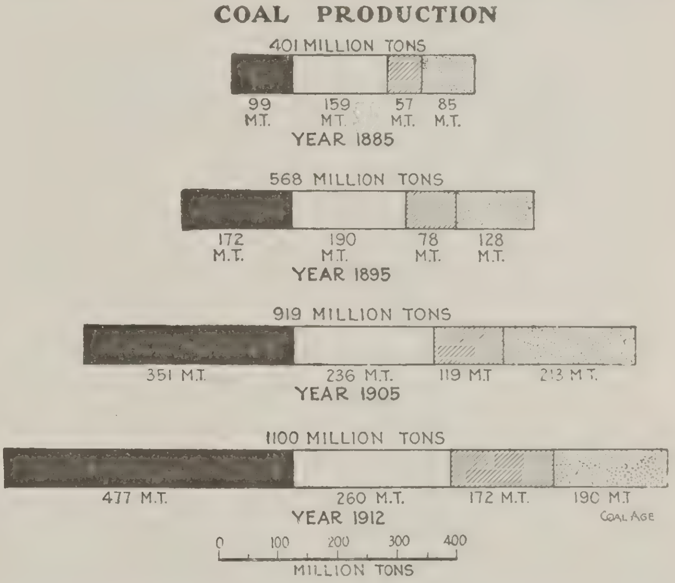
By G. Breffit*

SYNOPSIS—This is the second and concluding article by Mr. Breffit. The ultimate prominence of the United States coals in the world's markets is now an accepted fact. The author also discusses the adaptability of our coals for export business and outlines a tentative scheme for entering the foreign markets.

There is no doubt that America is destined to be the chief source of coal supply, and as soon as an export business from the United States is fairly commenced, the progress will be rapid. But a shop must be opened before customers come to buy, and at the present time foreign purchasers scarcely recognize this country as being in the market to sell.

As this export business grows, it will have its effect upon what has been best described as the "set of trade." New markets for the use of coal will be opened, while the transportation of coal itself will increase bunker requirements, and more coaling depots will be needed; in short, it is an example of business making business.





Graphic Representation of the World's Coal Production and Exports

An illustration of the gradual change in the "set of trade," as applied to the British coal exports, will be found in the accompanying statement (Table D) showing the quantities and percentages exported to each group of countries every fifth year for the last half century. Some lesson is usually to be learned from statistics, dry though they may be, and the object in working out these particular results is to show how, as the coalfields of the United States and of the Far East have developed, the British trade with groups 5, 6, 7 and 8 has dwindled, finding its replacement in the increase with groups 1, 2 and 9, while groups 3, 4 and 10 (at no time of any magnitude) have remained almost stationary. This is the grouping that has been adopted by the statistical department of the English Board of Trade, the boundaries of each being roughly shown on the map.

Export business should be cultivated. Although it is a healthy sign for a country to consume its own production of coal, the United States is really too dependent upon its home customers. An "equilibrium" is wanting, and as a result there is irregularity of work, which is bad for both employers and employed. Besides, regular work means cheaper coal, and in the long run it is the home consumers who benefit by this. Therefore an increase of exports becomes a benefit to the people and should be encouraged whenever possible by the state.

At first sight it would appear otherwise, as any addition to the vendors' list of customers would tend to strengthen prices, to the detriment of existing buyers; but this hardening tendency is more than compensated by the cheapening of production consequent upon more regular work, so that a coal owner could make larger profits without raising his price—or even in spite of lowering it.

Appended hereto is a statement showing the chief destinations of coal exported from Great Britain, Germany and the United States in 1905 and in 1912. It may be observed in this statement (see Table F) that the exports from Germany, although increasing annually to all countries, are chiefly in the direction of contiguous countries; exports to "other countries" being only from 3½ to 7 per cent. of the total.

Probably the ideal organization would be a coöperation of all the coal producers in the world, but this may be at once dismissed as entirely impracticable. Nor is it worth while to discuss the coöperation of all the producers in one country; the interests are too diffuse and the condi-

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*20 Broad St., New York City.

TABLE E. PRINCIPAL DESTINATIONS OF COAL EXPORTS (GIVEN IN THOUSANDS OF TONS)

	1905			1912		
To	U. K.	Germany	U. S.	U. K.	Germany	U. S.
Russia	2,578	955	....	4,047	1,486	....
Sweden	3,178	....	....	4,116	....	....
Norway	1,446	....	....	2,201	....	....
Denmark and fisheries	2,333	....	....	2,867	....	....
Germany	7,626	....	....	8,395	....	....
France	6,732	1,349	....	10,191	3,008	....
Spain	1,971	....	....	2,271	....	....
Italy	6,413	....	....	9,180	....	....
Egypt	2,243	....	....	2,926	....	....
Brazil	1,044	....	....	1,626	....	....
Argentina	1,784	....	....	3,365	....	....
Belgium	....	2,499	....	....	5,282	....
Holland	....	4,360	....	....	6,439	....
Austria	....	5,948	....	....	10,838	....
Switzerland	....	1,138	....	....	1,485	....
Canada	....	....	6942	....	....	13,595
Mexico	....	....	872	....	....	345
Cuba	....	....	535	....	....	1,151
Other countries	10,128	582	670	13,260	2,106	2,598
	47,476	16,831	9019	64,445	30,644	17,689

tions too various, to be brought together in one line.

But to associate all the producers of one district, or even the producers of a particular class of coal in one district, is both feasible and worthy of consideration; and when the success attending the Westphalian scheme is reviewed it is surprising that such associations are so rare.

Control may be obtained in several ways, such as:

(a) By purchase of the undertakings.
(b) By amalgamation.
(c) By pooling sales.
(d) By convergence of sales to one office.
(e) By purchase of the greater part of production.

(a) Entails an enormous capital outlay, even if the purchases can be effected at prices satisfactory to the buyer, which is unlikely.

(b) Cannot be hoped for to any large extent, owing to the difficulty in agreeing upon the valuation of each component part.

(c) Is only applicable either when the several interests all produce the same quality, in which case each is content to receive the same price as his neighbor, or when the variations in quality are so exactly represented by the variations in price that the results admit of no dissatisfaction.

TABLE D—EXPORTS OF COAL FROM GREAT BRITAIN—TO THE 10 GROUPS OF MARKETS (GIVEN IN THOUSANDS OF TONS)

	1 Russia, Sweden, Norway, Denmark, Germany, Holland, Belgium and Whale Fisheries		2 France, Spain, Mediterranean, Azores, Madeira, Canaries and St. Vincent		3 W. Coast of Africa, Ascension and St. Helena		4 British South Africa		5 E. Coast of Africa, Mauritius, Arabia and Persia		6 Indian Continent		7 Ceylon Straits, China, Japan, Australasia and Pacific Islands		8 N. America (Atlantic), Central America (Atlantic), Venezuela and West Indies		9 Brazil and Argentina		10 Pacific Coast of North and South America		Total
Year	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	
1860	2,452	34.7	3,029	42.8	33	0.4	27	0.4	89	1.2	146	2.1	308	4.3	710	10.1	204	2.9	77	1.1	7,074
1865	3,070	34.5	3,810	42.8	54	0.6	38	0.4	88	1.0	217	2.4	267	3.0	843	9.5	313	3.5	175	1.9	8,876
1870	4,038	36.1	4,960	44.3	50	0.4	14	0.1	87	0.8	250	2.3	315	2.8	819	7.4	445	4.0	200	1.8	11,178
1875	5,408	38.7	5,995	42.9	60	0.4	48	0.3	116	0.8	367	2.7	406	2.9	663	4.7	519	3.7	398	2.9	13,979
1880	6,213	34.7	8,299	46.4	125	0.7	168	0.9	146	0.8	655	3.7	632	3.6	782	4.4	562	3.1	309	1.7	17,891
1885	7,290	32.1	11,261	49.6	191	0.8	199	0.9	241	1.0	776	3.4	747	3.3	646	2.8	986	4.4	374	1.7	22,710
1890	9,252	32.1	14,766	51.3	361	1.2	264	0.9	282	1.0	686	2.4	747	2.5	449	1.5	1454	5.5	477	1.6	28,738
1895	11,044	34.8	15,334	48.3	266	0.8	252	0.8	286	0.9	805	2.8	660	2.0	492	1.5	1977	6.2	598	1.9	31,715
1900	18,108	41.1	21,068	47.8	625	1.4	708	1.6	254	0.6	100	0.2	765	1.7	182	0.4	1977	4.5	302	0.7	44,089
1906	21,735	39.1	27,114	48.8	457	0.8	197	0.3			984	1.7			372	0.7	4189	7.6	552	1.0	55,600

(d) Is the simplest method, as it involves only the consent of individual operators to the principle and the assurance of a capable and trustworthy administrator. There is no disturbance of capital, no pooling, and no disclosure of internal affairs.

(e) Requires no "consent," and could be operated by anyone endowed with sufficient credit to make unlimited purchases. The actual cash for working capital (beyond payment of railroad freights) is not necessarily large, all depending on whether any longer credit is allowed to buyers than is obtained from sellers.

In any of these cases the principle sought is that of "selling from one office," in order that fluctuations in prices may be accommodated to the relation of supply to demand and nothing else, and so do away with the unnecessary competition which so frequently cuts prices needlessly.

In addition to this, the operator (or the administrator, as the case may be) could so handle his product as to be in a position to offer exceptional terms to consumers—particularly guaranties, under specified penalties, as to quality. Such a condition would be onerous to an individual coal owner, while it could be undertaken with comparatively little risk by a group of producers, or by the administrator, because of the varied sources of supply.

Adaptability of American Coal for Export

The production of coal in the United States is not only very large, but is so varied in character that there is little doubt as to the ability of this country to supply, with a few exceptions, the entire demands of the world. The exceptions include:

(1) The high-grade smokeless steam coal, which has so far been found only in South Wales and which has a special market (where price is not of first consideration) in warships and mailboats.

(2) The very dry steam coal, verging upon anthracite, suitable for the manufacture of producer gas, of which there appears to be no supply in the United States.

(3) Coking coal. Of this there is a large production, but it is all needed in this country and none can be spared for export; particularly as the area is not extensive and at the present rate of exhaustion will be worked out in a comparatively short period.

But with the exception of the special demand upon No. 1, which this country does not produce, and on No. 3, which is not for sale abroad, it appears that the United States has coal to offer suitable for every purpose and that it is only a matter of price, regulated by efficiency, as to what portion of the world's orders can be booked.

The classes of coal used and the proportions required vary considerably in different countries. From the point of view of quantity, the markets of France and Italy are, to the English merchant, of equal importance, both countries importing about 10 million tons of British coal annually, but there is much difference in the class of coal bought by each. Italy produces no coal, and the quantity imported from Great Britain is practically all Italy consumes, less than 5 per cent. coming from other countries. France, on the other hand, uses 35 million tons of native coal and buys another 10 million tons from Germany and other countries besides the 10 million tons from Great

Britain; so that French purchases are, to a greater or less extent, confined to selected qualities, while the Italian imports are fairly representative of the country's needs.

I would sum up the foregoing into three recommendations:

(1) Organize internally with the view of lessening competition and of economizing production.

(2) Please your customers by helping them to find out what best suits them; by giving them this, or the nearest approach to it possible, or, if you do not produce it, by getting it for them.

(3) Obtain all information of what is going on in other countries, statistical and otherwise; remembering that anything, no matter how trivial or apparently irrelevant, may have a bearing upon international competition.

Some Notes on Fuel Consumption at San Francisco

The population of Oakland, with Berkeley and Alameda, is estimated to be 300,000 at the present time, and taking all the cities and towns situated on San Francisco Bay into consideration, the population is very nearly a million. San Francisco has an even climate the year around; its highest mean temperature is given as 61 deg., for September, and its lowest as 50 deg., for January. The average date of the first frost in autumn is Dec. 10 and of the last in the spring is Jan. 25. San Francisco is the financial center of the West and occupies eighth place for bank clearings in the United States; these amounted to $2,624,428,532 in 1913.

RECEIPTS OF COAL AT SAN FRANCISCO (IN TONS)

Year	British Columbia	Australia	Great Britain	Japan	China	Washington	Oregon	Domestic Eastern	Rail	Grand Total
1906	311,099	72,638	37,215	.....	.....	110,670	42,975	11,455	.....	586,052
1907	205,956	387,740	18,582	73,398	.....	87,346	26,445	83,883	.....	883,550
1908	167,415	228,174	15,110	.....	.....	29,426	24,885	171,875	.....	655,801
1909	179,187	97,281	.....	5	.....	25,557	24,470	76,081	.....	402,581
1910	166,443	154,603	2,564	39,077	6,170	65,085	13,572	86,744	.....	534,238
1911	200,646	160,626	1,076	2.100	14	59,128	4,655	154,789	10,930	593,964
1912	173,753	94,439	.....	2,150	500	49,829	1,200	122,090	19,080	463,041
1913	40,297	89,579	200	80,222	800	66,344	950	126,668	47,250	452,310
1914	97,598	123,050	13,421	25,077	1,000	12,637	73	60,219	39,030	372,105

Oil has replaced coal for steam production on the Pacific Coast and nowhere to a greater extent than in California. In addition, coal has had to contend with the competition of electricity and gas here as in other places. Electricity is produced by water power, and for reserve power the companies are keeping steam plants that burn crude oil. The gas is produced and sold generally by the companies that sell electricity. The gas is now made from oil instead of from coal.

The marine department of the San Francisco Chamber of Commerce compiles an annual statistical report of all the coal brought into San Francisco harbor as cargo and of all that which enters by rail. The Oakland Chamber of Commerce does not compile statistics, and figures are not available for coal entering other ports of San Francisco Bay by rail. These figures as compiled are shown in the table herewith.

Developments in Ocean Shipping Facilities

That some shippers are intending to enter oversea markets as a permanent thing appears in a recent announcement of ships being built to carry coal from Chesapeake Bay to Mediterranean ports. Two steamers, each of 7500 tons' capacity, to be operated by the Coastwise Transportation Co., of Boston, have been chartered for six years in this service, and it is understood they will usually load in Baltimore. These ships will be 400 ft. long and 55 ft. beam, with engines amidships. The keels have already been laid at Camden, N. J., and one is to be ready in October and the other in December. Other ships are in process of construction, but are designed primarily for coastwise trade. Among these are the three steam colliers, of 5000 tons each, for the Pocahontas Navigation Co., which will be factors in the Pocahontas field.

Situation in the Middle West

The more hopeful Indiana and Illinois operators feel that any change would be for the better, conditions now being at their worst. Current shipments are confined absolutely to orders, and in consequence there is little consignment coal on hand to disturb things, which is encouraging. There is also a renewal of activity in manufacturing and industrial circles in the Chicago district, which should soon reflect favorably on the coal trade. On anthracite, some orders have been placed at April storage prices, but there is no movement of consequence. The old-line companies are maintaining circular prices, but the independents make concessions to obtain orders.

Conditions at Milwaukee

Summer retail rates on coal at Milwaukee went into effect on Apr. 1. Nearly all anthracite grades with the exception of buckwheat now retail at 50c. per ton below the winter rate. Egg and stove sizes of anthracite are quoted at $7.60 per ton instead of $8.10, chesnut at $7.85 instead of $8.35, and pea size at $6.55 instead of $6.60. Buckwheat remains at $5.25. On bituminous, Pocahontas sells at $6 as against $6.50 during the winter and Hocking Valley at $4.75 instead of $5.25.

With the exception of stove coal the supply of domestic fuel coal is ample; some dealers have been short on this grade and have been replenishing their stocks by rail. Some cargoes of anthracite now afloat at Buffalo will come forward as soon as navigation opens. Stocks of soft coal on the docks are a little above normal and the rate of shipment fair. Indications are that the movement for the coming season will be about the same as that of last year. It is the policy of Milwaukee coal-handlers to keep stocks replenished to the limit of storage capacity. Milwaukee's favorable situation as a distributing center is reflected in the stability of her coal trade.

* * *

The following values for power factors may be assumed for circuits and used in any calculations when exact values are not known:

Incandescent lighting and synchronous motors ..	95 per cent.
Lighting and induction motors	85 per cent.
Induction motors alone	80 per cent.

Coal in Canadian Middle West

The importance of the coal deposits of Saskatchewan, occurring as they do in a territory lacking almost entirely resources of timber or water power, has been to a great extent overlooked in the past, says Consul Samuel C. Reat, of Alberta, in *Commerce Reports*. Of late years the investigations carried on by both the Department of Mines, Ottawa, and the Geological Survey of the United States, on the coals of the same character on the other side of the international boundary, have brought out facts which place these deposits on a much higher plane, and these investigations have paved the way toward obtaining more definite data which will develop uses for these low-grade lignites for purposes hitherto thought impossible.

The more important districts, or rather those districts which have been studied in any detail, are very few; but there is no doubt, as the demand for coal grows, other districts will be developed.

The only important district at present from the shipping standpoint is the Estevan district, while the Willow Bunch area has been tapped by a railway only lately. From estimates computed by the Geological Survey of Canada, it is found that the coal resources are enormous. The estimated tonnage in the Belly River formation is 33,908,000,000 tons. In the Tertiary formation in the Souris area, consisting of eight townships, there are 2,304,000,000 tons, while the area to the west of Souris has possibilities up to 23,600,000,000 tons.

The principal mines of the Estevan district are those of the Western Dominion Collieries Co., whose property is equipped for an output of 1000 tons per diem; those of the Manitoba & Saskatchewan Coal Co., equipped for an output of 2000 tons per diem; and those of the Eureka Coal & Brick Co., with an output of 200 tons per day. There are some 15 to 18 other smaller mines, supplying mostly local markets and working intermittently.

According to a report just issued by the Dominion Government the 3,821,739 short tons of coal produced in Alberta for 1914 was 11.25 per cent. less than in 1913. The export of coal from Alberta to the United States last year was 106,087 tons, according to the official report. The declared export returns from this consular district show only 7774 tons.

There are 246 coal-producing mines in the Province of Alberta, of which 62 were new mines opened up last year. The cost in lives of this 3,821,739 tons of coal last year was 209 victims of fatal accidents, of whom 189 were killed in the Hillcrest mine alone and 1 man on the surface, making the mining accidents, aside from the Hillcrest, only 20 for the whole province.

North Dakota's New Coal Laws

By A. L. H. Street*

Coal was the subject of two laws adopted by the North Dakota Legislature, which adjourned Mar. 5, 1915.

One of these laws describes the word "coal" as including "all kinds of coal, and . . . what is known as lignite coal." The other law relates to the use of lignite coal in state and county institutions and schools. Summarized, the provisions of this act are as follows:

The various state institutions, county buildings and public school houses of the state must "use for fuel native or lignite coal or lignite-coal products, and it shall be unlawful for any officer to purchase for use in such institutions . . . any coal other than that taken from the mines within the boundaries of this state," except when the cost of other fuel does not exceed that of native coal, and excepting public schools located six miles or more from a mine or railroad station.

The purchases of lignite coal must be based upon proposals invited by notice in a newspaper published and having a general circulation in North Dakota and must be awarded to the lowest responsible bidder. Copies of such proposals must be filed with the Secretary of State. Proposals are to be based upon the standard of 2000 lb. per ton.

The law reads as follows:

> Standard contract grade of lignite coal shall contain as delivered 33 per cent. of moisture as determined at 105 deg. C. For actual weight of moisture above 35 per cent. deduct proportionately the price per ton. Standard contract-grade lignite coal, water-free basis, shall contain from 10 to 15 per cent. of ash. For each 1 per cent. of ash above 15 per cent. deduct 2½ per cent. of the bid price per ton. For each 1 per cent. below the 10 per cent. add 1⅜ per cent. of the bid price per ton. Standard contract-grade lignite coal shall contain, water-free basis, not over 2 per cent. of sulphur. For each 1 per cent. or major fraction thereof above 2 per cent. deduct 2 per cent. of the bid price per ton. Standard contract-grade lignite coal shall contain, water-free basis, 9500 B.t.u., and the price per ton shall be based upon that number of heat units. When the B.t.u. are in excess of that amount, such excess shall be paid for proportionately; and, if the contents are less than 9500 B.t.u., then a proportionate amount shall be deducted from the price. The method of ascertaining the above facts shall be agreed upon between buyer and seller; provided, that any school or institution which does not use to exceed 50 tons of coal in any one year shall not be required to publish for proposals.

Any board that violates the provisions of the act renders its members personally liable for the purchase price of the coal and exempts the institution from liability; "provided, however, that this act shall not apply to country schools or public buildings where no janitor is employed."

A Government Coal Mine

By A. P. Connor

This mine, which was shown on the front cover of Coal Age last week, is owned and operated by the Federal Government. The coal is a lignite variety and is deposited in a flat bed. The mine consists of a series of drifts in a 9-ft. seam, while the workings extend to an average depth of 100 ft. below the surface of the ground.

The main entry in the mine is about 2000 ft. long and 6 ft. in height and width. The rooms where the workings have progressed are about 150 ft. long and 16 ft. wide. The mine is ventilated by motor-driven fans. The workings are wet, the water being collected in sumps and taken out in barrels. The average output of the mine is 100 tons a day. The cost of mining the coal, including maintenance costs, has been found to be $1.78 a ton. The miners are provided with comfortable quarters free, and their wages average from $3.50 to $5 a day.

The mine is situated at Williston, N. D., on the governmental reclamation project there.

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Claims to Ownership of Coal—When underlying coal is owned by a person other than the owner of the surface of land, any title acquired to the surface through adverse possession cannot be deemed to affect the title to the coal. (United States Circuit Court of Appeals, Fourth Circuit; Shrewsbury vs. Pocahontas Coal & Coke Co.; 219 Federal Reporter 142.)

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*Attorney-at-law, St. Paul, Minn.

The Labor Situation

SYNOPSIS—The Coshocton miners of Ohio approve by referendum vote an agreement with the operators. The rate for run-of-mine coal machine-mined is 51c. for wide work and 60c. for narrow work. A reduction in wages is demanded at a small mine in Pennsylvania, and the duration of a shutdown is extended at Vesta No. 5. Floyd County, Kentucky, is organized.

The joint committee representing the miners and operators in the Coshocton district, which met at Coshocton, Ohio, last week, agreed on a wage scale. This was submitted to the referendum vote of the miners' organization on Apr. 10 and was carried almost unanimously. In all, about 1200 miners in the district are affected, and they have been idle since Apr. 1, 1914.

The scale as formulated by the joint committee provides for 67.6c. for pick-mining on a mine-run basis. In machine-mining in wide places 11c. will be paid for cutting and 40c. for loading, or a total of 51c. In mining by machine in narrow work 13c. will be paid for cutting and 47c. for loading, making 60c. Inside workers are to be paid at the rate of $2.84 per day and outside labor at the same rate as provided in the former scale. C. L. Barnes was chairman of the conference, and the secretaries were E. P. Miller and C. R. Thrapp.

Eastern Ohio Still on Strike

In the eastern Ohio district there were no developments during the past week. Everyone appears to be awaiting the action of the legislature on the Gallagher amendment to the mine-run bill. It is announced that it has been placed on the house calendar for action Apr. 12. Eastern Ohio operators in general believe it will be adopted.

The officials at the miners' headquarters at Bellaire have issued a statement saying that the miners will not sign except on the mine-run basis, no matter what the legislature does with the Gallagher bill.

A Mine Lowers Wages in Somerset County, Pennsylvania

A correspondent at Garrett, Penn., writes that the Atlantic Coal Co. has demanded a reduction of 10% on all day labor and 5c. on each ton of coal, the schedule applying to No. 2 plant. It was also declared that nothing would hereafter be paid for setting timbers. This resulted in a strike of about 200 miners. The Atlantic Coal Co. operates near Meyersdale, Penn., in the Somerset County district.

It is much to be regretted that some operators think they are justified in reducing wages so as to take contracts away from other companies which are still paying the scale customary before the depression. All attempts to secure such advantages over their competitors injure the employees of the other companies and should be resisted by the men working for any management seeking such a reduction. Everyone knows that no company would be disposed to reduce wages if it thought it would have to meet the competition resulting from equal reductions made by its rivals. The whole reasonableness of a cut in the wage-rate lies in the advantage it gives to one employer to undersell a competitor who pays a better wage. He is not out to create trade, but to secure it at the expense of another man who is more liberal to his men and who hesitates to add to their misfortunes by giving them at once both short pay and short time.

Vesta No. 5 mine, owned by the Jones & Laughlin Steel Co., of Pittsburgh, reopened Apr. 8 after a long period of idleness. It is said that the miners refused to return to work unless 18 men formerly employed by the company were reinstated. The company did not argue the matter, but closed down the mine.

The Union in Kentucky and West Virginia

In Floyd County, Kentucky, two organizers of the United Mine Workers of America have managed to form a strong branch of the organization, apparently with the approval of both miners, operators, business men and county officials. The meetings were held in the courthouse. Two hundred charter members were admitted.

The returns on the referendum in the New River and Winding Gulf coal field are now officially reported. The agreement recently made has been ratified by a majority of 156½ votes. Several local unions lost their votes because their returns were made under seal. These were Fayette, McAlpin, Tams, Glen White and Slab Fork. Eccles' returns arrived late. Had the votes of these locals been counted their vote would have stood 1007 for ratification as against 542½ for rejection; so the action of these unions would have been to swell the small majority in the other parts of the field. Of the 40 unions voting, 23 were for ratification and 17 for rejection. Of those favoring ratification, 12 voted unanimously. On the other side 11 were equally clear as to the right course of action.

With Her Liniments and Patches

The First-Aid Corps

By MICHAEL BERNARD

Written Expressly for COAL AGE

Always Swift and Always Ready

WHEN our youthful lives were pestered
With the boil that ached and festered,
And with gashes, bruises, scratches,
Blisters, burns and stings galore,
Mother soothed our wounded feelings
And accomplished wondrous healings
With her liniments and patches,
Like a first-aid corps.

SHE performed the dual mission
Of the surgeon and physician
Till we felt that she could handle
Any kind of cut or sore;
But, arrived at man's discretion,
We are forced to make confession
That she couldn't hold a candle
To the first-aid corps.

ALWAYS swift and always ready,
Calm, self-confident and steady,
Trained to shun the painful errors
Made by rescuers before;
Armed with bandage, gauze and lotion,
Filled with courage and devotion,
Grim disaster holds no terrors
For the first-aid corps.

ACCIDENTS like laceration,
Twisted limbs, asphyxiation,
Severed artery and bleeding,
And a half a hundred more,
Fail in modern times to frighten,
For the outlook's bound to brighten
When proficient help comes speeding
With the first-aid corps.

Editorials

Economic Utilization of Coal

The American coal operator of today is a thorough economist. There was a time perhaps when guesswork and the rule-of-thumb answered the purpose of carrying on his business. Fortunately that time is past, and the modern operator must know the facts and takes nothing for granted.

We have heard much in the recent past concerning the exhaustion of our coal measures, and "conservation of natural resources" has become a household word. Some people hold the view that we of the present generation are morally accountable to those that are to come after us for our profligate waste of the riches with which nature has endowed the world.

However ethical such a doctrine may appear and however high a literary polish may be given to the phraseology in which it is couched thinking people are of the belief that the present is ours to enjoy and that we should make such use of nature and her gifts as best to serve the present needs of humanity. Let the future take care of itself. Coming generations will have their problems as we have ours and will doubtless be able to solve them by ways and means quite as efficient as those which we employ.

We have long been accustomed to regard coal as a substance containing a certain number of British thermal units per pound, this heat being made available through chemical combination with a certain quality of atmospheric air. Coal has been and is now being purchased regularly on the basis of its heat content. A contract for fuel has been a balance between British thermal units upon one hand and dollars and cents upon the other. A ton of coal has meant so much heat and nothing else. It has been, and in large measure is still in the popular conception, a fuel and a fuel only—a storehouse of heat-energy which warms our homes, cooks our food, lights our buildings, hauls our trains, smelts our ores and drives our commerce to the four corners of the globe.

Within the comparatively recent past, however, man has learned that coal contains more than British thermal units; that a multiplicity of products useful in the arts and sciences may be recovered from the gases evolved in the process of coking. Furthermore, the heat, the principal constituent for which the coal is dug, remains practically undiminished.

Besides the coke and gas which may be employed advantageously for metallurgical purposes or for the generation of power, the tar, ammonia, benzol, etc., recovered in the process of coking frequently possess a market value almost, if not quite, equal to the original coal as it was delivered to the byproduct ovens.

In our present stage of development along economic lines, no one would venture the assertion that the utmost attainable has been reached. Development of the coal industry will proceed in the future as it has in the past, whenever and wherever such development and improvement will pay a reasonable dividend upon the capital necessarily invested.

The invested capital of production is increasing, but not so rapidly as is the cost of coal. Consequently the time may not be far distant when we may reasonably anticipate that, notwithstanding the high fixed charges of the by-product coking plant, we will no more consider burning raw coal for the sake only of the heat which is thus liberated than today we habitually eat wheat in preference to bread.

But this improvement in the utilization of coal will not come about as a measure of conservation. It will transpire rather from natural economic causes, such as the increasing cost of coal production and transportation. The products evolved will be many and varied, but their market value will be such that when the cost of the raw coal is properly proportioned, heat (or the primary product for which the coal is mined) will be little if any more expensive than it is at the present day.

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The Have-Nots in California

California in 1913 had 35 coal miners and two operating coal mines, and it produced 24,839 tons of coal. It also at one time had a Special Commissioner of Mine Accidents who, once appointed, promptly muckraked the coal operators in other states than his own, not being able to find any at home, and made statements from which a competent technical mining man would have refrained largely because they were not true.

But California, being a revolutionary state, has not been satisfied with these services to the industry, but has recently memorialized Congress to inaugurate Government ownership of coal mines, the Assembly of the state showing a marvelous unanimity and voting for the resolution 49 to 5. Assemblyman Downing, a socialist of Los Angeles, introduced the bill.

The Sacramento, Calif., journalist who recorded the fact declares that the California legislature never did this before. It is its first offense apparently; let us hope it will be its last. The reporter declares that "the project calls for the supplying of citizens with coal at the cost-of-production price."

Herein is the goal of much of the present-day socialism—the abolition of profit. When, however, the government absorbs all the businesses of the world and runs them all without profit, when also all the sources of taxation are cut off because private ownership is at an end, shall we not long for some profits to build our plants, excavate our railroads and common roads and meet the constant needs for expansion? Everywhere we go we see evidences of profit—factories, bridges, docks, dwellings, tipples, power-houses and what not. Only where Indians and savages live are none to be found.

To seek an end of profits is nihilism and not socialism. We fear that the mild climate of the state has unbraced the Californians and made many of them disposed to policies which can end only in the death of civilization. And like the man who was asked where he preferred to have a carbuncle they declare they like best to have it on the other fellow. They would like to see the regulation of industry tried on the sister states.

A coal miners' organ quotes a diatribe by Scott Nearing, an instructor in political economy at the University of Pennsylvania and at Swarthmore College, Pennsylvania. In it he says:

> Is not the world beginning to realize that today the most sinister crimes against the ideals of Christ's religion are committed by the system of industry for profit?

If he will change *realize* to *imagine* we will agree with him. The world is truly beginning to believe that profits need an apology. But when we note that almost every improvement is derived from capital which is created by profit, then that profit becomes to us as dear as our homes, as indispensable as our means of employment. We know, when we reflect, that almost all construction is from the profits of some business somewhere if not of the business where the improvements are made.

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Increasing Connellsville Coke Production

Iron and to a lesser extent metallurgical fuel are regarded as trade barometers. It is a well-recognized fact that when the steel mills of the land are busy other industries follow suit, and no man needs to go hungry if he is willing and able to work.

Metallurgical fuel such as coke is produced only about as fast as it is needed, and consequently its rate of production is an index to industrial conditions scarcely less sensitive and reliable than the manufacture of steel and iron.

During the past three months, or since the beginning of the present year, the production of coke in the Connellsville region has been steadily increasing. The first week in January saw about 200,000 tons of this fuel produced in that locality. At the present time the production is slightly over 280,000 tons weekly.

While many mines in the coke region have worked steadily for many months past, the majority have been on part time or closed down altogether. Many are now, however, either resuming operations after a shutdown or are increasing their capacity.

The reports from southwestern Pennsylvania have in the past few weeks been particularly encouraging. One hundred ovens have been blown in at Allison No. 2. The Ellsworth Colliery Co.'s works at Cokeburg and Ellsworth have been placed in full operation. The Marianna mine of the Pittsburgh-Buffalo Co. is working with 500 men. One hundred ovens were recently fired at Alicia, making 400 at that place. Reliance is operating 235 ovens six days per week; 35 additional ovens have been fired at the Century plant; 120 ovens were recently fired at Thompson No. 1 plant, making 400 in all, or the entire oven installation. Furthermore it appears to be the consensus of opinion that other plants will be starting within the next few weeks.

Whatever may have received the bulk of the blame for the present business depression, it would appear that one real cause of lessened prosperity lay in a lack of confidence. It would further appear that this lack of confidence is now vanishing and that better times are in store. While the wheels of industry are not turning as rapidly as they have sometimes done, their rapidity of rotation is at present increasing, slowly perhaps, but nevertheless steadily and surely.

State Mine Reports

Owing to the frequent changes in mine-inspection officials, the state mine reports are often less valuable and less readily usable than they should be. In the short tenure of office, the incumbents do not have time to observe, consider and correct the shortcomings of their reports. Some are, however, most complete, notably those of Pennsylvania, Illinois and West Virginia.

Every report should contain a preface stating the period which the report covers, the number of pounds in a ton, the inclusion or exclusion of mine managers, superintendents, clerks, safety bosses and firebosses in the enumeration of employees, the statement whether washery tonnages have reference to coal washed from culm banks only or to all coal received by such washeries, a declaration that coke-oven employees and strippers are or are not included in the enumeration of outside men and a statement showing which coal mines are recorded and which excluded and whether the coal output is supplemented by a clay or other noncarboniferous product at any of the mines the output of which is recorded. In this way false inferences will be avoided.

Then also all instructions given to those who fill the forms should be repeated here in full. The rules guiding the tabulating clerks should also be given. It is important to know, for instance, if the "number of days worked" is calculated as an average of the collieries taken as units or whether it is a weighted average and whether the weight is made dependent on tonnage produced or employees engaged.

Thus one tabulator might add the days worked at some 100 collieries and divide by 100. Another would multiply the tonnage produced by the days worked and finally add these products, dividing the sum by the total output. Another would take the products of days worked and men employed at each colliery, add these together and divide the result by the total number of employees. The last method is preferable to all others.

A list of the mine inspectors, the numbers and the geographic bounds of their districts would also be extremely valuable. Most of the reports omit one or more of the statements mentioned, and reference to the contents is thereby made difficult. One report on its cover even failed to record the name of the state to which the report referred.

It would be well if the nature of inquiries could be standardized in the various states so that results might be made more precisely comparable. Matters of this kind are well worthy of the attention of the Mine Inspectors' Institute of the United States of America.

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A Profitable Season for the Retailer

The winter just closed has been a most satisfactory one to the retail dealers from the standpoint of profits, although the tonnage handled has been smaller. This is due to the fact that what coal has been shipped to the yards has been furnished at a minimum cost, including handling and hauling. Labor has been plentiful at less cost than in many seasons past, and the retailer has undoubtedly benefited on this score. The open winter has also permitted quick deliveries at a low cost, and the retailer has been able to buy his coal at the lowest prices in several years.

Discussion By Readers

Recognition of Bravery

Letter No. 11—I want to add a few words to what has already been said in regard to the recognition of acts of heroism in rescue work. I want to say, in the start, that I thoroughly believe that such acts of heroism and self-sacrifice in the mine warrant the same recognition as similar acts of bravery on the battlefield.

We read in our daily newspapers of the unselfish sacrifice of many lives in the European War. Men give their lives for the sole purpose of perpetuating the honor of their country and flag. These deeds are being enacted on the land, in the air, on the sea and beneath the waves. In many cases the actors face inevitable death. The same is true of the miner, with the difference that his acts are performed in the dark recesses of the mine away from public view. But the field of battle furnishes no greater danger than the mines, where rescue work often means "a race with death."

I am proud to say that in time of accident there are always men in large numbers willing, ready and anxious to go to the rescue of their fellows in danger. There is no spectacular display in this service, but trained men equipped with uptodate rescue apparatus and devices for resuscitating those overcome with gas enter the mine heedless of their own danger. Anything else would be cowardly and unworthy of a true miner.

Every precaution is taken in the training of men for rescue work. The apparatus is constantly inspected and kept in perfect working order ready for any emergency. The captain of the rescue team examines the apparatus twice a week. In addition to these precautions, in the event of an explosion, the rescuers wearing the apparatus, before entering the mine, examine carefully every part to see that the valves are in working order and the tanks fully charged with oxygen and that all unions and joints are gas-tight.

It is needless to say that these men recognize the dangers they are about to encounter. By all means their heroic work should receive recognition.

J. W. Powell.

Windham, Mont.

Mining Laws and Legislation

Letter No. 1—Referring to Mr. Hogarth's letter, Coal Age, Apr. 3, p. 613, regarding mining laws, etc., I wish to take issue with him in what he says about the need of the mine superintendent having a certificate, for two reasons.

The first reason is that the same line of argument could be extended to include the general superintendent, general manager and president, which would be impracticable. The same line of argument might be used also to show that because the superintendent, general superintendent or general manager is in authority over the mining engineer, master mechanic or electrician, he must in himself be all of these things.

The second reason is that one certificated official in charge of one job would seem to be enough; and the foreman, being in direct and immediate charge of the inside of the mine, should be that one. Also, it frequently happens that the superintendent is chosen as much for his executive ability as for his mining knowledge, and if he has sufficient executive ability to be a superintendent he will not insist on his foreman committing any act that would endanger the men under him; or doing so, he should be amenable to the law. The law must place the responsibility for the safe operation of a mine on some one person, and why not on the foreman?

If Mr. Hogarth's line of reasoning were followed to its logical conclusion the responsibility could not be placed on the superintendent on the ground that he must act in accordance with orders from his general manager; nor on the general manager, who must act in accordance with the orders of his president, and he in turn is controlled by his board of directors.

I do, however, agree with Mr. Hogarth in what he says about graded certificates for gaseous and nongaseous mines and with his suggestion that there should be more frequent inspection of the working faces with reference to roof and timbering conditions. I will even go further than Mr. Hogarth and suggest that in every mine the foreman should have sufficient competent assistants so that each working place shall be visited at least twice each working day by a competent person who shall have sufficient authority to see that the workmen properly protect and care for themselves.

Edward H. Coxe.

Knoxville, Tenn.

The Layland Mine Explosion

Letter No. 1—In the issue of Coal Age, Mar. 27, p. 549, there appeared a criticism of the part taken by the federal Bureau of Mines in the rescue work at Layland, W. Va., following the explosion, Mar. 2, in the mine of the New River & Pocahontas Consolidated Coal Co.

Since the organization of the Bureau of Mines it or some of its officials have been the object of attack from men of the mining fraternity who should know better. Instead of handing out body-blows to the department at every opportunity afforded, these men should be their best friends and ardent supporters of the work the bureau was organized to perform. This would go far toward an early realization of the desired results; namely, to develop the most efficient rescue organization and, at the same time, carry on effective research work for the benefit of the men employed in the mine.

In regard to the criticism made in the Coal Age editorial referred to above, I want to suggest that if the federal rescue corps is open to criticism in this instance, the state inspection department is also worthy of the same charge. My purpose in writing at the present time is to point out the mistake of making a hasty criticism, which could be avoided by more mature thought.

All practical mining men know that the work of rescue in mines is often carried on under difficulties that render progress slow indeed. Such was the case in the Layland mine, where the haulage road was badly blocked by the débris resulting from the explosion; and the work of rescue, for that reason, had to be started and carried on through the air-course, until later when the clearing away of the wreckage made it possible to reverse the air current in the mine and enter by way of the main-haulage road.

As explained in Coal Age, Mar. 20, p. 509, the stoppage of the fan for the purpose of making this change in the circulation produced a decided change within the mine, which was shortly after noticed by the five men entombed behind an improvised stopping in the ninth-left entry. It did not take long for these five men, who had been well provided with food and water in their prison, to make their escape along the main-haulage road, under the changed conditions.

It is not claimed that either these five men or the remaining 42 men, for that matter, entombed behind two improvised stoppings in the tenth-left entry were rescued by the men who had labored so hard for nearly three days to accomplish this end. The rescue, if such it may be called, was the result of their own initiative; and yet the inference to be drawn from the criticism to which I have referred is that if the air was good enough for these men to walk out of the mine without the aid of helmets, it surely would have permitted rescuers to pursue their work of investigating those portions of the mine not yet reached. If this inference is merited, every man on the rescue corps should be awarded a leather medal.

It is not clear why the men on the staff of the bureau are subjected so often to special criticism, while the state mine inspector, who is naturally better acquainted with the local conditions and who is generally better paid for his service than men of the bureau corps, escapes such criticism. It should be recognized that more harm than good results from so doing. Messrs. Holmes, Rice and Paul, at the head of the rescue work of the bureau, have several times pointed out that the work of rescuing entombed men and the stoppage of mine fires is not regarded by them as a "secondary affair," as some miners and mine officials have assumed. It is this false idea of the bureau's work and aims that has led at times to unjust condemnation, because these men, trained to scientific work and methods, have refused to sacrifice their lives in what would prove, on more mature thought and the exercise of calm judgment, a futile effort. The fact is that, with all this caution on the part of a trained rescue corps, a greater percentage of the men engaged in this work have lost their lives than can be shown by the statistics of any other industry. This fact alone should answer any accusation of cowardice or indifference.

Fair Play.

Wheeling, W. Va.

Letter No. 2—I have been much interested in reading the account of the Layland mine explosion, Coal Age, Mar. 20, p. 508, which seems, however, to give undue credit to the rescue men of the state and federal departments. The account shows that 54 men in all escaped from the mine. Of these, seven owe their lives to the work of the hastily organized local rescuers, under the lead of General Manager Bertolet. My purpose in writing is not to cast any reflection on the heroic work of any class of mine rescuers, who certainly earn the right to all the credit due them. I only desire to rehearse a few facts of which I have personal knowledge, having engaged for a considerable time in the work of rescue at this mine.

The explosion occurred Tuesday morning, Mar. 2, shortly after the miners had started work at the face. The damage caused by the explosion has been previously described, but the general plan of the mine may not be thoroughly understood. The Layland mine or mines consists, practically, of a pair of main tunnels, running along the face of the mountain, a few hundred feet under cover. Cross-tunnels are driven into the hill off this main tunnel, and these cross-tunnels or entries form practically separate mines known as "No. 3 mine," "No. 4 mine," etc. There were 13 butt-entries turned to the left off the haulage road of No. 3 mine. The distance on the main tunnel, from No. 3 mine to No. 4 mine, is 2400 to 2600 ft. There were nine butt-entries driven to the left off the haulage road of No. 4 mine. No. 6 left entry, in No. 3 mine, is cut through to the No. 4 mine air-course. The main tunnel extends a few thousand feet beyond the mouth of No. 4 mine, and butt-entries are turned off this main tunnel, inby of that point. The face of the main tunnel is considerably higher in elevation than the face of No. 3 mine.

It was but a short time after the explosion occurred that the seven men referred to in the article in Coal Age walked out of the mine. These men had worked in No. 4 left entry, in No. 3 mine.

The fan had been disabled and put out of commission by the force of the explosion, but repairs were quickly made and the fan started again. The first efforts of the local rescuers were to establish a current of air in No. 3 mine, as they were of the opinion that more men were still alive in that time. They soon had the air conducted along No. 3 air-course to the sixth-left entry, which was cut through to No. 4 mine, as previously stated. The mouth of the sixth-left entry, in No. 3 mine, was 1200 to 1500 ft. from where the men were entombed, as was developed later. Up to this time the local rescue party had been led by a superintendent of the New River & Pocahontas Consolidated Coal Co.

It was about this time that the state officials arrived on the scene. Following a short conference, it was decided to abandon the idea of further exploring No. 3 mine at that time, and the men were withdrawn and started to explore the workings of No. 4 mine, advancing as rapidly as possible along the left air-course of the main tunnel. This work had the effect to reverse the air in No. 3 mine, which was soon filled with the return air from No. 4 mine, the intake to No. 4 being now conducted through the main-tunnel air-course to those workings.

This condition of the circulation in the mine continued from Tuesday night until Friday night, when the fan was stopped, as has been stated, for the purpose of reversing the air current in the mine, in order to make it possible to explore further the workings in No. 3 mine. The fan was stopped from about 12:30 Friday night until about noon Saturday, by which time all the entombed men were out of the mine.

As has been stated, about 8:15 Saturday morning, while the fan was stopped, to the surprise of everyone five miners walked out of No. 3 mine with their lighted carbide lamps on their heads. They stated that they had come from the ninth-left entry in No. 3 mine, in which entry they had barricaded themselves shortly after the explosion occurred. They stated, further, that 42 men were still in the tenth-left entry in the same mine, where they had gone immediately after the explosion to barricade themselves in a similar manner.

It is true that rescuers at once proceeded into the mine to find the 42 men reported to be in the tenth-left entry. They found these men and assisted them out. The fact remains, however, that the men could have come out themselves, in the same manner as the five men who preceded them from the ninth-left entry. They would have done this probably in another hour had not the rescuers appeared in the meantime. The escape of these men from their entombment should therefore not be credited to the rescue work, but rather to their own cool judgment and self-possession in barricading themselves in these entries and not attempting to escape from the mine immediately after the explosion occurred, in which attempt they would undoubtedly have perished.

It is fortunate, indeed, that the Layland mine was not a gaseous one, or there would have occurred a second explosion when the entombed men came out with their open lights. This would have proved a serious matter as there were then from 50 to 75 rescuers in the mine. Having recited these facts of my own observation I am willing to allow all readers to judge for themselves where credit belongs.

One of the Rescuers.

——, W. Va.

* * *

When Should Rescue Work Be Abandoned?

Letter No. 1—The editorial that appeared some time since in Coal Age, Jan. 9, p. 90, entitled "When Should Rescue Work Be Abandoned?" attracted my attention. The question of rescue work has always appealed to me very strongly by reason of its seriousness and importance.

The question of how far rescuers are justified in risking their own lives in the attempt to save others will always meet with a variety of opinions among mining men. For myself, I want to say emphatically that I am of the opinion that rescue work should *never* be abandoned as long as there is the remotest chance to get into the mine and until the last man has been rescued or accounted for.

The history of coal mining is replete with instances where entombed miners have been rescued days after the occurrence of the explosion that made them prisoners in the mines. In a few instances these unfortunate men have found their way out through the Stygian darkness of the mine and have come unassisted to daylight, safety and home, after they had been given up as lost. Such instances will be repeated from time to time in the annals of coal mining yet to be written.

There is manifested, too often, the tendency of mining men when reviewing the results of rescue work following a great mine disaster to criticize the actions of those who had charge of the work. This criticism is offered after the true conditions that existed at the time in the mine had become fully known. The story of rescue has been read, as it were from an open book, with all the knowledge that subsequent investigation has made available. The fact is ignored that the rescuers at the time knew nothing of the conditions prevailing in the workings, the location of the men whom they hoped to save or the possibilities of their own chances of success and safety. All of this information now clearly revealed had then to be judged by meager facts and experience, in the excitement of the moment when the fate of fellow-workers rested on instant and wise action.

In this connection I recall the words of Sir Thomas Holland, referring to the tragic death of W. H. Pickering, H. M., mine inspector, who sacrificed his life in the attempt to rescue any possible survivors of the first explosion in the Cadeby main colliery, of July 9, 1912. Mr. Holland remarked:

> It is easy to be wise after the event; it is easy apparently in the comfort of an office chair to criticize the wisdom of more experienced men; but we often fail to distinguish between the conclusions which were justified by the facts before the rescuers at the time and those which are developed later. . . .
>
> Fancy Pickering sitting at the surface estimating the risks of another explosion while his fellows were dying below! Doubtless if the rescue party had been restrained long enough, in this case as in similar cases, they could have proved the futility of an attempt, as the men would then have been dead.
>
> But the deeds of men like Pickering and Scott are worth more than lives; through their deaths the spirit of the race lives, for to this world a brave man dying in the face of danger is worth more than ten cowards living and carefully counting the costs.

The keynote of rescue work is a high degree of courage without recklessness. For this there should be selected men of strong physique, known courage and superior natural intelligence. Their motto should be, "Save the lives of others, if possible, even at the cost, perhaps, of our own."

In closing, I want to quote one verse from Berton Braley's poem entitled, "The Boys of the Rescue Crew," which appeared in Coal Age, Vol. 4, p. 685. It reads as follows:

"By day or night
It's theirs to fight
With death itself in view,
And they face their fate
With hearts elate,
The boys of the Rescue Crew!"

J. W. Powell.

Windham, Mont.

* * *

Longwall in the Pittsburgh Seam

Letter No. 5—There is only one way in which the No. 8 seam of coal in the eastern Ohio and the Panhandle district of West Virginia can be worked on the longwall system, and that is by the adoption of the *longwall-retreating* plan. If the capital invested will permit of driving the entries to the boundary lines of the property and longwall work be then started at that point, on the retreating system, I believe the work would undoubtedly prove successful.

It has long been the custom for Pennsylvania mining men who have migrated into these districts to hold up their hands in holy horror on being informed that from 45 to 50 per cent. of the coal must be left in the ground. When these men start to operate the mines in these districts, they immediately begin to devise plans for extracting the pillar coal. In many cases, they start recovery work on a splendid scale. They procure a couple of dozen good pick-men and for a period of from two to six months the work of recovery booms.

At about this time, however, by an inexorable rule, it is found necessary to rush timber, cement and other material into the mine to build cribs to control the squeeze that has set in and threatens to close the mine. This condition may continue for a couple of months longer, when the company gives up the idea of being able to recover the pillar coal, and the man with the big idea of "pillar recovery" is forced to hunt another job—an older and a wiser man.

It is not strange that a mining man used to a fairly good recovery becomes heartbroken when he is obliged to leave these pillars and stumps required for the successful working of the No. 8 seam in these districts. But let them take the advice of one who has tried, and *let it alone.* In working this seam the fact has to be learned by hard experience that the soft shale underlying the hard limerock will not permit the "gradual settlement" that has been claimed by longwall advocates in this discussion.

As far as I have been able to learn, this limerock has not been broken in eastern Ohio or in the Panhandle district of West Virginia. Another fact that must be learned in respect to the working of this seam is that the slate over the coal cannot be used to build the packwalls required in the longwall system. The nature of this slate is such that it air-slakes and crumbles to pieces in a few days, before it is possible to complete the brushing of the roof necessary to keep the roads open in longwall work.

Notwithstanding all these facts, I believe longwall *can* be introduced and successfully conducted, on the retreating plan, in both of these districts; but the man who attempts to work the longwall system in any other way will lose out so quickly that he will not know how it happened.

I would like to see a retreating plan of longwall submitted, in the pages of Coal Age, that would be adapted to the working of the No. 8 seam in eastern Ohio and the Panhandle district. I am convinced that if these discussions are continued practical results will follow, and a good plan will be developed that will avoid the deplorable loss of coal in the working of this seam. With the present plan of working this waste of coal is apparently unavoidable, but every effort should be made to stop such waste, by the adoption of a plan that will be feasible and practicable, in the operation of coal mines.

O. P. Rator.

——, Ohio.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

INFLAMMATION AND EXPLOSION OF GAS

Theory of Inflammation—The inflammation of a combustible gas involves, at least, two main conditions that are essential to the reaction. They are as follows:

1. The presence of another gas that will **support the combustion** by reason of the different affinities of the elements of the gases that invite dissociation and recombination to form other compounds.

2. A **rise of temperature,** at the point of contact of the two gases, sufficient to start the reaction.

The ignition of a combustible gas in some cases (carbon monoxide) requires, besides the above, the presence of **water vapor.**

Temperature of Ignition—At the same pressure and under the same conditions of ignition, the temperature at which a given gas inflames or the temperature of ignition for that gas **is fixed.** The following table gives the average temperatures of ignition, as determined by experiment:

AVERAGE TEMPERATURES OF IGNITION OF COMBUSTIBLE GASES IN NORMAL AIR

Gas	Symbol	Temperature of Ignition (Deg. F.)
Carbon monoxide..........	CO	1240
Methane	CH_4	1212
Ethane	C_2H_6	1140
Ethene (olefiant gas)......	C_2H_4	1124
Hydrogen	H_2	1077
Acetylene	C_2H_2	970

The Nature of Flame—Flame, as here considered, is burning gas. It may be **luminous** or **nonluminous,** according to the presence or absence of carbon either free or combined as hydrocarbons. The incandescence of the carbon particles when present renders the flame luminous. This is the case with most oil-fed flames and flames burning in a dusty atmosphere. The flame of hydrogen burning in clear, pure air is practically nonluminous. Methane produces an almost nonluminous flame, but the flame of the heavy hydrocarbon gases is always more or less luminous.

The Temperature of Flame—The temperature of flame is variable, owing to numerous conditions that affect the combustion of the gas both as to its **rapidity and completeness.** The temperature will vary in different parts of the same flame, because of a variable supply of air that not only affects the combustion of the gas but absorbs much of the heat developed and lowers the temperature of the flame.

Owing to these varying conditions it is clearly impossible to calculate the actual flame temperature of a burning gas. This is often roughly assumed to be about one-half of the **theoretical value** as calculated from the heat of combustion per pound of gas and the heat absorbed by the corresponding products of combustion, for each degree rise in temperature.

It is important not to confuse the **flame temperature** of a combustible gas with its **temperature of ignition,** as they have no connection with each other.

The Coal Age Pocket Book

Influence of Temperature on Explosion—A rise of the initial temperature of an explosive mixture slightly extends the lower inflammable limit, but has no appreciable effect on the higher limit, owing to the small relative value of the increase as compared with the high temperature developed in the explosion.

Influence of Pressure on Explosion—Pressure exerted on an explosive mixture increases its **power to absorb heat** and thus renders it more readily ignitable. In other words, an increase of pressure lowers the lower inflammable limit of an explosive gaseous mixture. An increase of pressure, by increasing the **velocity of propagation** of the explosion in the mixture, raises the temperature developed and extends the higher inflammable limit. In other words, an increase of pressure **widens the explosive range** of a combustible gas.

Influence of Relative Humidity on Explosion—While the presence of moisture (water vapor) in a gaseous mixture is often necessary to secure its explosion, as explained in reference to carbon monoxide, the water vapor absorbs much of the heat and lowers the temperature developed, thereby reducing the **rate of combination** and the **force of the explosion,** except where fine coal dust is suspended in the air, when partial dissociation may take place in the water vapor and result in increasing the energy of the reaction.

Influence of Catalysis to Cause Explosion—Catalysis is the effect produced by a foreign substance to assist chemical reaction between two other substances, while the substance itself undergoes no change—first discovered by Berzelius. Much differenec of opinion exists as to the suggested **catalytic action** of fine incombustible dust suspended in mine air, to assist the explosion of combustible gases. Finely powdered **stone dust** has been shown to retard the ignition of coal dust by mixing with and diluting the latter. This effect, however, is wholly physical and not related to the possible catalytic action referred to by Sir Frederick Abel and others who have studied the subject closely.

Influence of Character of Initial Impulse—The manner in which the gas is ignited or the character of the initial impulse determines largely the explosion of gaseous mixtures. For example, a firedamp mixture ignited by a **lamp flame** may not explode, while if fired by the flame of a **blownout** or **windy shot,** the greater volume and intensity of the flame may cause an explosion.

The **volume of the flame** is important, because it envelops a larger portion of the gaseous mixture and ignition is thus started generally throughout the mass, causing a greater development of heat and reducing the percentage of loss by radiation, convection and conduction.

The **intensity** of the initial impulse or the higher temperature of the igniting flame will often cause the explosion of a gaseous mixture that would burn quietly if ignited by a less intense source of heat energy. The dissipation of heat is so rapid and general in a burning gas that the transition from **inflammation** to **explosion** requires a conservation of heat or greater local energy than can often be realized in the large open workings of a well-ventilated mine.

Inquiries of General Interest

Shipment and Transportation of Coal

I would appreciate answers to the following questions:

1. Is it true that the loss of coal from steel coal cars while in motion and, particularly, by theft when the cars are standing on sidings at stations is sufficient to cause any material loss to shippers?

2. Are there standard specifications for use in constructing steel coal cars? If so, can you give me the dimensions required and the details of construction generally included in such specifications.

3. What is the clearance between the top of cars and coal chutes or loaders at the mine and at coal bergs? Can these chutes, as a general rule, be raised and lowered to accommodate cars of different types?

4. How is the coal distributed in the cars when loading; does the chute swing from end to end of the car so as to distribute the coal evenly, or is the coal distributed by manual labor?

5. Kindly mention a list of the principal coal companies shipping coal to market and give any data that may be available showing losses in transit between shippers and distributors of coal.

A. L. Wyman.

Ridgefield Park, N. J.

Replying to these questions in the order in which they are given, it may be stated that—

1. The shrinkage of coal shipments, in transit, is the result of several causes that vary in different localities and under different conditions of preparation of the coal for shipment. These losses are no greater in the use of steel coal cars than where wooden flats are employed. The loss is very much decreased by the use of box cars, for the reason that there is less loss by the drying out of the coal in transit and by theft while standing on the siding, since these cars are closed and sealed before the shipment is made.

The shrinkage of the shipping weight is sometimes only *apparent,* due to imperfect weighing of the coal either at the point of shipment or at the destination. A *real* shrinkage may be due to the drying out of the coal, which is often shipped from the mine in a wet condition, or to actual loss by falling off the cars when the coal has been improperly loaded; or it may be occasioned by theft while the cars have been standing on the siding or, as sometimes happens, the coal is taken from the cars for use on engines when the regular supply runs short. The loss by theft is always greater in the cold seasons of the year. These losses are all variable and cannot be accurately estimated.

2. Different railroads have different standard requirements regulating the dimensions of cars for different shipping purposes. The details of construction are determined by contract of the manufacturing company with the engineering department of the road for which the cars are made, or by the specifications furnished by that department to their own shops. An interesting table giving the limiting dimensions for different styles of cars and railroads was published in Coal Age, Vol. 6, p. 462.

3. A clearance of 4 or 6 in. is generally allowed between the top of the coal as loaded on the car and the bottom of the loading chute. Some railroads have regulations specifying the height to which coal can be loaded above the top of railroad flats. In this connection, an interesting article, giving the instructions issued by the St. Louis & San Francisco R.R. to coal shippers on its lines, appeared in Coal Age, Vol. 4, p. 747. The instructions provided, in that case, for a height of 26 in. from the top of steel cars to the top of coal. For wooden cars this height was reduced to 20 in.

In general, loading chutes are stationary and cannot be raised or lowered. In many cases, however, a movable apron is provided at the bottom of the chute that can be raised or lowered a few inches.

4. There are numerous appliances for distributing the coal evenly in the car when loading. The most of these are adapted to the loading of box cars, which present the difficulty that all the coal must be run into the car through the center door. Some of these loaders employ a chute that can be run into the car and turned so as to throw the coal into either end. In other forms of loaders, the platform on which the car stands when being loaded is tilted so as to throw the coal first to one end of the car and then to the other. For a more even loading of flat cars and to avoid the breaking of the coal, a special loading boom has been designed by the Roberts & Schaeffer Co. that can be raised and lowered as the coal is piled in the car. This loading boom has a shaking motion that assists the coal in sliding down the chute.

Loading chutes are not arranged to swing from one end of the car to the other when loading flat cars, but even distribution of the coal is effected by letting the car down on the track as the coal is loaded, the loading beginning at the lower end of the car. Manual labor is now only employed for distributing or "chunking" the coal when loading box cars and for trimming the top of coal flats ready for shipment.

5. Some of the largest shippers of coal, in different states, are as follows:

Tennessee Coal, Iron & R.R. Co., operating in Alabama and Tennessee; Colorado Fuel & Iron Co., operating in Colorado; New Staunton Coal Co.; the Superior Coal Co.; Bunsen Coal Co., operating in Illinois; Delaware, Lackawanna & Western R.R. Co., Lehigh Valley Coal Co., Lehigh & Wilkes-Barre Coal Co., Lehigh Coal & Navigation Co., Pennsylvania Coal Co., Delaware & Hudson Co., Susquehanna Coal Co., all operating in the Pennsylvania anthracite region; Pennsylvania Coal & Coke Corporation, Pittsburgh Coal Co., Consolidated Connellsville Coke Co., all operating in the Pennsylvania bituminous district; Consolidation Coal Co., Cabin Creek Consolidated Coal Co., Pocahontas Consolidated Collieries Co., all operating in West Virginia.

No tables are available showing the specific losses of coal in transit between shippers and distributors of coal. Information in this regard can be best obtained by applying directly to coal distributors.

Examination Questions

Alabama First-Class Mine Foremen's Examination, Held Jan. 25-28, 1915

(*Selected Questions*)

Ques.—Where shots are being fired in mines producing large volumes of explosive gas what precaution should be adopted in firing the same?

Ans.—Under these conditions, all shots should be fired by competent and authorized shotfirers after the men have withdrawn from the mine. A thorough and efficient system of inspection of all holes drilled in the coal should be employed. These holes should be charged and fired by the shotfirers, who should have authority to refuse to charge and fire any hole that in their judgment is unsafe. It would be an advantage to use only permissible powder. Each place should be examined for gas before a shot is fired therein. The firing should begin on the "end of the air" and proceed slowly against the current, time being given for the air to sweep away the gases and dust produced by the shooting.

Ques.—Specify the conditions that must be fulfilled in order to secure good ventilation in a mine employing a large number of men.

Ans.—The mine should be divided into separate ventilating districts and a limited number of men allowed to work in each district. The air should be regulated so as to proportion the amount to the requirement in each district. The air in each split should be conducted in such a manner as to sweep the entire working face before passing into the main-return airway. The ventilating power must be sufficient to supply the required quantity of air for the mine.

Ques.—What are the causes of falls of roof, and how would you make an inspection to determine the security of the roof in a coal mine?

Ans.—The immediate cause of a fall of roof is the removal of the coal from beneath without providing any adequate support by timbers or packwalls. The presence of slips or faults in the roof strata induces sudden and unexpected falls of the roof. Roof falls are often caused by gas pressure in the strata or by squeezes and movements in the roof following the extraction of the coal. Driving too wide openings or leaving insufficient pillars induces falls of roof. Much depends, however, on the nature of the roof strata and the method of working employed and amount of timber used.

The roof in a mine must be carefully inspected to detect any slips or fault-lines or a weak or jointed condition of the roof. It is usual also to sound the roof by tapping the slate or rock with the butt end of a pick handle or other implement. Experience is required to sound a roof in this manner and determine its security.

Ques.—What dangers arise from the use of electricity in mines, and what methods would you employ to prevent accidents therefrom?

Ans.—The chief dangers are the liability of shock to men and animals by coming in contact with live wires, also the ignition of gaseous mixtures that may accumulate in the mine, or the ignition of combustible material by the sparking of wires, brushes and switches, or the blowing out of fuses, or the breaking of wire conductors.

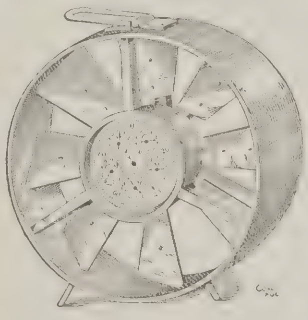
To prevent these accidents as far as possible, suitable danger signals should be displayed at all points in the mine where men are liable to receive a shock. All electric installations should be made by a competent electrician, and switchboards and other electric appliances should be carefully guarded. Live wires should be well insulated whenever possible. Men should not be permitted to travel on haulage roads where electric haulage is employed, and trolley wires should be suitably protected at all points where it is necessary for men or animals to cross such roads. The entire electric installation should be carefully inspected every day by a competent man.

Ques.—What percentage of relative humidity would you consider necessary in a dry and dusty mine?

Ans.—Inasmuch as the absorption of moisture by the air does not increase rapidly for a rise of relative humidity above 70 per cent. and since 60 per cent. presents a healthful condition of the atmosphere at ordinary temperatures, it would seem advisable to endeavor to maintain a relative humidity of the mine air, varying from 60 to, say, 75 per cent.

Ques.—Describe the anemometer and state its use in connection with mine ventilation.

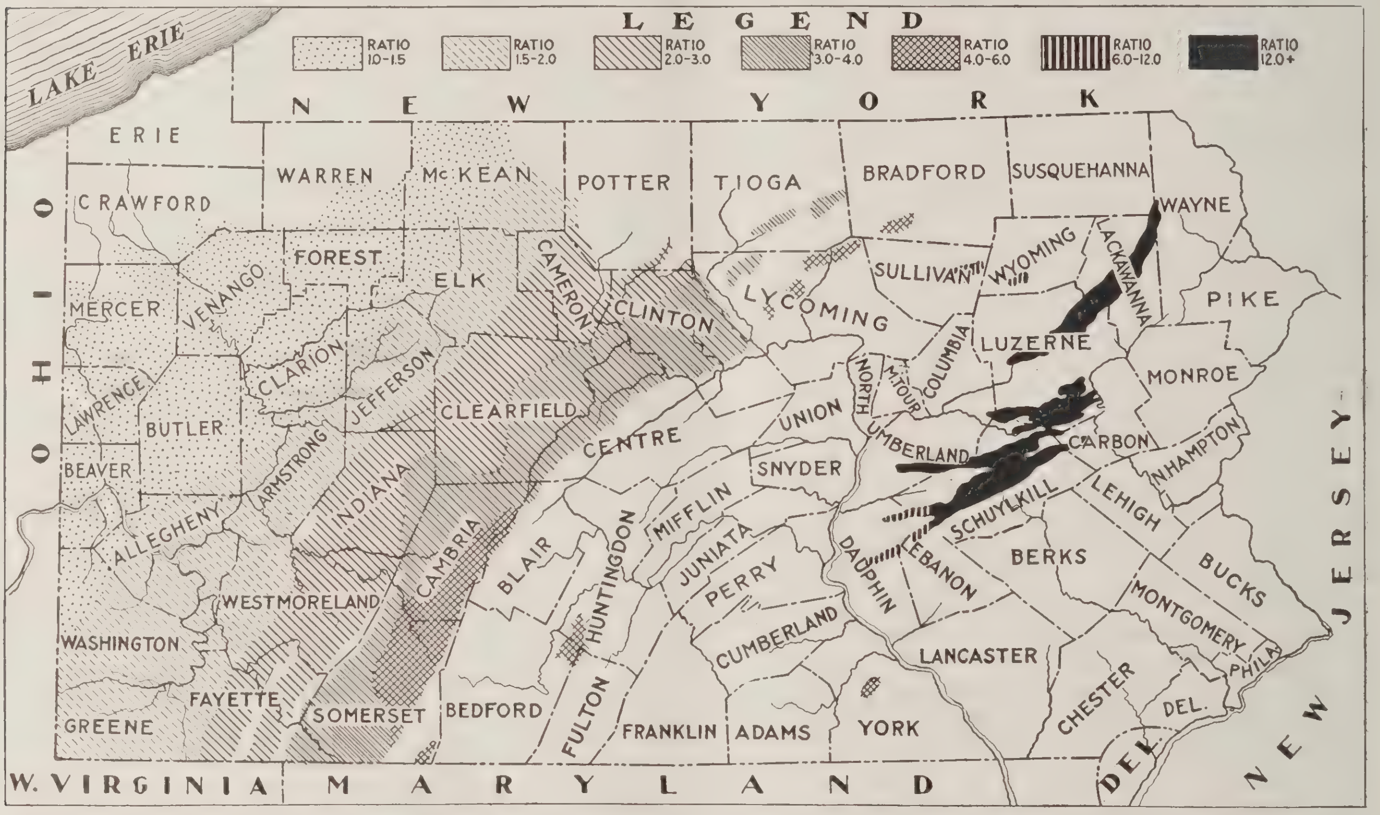
Ans.—The form of anemometer generally employed in mining practice is that known as the "Biram anemometer." As shown in the accompanying figure, this consists of a metal ring within which is poised a rotating vane, the blades of which are inclined to the plane of rotation. The air current striking the inclined blades rotates the vane, the number of revolutions being recorded on the face of the dial by means of a series of gears. The instrument is so calibrated that each revolution of the vane corresponds to 1 lin.ft. of air travel. This instrument is employed to measure the velocity of the air current in mine airways as expressed in feet per minute. It is important, however, to hold the instrument so that the vane revolves in a plane perpendicular to the direction of the current.


THE ANEMOMETER

Ques.—Is it safe to pass a current of intake air through the abandoned portions of a mine and then conduct it to the face of the workings?

Ans.—No. The intake air should be conducted at once to the working face before being permitted to pass through abandoned workings. Otherwise the gases accumulated in the abandoned workings would be swept by the air current onto the men working at the face, and this would menace both the health of the men and the safety of the mine.

Book Reviews



Map of Pennsylvania Showing How the Percentage of Volatile Matter in the Coal Varies with Its Location in Relation to the Great Appalachian Uplift

MINERALS OF PENNSYLVANIA, REPORT NO. 9, Topographic and Geologic Survey Commission of Pennsylvania, 1913. By Amos P. Brown and Frederick Ehrenfeld. Richard R. Hice, state geologist. 143 p. + 16 p. index. 6x9⅜ in. 10 plates and 1 fig. Cloth boards. For public distribution.

An alphabetically arranged account of the minerals found in Pennsylvania, included somewhat broadly under this list being buhrstone, grindstone, millstones, allanite, amphibole, pyroxene, asbestos, barite, beryl, brick, cement materials, chromite, clay, coal, copper, corundum, cyanite, epidote, feldspar, fluorite, garnet, natural gas, glass materials, glass-pot clay, gold, granite, graphite, greenockite, iron, lead and zinc ores, limestone, lime and cement rock, magnesium and manganese minerals, marble, marl, mica, mineral paints, molybdenum, tungsten, nickel, cobalt, petroleum, phosphate minerals, potash and saline minerals, salt, pyrite, marcasite, quartz, serpentine, shales, silica, silver, slate, strontium minerals, talc, titanium minerals, tourmaline, trap, uranium, radium minerals, and zircon.

We rejoice to see that the proof reading is much improved over that of last year's report. This year the volume is in this manner more worthy of the state which publishes it.

Coal receives 16 pages and 5 cuts, one of which we reproduce. On page 56 reference is made to the "Reynolds and Walton" coking coal. In case the people who live in that section fail to realize that they are listed as coke producers we will state that "Reynolds" should be "Reynoldsville" and "Walton" "Walston." The Pittsburgh district strange to say, does not get a number, though it is mentioned.

The descriptive matter is quite one-sided. Too much is taken from the reports of a few of the quadrangles, but otherwise the information is well chosen. A good cross section showing the order of the beds if not their thickness would have been helpful.

To enable readers to understand the map we republish, we will say that the fuel ratio is obtained by dividing the percentage of fixed carbon by the percentage of volatile hydrocarbons. It is a relation existing in the pure coal and has nothing to do with the impurities. The map illustrates in an excellent manner the editorial which appeared in our issue of Jan. 16 of this year entitled "Coal Beds and Their Characteristics." In this editorial we pointed out the fatuity of attempting to judge the character of a coal from its geological horizon. Its position geographically is equally important in many cases. For the readers' advantage we have calculated the following table showing the practical meaning of the fuel ratios to which reference is made in the map.

ANALYSES CORRESPONDING TO CERTAIN FUEL RATIOS

Fuel Ratio	Ash and Moisture	Fixed Carbon	Volatile Matter
12.0	0.00 Pure Coal	92.31	7.69
12.0	6.00	86.77	7.23
12.0	8.00	84.92	7.08
12.0	10.00	83.08	6.92
6.0	0.00 Pure Coal	85.72	14.29
6.0	6.00	80.57	13.43
6.0	8.00	78.86	13.14
6.0	10.00	77.15	12.86
4.0	0.00 Pure Coal	80.00	20.00
4.0	6.00	75.20	18.80
4.0	8.00	73.60	18.40
4.0	10.00	72.00	18.00
3.0	0.00 Pure Coal	75.00	25.00
3.0	6.00	70.50	23.50
3.0	8.00	69.00	23.00
3.0	10.00	67.50	22.50
2.0	0.00 Pure Coal	66.67	33.33
2.0	6.00	62.67	31.33
2.0	8.00	61.33	30.67
2.0	10.00	60.00	30.00
1.5	0.00 Pure Coal	60.00	40.00
1.5	6.00	56.40	37.60
1.5	8.00	55.20	36.80
1.5	10.00	54.00	36.00
1.0	0.00 Pure Coal	50.00	50.00
1.0	6.00	47.00	47.00
1.0	8.00	46.00	46.00
1.0	10.00	45.00	45.00

Thus a coal having impurities of ash and moisture of 10 per cent. and a fuel ratio of 1.5 would have a fixed carbon percentage of 54 and a volatile matter percentage of 36.

Coal and Coke News

Washington, D. C.

President Wilson has acted upon Secretary Lane's recommendations relative to the choice of a route for the new Alaskan line, and in so doing he has brought the Alaska coal controversy of such long previous standing considerably nearer to a definite status. The order relating to the line and its route was signed on Saturday, Apr. 12, and designates the Alaska Northern R.R. as the first link in the Government line, the existing road to be bought by the Government and then extended up the Susitna Valley to Fairbanks, a total of 471 miles from Tidewater at Resurrection Bay. There will be according to the present plan a branch 38 miles long into the Matanuska coal field.

The latter field is to be opened and exploited, it being understood that the navy coal tests resulted in favor of the coals of the Matanuska field. Believing, however, that the coal of the Bering River field is also good, further tests have been ordered and will be made with a view to constructing a line to open up these deposits as well as the others.

Many coal claims have been filed in both fields and an effort is being made to dispose of these claims as fast as possible and close them up by passing upon their validity. The decisions that are being handed down will probably clear up the titles to the coal that have been in doubt since the days of the Ballinger controversy and by the time the branch line is open it will be possible to make new entries in accordance with law. The Government expects to reserve for its own use 5000 acres of the best coal land, thereby providing a supply for the navy. Many expect that within a year or two, it will also be possible to supply Pacific Coast ports with Alaska coal in commercial quantities.

The Alaska Northern is to cost the Government $1,150,000, and the construction of the new mileage is to be made in sections by contract. The work will be in charge of the Alaska Engineering Commission which will have charge of the letting of the contracts and the conditions of work generally. It is believed that the region to be opened will be available for settlement and agriculture as well as for mining.

A Supreme Court Decision

The Supreme Court of the United States has made public the complete text of the opinion lately handed down in the case of the Pennsylvania R.R. Co. vs. the Puritan Coal Mining Co. As has already been announced, the decision of the upper court is in support of the decision of the Supreme Court of Pennsylvania which held that the plaintiff in the lower court (the coal company) was entitled to recover damages due to unfair distribution of coal cars by the road. The decision as now published, however, throws new light on the outcome and offers some important points not previously given much attention.

The main facts in the case were shown to be as follows:

Usually the carrier was able to furnish shippers with cars on demand; but in 1902 there was a strike in the anthracite region which cut off the usual supply of anthracite coal to Eastern cities and compelled them to use bituminous coal mined along the lines of the Pennsylvania Ry. The new demand for soft coal was so great that the railroad company was not able to supply the full number of cars called for by the mining companies on its line. Its established rule in such cases was that cars should be allotted to the several coal districts in proportion to their output, the cars thus allotted to the districts being then distributed to the mining companies there in proportion to their capacity. During the anthracite coal strike, however, the carrier violated this rule and made excessive allotments to the "scalp level region," in which the Berwind mines were located, and made too small an allotment to the "mountain region" in which the Puritan mines were situated.

There was evidence that the Puritan company had orders for coal at a price which would have netted it a large profit. The coal so ordered was to be delivered "free on board" the cars at the Puritan mines—the purchaser and consignee paying the freight to points of destination within and without the state. There was evidence that the Puritan company was ready, willing and able to make such sales and deliveries and constantly demanded cars in order to enable it to fill these orders. Sometimes the carrier for days would fail to furnish cars, with the result that the company's mining operations were seriously interrupted. Sometimes the Puritan got cars but not the full number to which it was entitled on the basis of distribution according to mine capacity, although the Berwind-White Co. during the same period received more than its proportion.

In the lower court there was a total judgment for the coal company amounting to $74,323.88. The railroad company took the case to the Supreme Court, urging that the lower court had erred.

(1) In holding that the state court has jurisdiction.

(2) In failing to hold that under the Commerce Act the Federal Court alone had jurisdiction.

(3) In holding that the business between the Puritan company and the railroad was intrastate business where coal was sold f.o.b. the cars at the mines.

(4) In holding that the plaintiff could recover damages for failure to receive cars intended for use in shipping coal outside the state.

(5) In adopting the method for distributing cars on which the damages were collected.

(6) In failing "to take into account the private or individual cars, socalled, which were delivered to the plaintiff during the period of the action in determining the number which it would have been entitled to receive of the additional cars which the court has found should have been allotted to the region or district in which the plaintiff's mines were located."

When the railroad company appealed to the Supreme Court of the United States from the verdict as thus handed down, it urged that:

(1) The determination of the proper basis for the distribution of cars was a matter calling for the exercise of the power of the Interstate Commerce Commission; (2) that no court had jurisdiction of a suit against it for discriminatory allotment until after the Commission had determined that its rule for distribution was improper; and (3) that no suit for damages against an interstate carrier could be brought for damages occasioned by a failure to deliver cars or for an unjust discrimination in distribution except in a United States Court.

In passing upon these matters the Court turns first to the question of jurisdiction under the Interstate Commerce Act and holds that the act in question "did not supersede the jurisdiction of state courts in any case, new or old, where the decision did not involve the determination of matters calling for the exercise of the administrative power and discretion of the Commission; or relate to a subject as to which the jurisdiction of the Federal courts had otherwise been made exclusive."

It then goes on to consider whether suits relating to discriminatory acts be confined to state courts. As to this "it must be" says the court's opinion, "borne in mind that there are two forms of discrimination—one in the rule and the other in the manner of its enforcement; one in promulgating a discriminatory rule, the other in the unfair enforcement of a reasonable rule. In a suit where the rule of practice itself is attacked as unfair or discriminatory, a question is raised which calls for the exercise of the judgment and discretion of the administrative power which has been vested by Congress in the Commission. It is for that body to say whether such a rule unjustly discriminates against one class of shippers in favor of another. Until that body has declared the practice to be discriminatory and unjust no court has jurisdiction of a suit against an interstate carrier for damages occasioned by its enforcement. When the Commission has declared the rule to be unjust, redress must be sought before the Commission or in the United States courts of competent jurisdiction as provided in section 9."

As to the claim that private cars should have been reckoned in and considered in determining the proper car apportionment the court finally concludes that:

Probably because of the carrier's own rule of distribution, there was no pleading raising such an issue, and there was no sufficient evidence as to the number of private cars received by the Puritan, the Berwind-White, or other companies. The information on that subject was peculiarly within the knowledge of the carrier and proof adequate to furnish a basis for the contention should have been offered—if, indeed, the carrier could have been heard to insist that private cars should have been counted when its own rule, as well as the general practice in the United States, was to exclude them in calculating the number of coal cars to which each mine was entitled. Neither need we inquire whether the fact that the Commission subsequently announced a rule, under which private cars had to be taken into account in making the distribution, could be given a retrospective effect. For, be that as it may be, the exception was properly disallowed, because, as held by the Supreme Court of Pennsylvania, no relevant evidence was offered to support the contention, and no point was raised during the trial, that private cars should be counted in the distribution.

HARRISBURG, PENN.

In a rather emasculated condition the Catlin Bill No. 160 was on Apr. 7 reported out of the Mines and Mining Committee of the Senate.

There are but three sections in the bill left intact. The principal one is that allowing an attorney for a victim of a mine accident to appear at the coroner's inquest. A slight amendment is inserted regarding the definition of a miner and as the bill now reads "any person competent to do the work of a miner" goes into the class of miners.

The section prohibiting the use of gasoline engines in the mines so as to prevent accidents from white damp is eliminated entirely, as is that compelling a man to work five years at the face cutting coal before being qualified to become a foreman.

The section pertaining to workmen's compensation is amended so that a company may go outside of the mine foreman class to select a foreman, but adds that a mine cannot be operated without a certified mine foreman. This the miners claim is a direct contradiction. The words "equally as competent" have been inserted.

The mine workers have asked that the interpretation of Attorney John G. Johnson as to what law is necessary to bring miners under compensation be incorporated in the Catlin bill, and this has been agreed to.

Representative Hugh L. Dawson, at the request of the attorney-general, introduced a bill on Apr. 7, providing that mine foremen and their assistants in and about the coal mines of the state shall be agents and employees of the operators of such mines, and shall be employed and discharged as are other agents and employees, and that operators shall be responsible for the acts and neglects of such mine foremen and their assistants as in the case of other agents and employees, and notwithstanding the employment of such mine foremen and their assistants, and shall at all times be under the supervision, management and control of such operators.

Representative Schaeffer has introduced a bill that no person under the age of 18 years shall be employed in any capacity whatever in or about any of the anthracite coal mines of the state for a longer period than 8 hours out of each day of 24 hours.

A bill to amend the act of 1911 providing for the powers, etc,. of sealers of weights and measures, so as to include instruments and devices for weighing coal has been introduced by Mr. Dodds.

Mr. Hess, chairman of the Committee on Mines and Mining in the House, has introduced a bill which provides that the governor shall have the power to appoint a board of five men to hold examinations for mine inspector in the anthracite region and do away with the district boards. The governor is to make the appointments during the month of June, two of the members are to be engineers, and three miners. The board is to meet in Harrisburg on the second Tuesday in July following its appointment to prepare questions and answers, and on the fourth Tuesday in July examinations are to be conducted in Harrisburg.

Candidates must not be under 35 nor over 60 years of age. The governor will have the power to appoint any person who has received a percentage of 90 or over. The inspectors named during 1915 shall serve until Dec. 31, 1915 and the inspectors elected or appointed under the act of 1901 are to serve until Dec. 31, 1915, after Jan. 1, 1916, the term of all inspectors shall be for four years. In the case of a vacancy the governor is to appoint the person having the highest percentage of those who have received over 90 per cent. The anthracite district is to be divided into 25 inspection districts instead of 21 as at present.

PENNSYLVANIA

Anthracite

Hazleton—Flooded since 1899, although rich with virtually untouched veins of anthracite coal, Stockton mines, which are one mile from here, will be thrown open to operation again. The new tunnel to be driven from Hazleton to Butler Valley will tap the water in the Stockton workings.

.It is reported that miners driving a rock tunnel at the Drifton colliery of the Lehigh Valley Coal Co. recently struck a thick bed of anthracite in a portion of the workings which were on the verge of abandonment. This discovery signified a considerable lease of life to the mine which has been in steady operation since 1863.

Shenandoah—The Mine Inspectors' Examining Board of Schuylkill, Northumberland, Dauphin and Columbia counties, examined 17 candidates for mine inspector on Apr. 6 and 7. There are 7 vacancies to be filled at the November election, but all candidates must have a certificate of eligibility before their names may be placed on the primary ballots. Mine Inspectors A. B. Lamb, P. C. Fenton, J. A. O'Donnell, B. I. Evans, P. J. Friel, John Curran and Charles J. Price, whose terms expire, are all candidates for reëlection and took the examination.

Pottsville—The Philadelphia & Reading Coal & Iron Co. through its counsel, on Apr. 8, made a legal fight in court to have dissolved the injunction preventing it from using the water of the Little Schuylkill River, for its collieries and locomotives. The company anticipates another severe drought like that of last year, and declares that it will be absolutely necessary to use this water. The water company contends that the Reading violated its charter in its furnishing water to the collieries of the Lehigh Coal & Navigation Co., from the river, whereas its charter only entitles it to furnish it for domestic purposes.

Plymouth—Several hundred men on Apr. 7 refused to work and declared a strike because the foreman prohibited them using the slope in going to or from their work. It being a violation of mining laws to trespass on slopes, the men must use the manway provided for that purpose, but this they refuse to do unless the company dampens the dust with which it is laden and kept in continuous circulation by mules which use the same passage in getting to the work of the vein.

Wilkes-Barre—At a conferencé recently held in this city it was decided to hold the Tri-District Convention of the United Mine Workers to formulate their demands to be presented to the anthracite operators at the expiration of their present agreement in this city on Sept. 7. It is thought that an increase of about 20 per cent. in wages will be asked.

Bethlehem—Navigation on the Lehigh Canal between Mauch Chunk, Bethlehem, Easton and Philadelphia was recently brought to a standstill by a strike of boatmen who demanded more money for conveying the coal from the mines to tidewater. Forty-three boats were at one time tied up at Walnutport alone.

Bituminous

Connellsville—The Connellsville coke trade shows a slight decrease, the production and shipment approximating 280,000 tons during the present week. There has been a marked increase in merchant production, the decline being due to decreased furnace demand. A sale of 40,000 tons of Pocahontas furnace coke for delivery, 6000 to 7000 tons per month for the next six months, is reported. This is the only transaction of importance in Southern coke in some months.

WEST VIRGINIA

Fairmont—At a meeting of operators from all sections of the state held here for the purpose of taking action to protect the industry against unwarranted legislative attacks, it was indicated that action may be taken looking toward the establishment of uniform prices for the product, graded in a proper manner. The evils of unrestricted competition and of price-cutting were pointed out, and the obvious remedy suggested. No agreement which might have the effect of making the proposed price basis illegal will be entered into, something on the order of the present circular plan being contemplated.

Heberton—The Willis Branch Coal Co., Thomas K. Laing, president, made its first shipment of coal a few days ago. This company is mining the Eagle Seam of the Kanawha measures and expects to produce between 4000 and 8000 tons per month

KENTUCKY

Lexington—Students from all parts of Kentucky and some from West Virginia have matriculated in the practical miners' course which has opened at the State University here. All the classes are well filled.

Domino—The Himyar Coal Co. here has increased the output from 600 to 1200 tons daily and is now running every day in the week. Louis Des Cognets, manager of the operation, has just returned from the Northwest, where he secured some good-sized orders, so the plant will run regularly for some time.

Hazard—The Hazard Coal Co. made a record run one day recently, 15 cars being loaded. A little later the company expects to fill that number every day in the week.

Ashland—Because several stockholders were absent from the meeting recently held at Ashland where arrangements for the consolidation of several companies as the Kentucky River Coal Corporation was to have been perfected, the meeting was postponed. Some of the details also had not yet been arranged.

OHIO

Columbus—A death rate of three to every million tons of coal mined in Ohio in 1914 is reported by the State Industrial Commission, the figures being 59 deaths, to 18,500,571 tons of coal mined during the year, or one death to each 313,569 tons of coal. There were 162 deaths in 1913, but the difference is largely due to the general idleness in the eastern Ohio field during 1914.

Upon his own motion, Senator Vorheis, author of the bill pending in the Ohio legislature, seeking to regulate coal rates in Ohio killed the measure. So much opposition to the bill developed that its friends did not want to bring it to a vote. Operators also lost the bill providing that all state institutions shall use Ohio coal only.

A bill has been introduced in the Ohio legislature appropriating $6000 for the state mine department to establish "first aid" schools and stations at various mining camps. A portion of the money, if appropriated, will be available for the operation of the mine rescue car.

Belleaire—The resumption of the payment of strike benefits to miners in the eastern Ohio field occurred a few days ago, after a suspension of several weeks. Miners receive $3 a week, women 50c. and children 25 cents. Community gardens are being prepared, for the purpose of enabling the men to get through the spring and summer as economically as possible, although it is rumored that a settlement on a 47-cent basis, run-of-mine, is being discussed by one of the large companies.

INDIANA

Linton—Prospects seem good in the Linton coal field for the summer months. Business is about up to the April average and in addition the Vandalia Coal Co. is to sink a new mine just south of this city while the Gould Co. has its 500 acres southwest of the city to open up.

Terre Haute—William Houston, who has retired as president of the Indiana Mine Workers, Henry Pigg, member of the executive board, and others have organized the Ohio & Indiana Collieries Co. and will operate a large coal stripping plant near Jasonville, Ind., which has been in operation about three months. There are 400 acres in the property.

UTAH

Salt Lake City—Application for an injunction to prevent the transfer of the Castle Valley Coal Co.'s holdings to the United States Fuel Co. in connection with the recent $10,000,000 merger of four Utah coal properties was recently filed with the clerk of the United States District Court. The complaint set forth that by the carrying out of a resolution adopted by the board of directors of the Castle Valley Coal Co. on Mar. 13, 1915, holders of the company's stock will be forced to liquidate and accept in lieu of their stock shares in the United States Fuel Co. It is maintained by the plaintiff that this is unfair to the holders of stock that voted against the adoption of the resolution at the stockholders' meeting on Mar. 30, 1915, held in Evanston, Wyo.

FOREIGN NEWS

Tokio, Japan—Three hundred miners were buried alive by a cave-in that wrecked the interior of a colliery near Shimonoseki, Apr. 13. The entrapped miners are 700 ft. below the surface and it is believed that their rescue is impossible.

PERSONALS

Jonathan Bryan, of Richmond, Va., recently paid a visit of inspection to his properties in the Birmingham, Ala., district.

James H. Cassidy was recently removed by Federal Judge John H. Clarke from the receivership of the Cleveland & Pittsburgh Coal Co. Carl C. Friebolin was appointed in his place.

W. H. Cunningham has bought the interest of C. R. Conner in the engineering firm of which they were members, and will practice as a consulting mining engineer and geologist in Huntington, W. Va.

J. B. Whitnall, president of the Pennsylvania Coal & Supply Co., of Milwaukee, Wis., resigned on Apr. 10 on account of ill-health. He will continue to serve on the board of directors. Frank S. Peabody, of Chicago, was elected as his successor.

F. P. Wright, of Bevier, Ky., was recently reëlected president of the Western Kentucky Coal Operators' Association. C. W. Taylor, of Central City, was named vice-president and D. Stewart Miller, of Owensboro, chosen secretary and treasurer.

A. F. MacKennon, for 16 years superintendent of the Pennsylvania Coal & Coke Corporation, has severed his connection with that company. Mr. MacKennon has not yet announced his plans for the future, but anticipates taking a trip through the South shortly.

Charles Finley, of Williamsburg, Ky., president of the Proctor Coal Co., operating in Kentucky and Tennessee, has taken options on a large body of coal land in the Hazard, Ky., field and is having the same prospected, with the idea of buying and developing it at once if the prospects prove satisfactory.

B. J. Rowe, coal traffic manager of the Illinois Central R.R., recently testified in the Interstate Commerce Commission hearing of the Western freight rate case that more reductions than increases in the freight rates on soft coal would result from the Western railroads' proposed readjustments of rates on certain commodities.

Milton H. Smith, president of the Louisville & Nashville R.R. Co., and a number of the directors of the road recently concluded an inspection trip over the new Winchester-Irvine extension of the road. Freight has been carried over the road for a month or more and it is hoped that passenger traffic may be begun in the near future.

S. B. Warriner, president of the Lehigh Coal & Navigation Co., Attorney Thomas D. Shea, of Nanticoke, and State Labor Commissioner John Price Jackson were recently selected as a board of arbitration to settle the strike of the Wilkes-Barre street railway employees. Pending the decision of this board, the employees have returned to work.

L. P. Johnson, of Wallins Creek, Ky., recently resigned his position as superintendent of the Wallins Creek Coal Co., to take part in the organization of a new coal company which will soon open up a new mine in the Harlan field in Kentucky. Mr. Johnson expects to spend the present month in traveling before assuming his new duties.

L. D. Kniffin, sales manager of the Sheridan Coal Co., lately spent a few days at the company's mines in Paris, Ark., and in southern Kansas. He reports that only a small quantity of steam coal is now being taken from the mines and that otherwise everything is running in good shape. There is something of a shortage of steam coal on the local market.

Lynn W. Searles, mining engineer, of Birmingham, Ala., has been appointed consulting engineer for the Deepwater Coal & Coke Co., with headquarters at Evansville, Ind. This company is a syndicate formed to take over a large number of operations, in the western Kentucky field in the vicinity of Henderson, Uniontown and Morganfield, and furnish river transportation for them.

J. M. Roan, state mining inspector of Ohio, gave an examination to 21 applicants for the position of deputy mine inspector in Columbus, Apr. 9 and 10. Since the positions are under civil service all appointees must take the civil service examination. There is one vacancy in the service, in No. 4 district, and the appointment will be made as soon as the eligible list is completed.

Barney Day, of the Sanford-Day Iron Works Co., of Knoxville, Tenn., has assumed the indebtedness of the Dean Coal Co., of Artemus, Ky., which was recently placed in the hands of a receiver, and has taken over the mine, which he will put in operation at once. This property contains 6 ft. of the Dean seam of coal which is being worked, besides carrying the Jellico seam. It is understood that Mr. Day will offer the property for sale, as he is not a coal operator, and does not aspire to that honor.

John Mayer, president of the Mayer Coal Co., has been in southeastern Kansas for several days superintending the development of new mines. At Rabley the company is building one of the largest mines in the state and claims that it is one of the most up-to-date mines in America, since all the material used in the construction is steel. The mine is on the Sante Fe R.R. and the company expects to be operating it in three or four weeks. The mine will eventually have a capacity of 1000 tons daily.

INDUSTRIAL NEWS

Lorain, Ohio—The Baltimore & Ohio dock at this port will start loading coal on or about May 1. The steamer "D. J. Morrell" is fitting out and will be ready to sail at that date.

Pittsburgh, Penn.—The Wilson-Snyder Mfg. Co. of Pittsburgh, Penn., has opened a branch office at 52 Vanderbilt Ave., New York City. This office will be in charge of A. H. Sherwood.

Washington, D. C.—Rates on bituminous coal from mines in Illinois and Indiana, to St. Paul and Minneapolis over the Chicago & Alton and other railroads were found not unreasonable Apr. 10, by the Interstate Commerce Commission.

Lexington, Ky.—It is estimated that the Lexington & Eastern R.R. extension of the Louisville & Nashville, when present improvements are finished, will be able to handle about 10,000,000 tons of coal annually from the Elkhorn field in Kentucky.

Hazelton, Penn.—Contractor Lawrence Carey has a force of men engaged in driving a tunnel in the No. 23 slope at Tresckow. This tunnel is being pushed with all possible speed, and when completed will develop a large body of coal chiefly in the thinner measures.

Columbus, Ohio—J. M. Roan, Ohio mine and safety commissioner, has issued Bulletin A-4, dated Mar. 30. The bulletin takes up every fatal accident for the year 1914 and gives the causes in detail. The effort is made to teach other miners to avoid such accidents in the future.

Columbus, Ohio—The Hocking Valley R.R. Co. has appealed the case where the Ohio Utilities Commission ordered the company to resume electric service on the branch between Wellston and Hamden to the Supreme Court of Ohio. A bond of $5000 was given by the railroad company to appeal.

Charlestown, W. Va.—A petition in voluntary bankruptcy has been filed by the Hughes Creek Coal Co. The liabilities are placed at $125,373.16 and the assets at $150,162.56, the petition was filed by James Kay, president of the company, after the Board of Directors had met and decided that the company was insolvent.

New Orleans, La.—The "Captain Bud," the new $50,000 tug built at Dubuque, Iowa, for the Bisso Towboat Co., which is managed by the New Orleans Coal Co., arrived in New Orleans recently and has been put in commission on the Mississippi and has made an important addition to the Bisso fleet.

Washington, D. C.—It has been informally announced that the Federal Trade Commission will make an early investigation into conditions in the Indiana and Illinois coal fields. Operators in these fields have been pleading with the Commission for its advice as to the best method for conducting their business in order to escape prosecution under the provision of the Sherman Anti-Trust Law.

Bismarck, N. D. — New lignite coal rates in North Dakota may be made on a basis that will be in the nature of a compromise between the rates established by the Legislature and declared confiscatory by the Supreme Court, and the rate formerly maintained by the railroads. Pending an anticipated conference between state and railroad officials, no steps are being taken by the railroads in the matter of establishing new lignite coal tariffs.

Dante, Va.—On June 26, 1914 the Clinchfield Coal Corporation awarded a $50,000 contract to the Roberts & Schaefer Co. for the designing and building of a fireproof coal tipple at mine Nos. 2 and 5, similar to the one installed at Hurricane, W. Va. Just after the outbreak of the European war, the directors of the coal company suspended operations on this contract. They have now, however, authorized the immediate completion of this new plant.

Fairmont, W. Va.—The first trial growing out of the Farmington strike riot began here Apr. 12, before Judge W. G. Haymond, of the Circuit Court and Dock Urich, a Croatian miner, was called by the Commonwealth to answer a charge of the murder of Constable W. R. Riggs. One hundred and thirty-four men in all, are charged with murder, conspiracy to commit murder and riot. The trials of the other men are scheduled to follow that of Urich.

Trenton, N. J.—The Central R.R. of New Jersey was fined $200,000 in the U. S. District Court on Apr. 5, for granting rebates to the Lehigh Coal & Navigation Co., for the shipment of coal from Nesquehoning, Penn., to points in Pennsylvania, New York and New Jersey. Sentences on 25 counts of an indictment of 185 counts on which the railroad was found guilty were imposed. An appeal will be taken by the railroad to the U. S. Circuit Court of Appeals.

Charleston, W. Va.—Figures showing the March shipments over the Chesapeake & Ohio R.R. indicate a gain of 85,655 tons over the preceding month, gains in the New River and Kentucky fields being responsible for the increase, as the Kanawha and Guyan districts both showed decreases. As compared with March, 1913, the movement was 157,000 tons less, the Kanawha output being only about half as large this year as last.

Washington, D. C.—Work on the new Bureau of Mines plant adjoining Schenley Park in Pittsburgh will be started in the near future. The Treasury Department announced on the afternoon of Apr. 10, that the contract for the construction of the main building had been let to the George W. Will Co., of New York, whose bid was $287,540. The contract for grading and excavating the site was awarded to the C. A. Riffle Co., of Pittsburgh, the price being $27,242.

Norton, Va.—Work was recently started on the government building which is to be used for a post office and federal mine rescue station and to cost $90,000. It will be erected on the site formerly owned by the Norton Grocery Co. The building will be one of the most expensive and handsome structures in southwest Virginia. A United States mine rescue car with its crew will be stationed at this building for use in the southwest Virginia coal fields. It will be several months before the structure is completed.

Cincinnati, Ohio—The United States Circuit Court of Appeals has affirmed the judgment of $125,000 in favor of Mrs. Jean D. McKell recently handed down by the district court, against the Chesapeake & Ohio Ry. Co. This is the fourth time the case has been decided by the appellate court, and is the first time the judgment of the lower court has been sustained. The case was instituted by the late Thomas G. McKell, banker and coal operator, in 1902, and damages to the amount of $3,575,000 were demanded from the railroad company by reason of its alleged failure to carry out an agreement for the development of West Virginia properties.

Toledo, Ohio—A new coal-car dumper, costing $360,000, will be put in service shortly by the Cincinnati, Hamilton & Dayton R.R. at Toledo. This is the first time a machine as large as this, with necessary extension to docks, has been constructed during winter weather. The new machine will pick up bodily a 75-ton car loaded with coal and dump the entire contents into a vessel returning the car to its track. It will handle cars of this size at the rate of 40 per hour. The Cincinnati, Hamilton & Dayton handled at Toledo for shipment by Lake to the Northwest during the 1914 season more than 2,000,000 tons of coal.

Washington, Penn.—A proceeding was recently instituted by George S. Harah, of Uniontown, to save from sacrifice the properties of Altha L. Moser, for whom Harah is receiver. Moser owns large coal holdings in this county and the court handed down a decree in which it was ordered that the exemplification of the record in Fayette County be filed among the equity records of this county. The outstanding obligations of Mr. Moser are placed at $300,000, of which $48,000 is personal indebtedness and unsecured. He owns 152 acres of coal in Washington County and 706 acres in Greene County. He also holds real estate in Pittsburgh and farm land in Fayette County.

St. Louis, Mo.—In the Supreme Court in New York City recently a decision was handed down that will be of interest to coal men in the Middle West. It was in the case of Robert Holmes vs. the directors of the St. Joseph Lead Co., in which the judge overruled the demurrer of E. C. Smith, vice-president of the St. Joseph Lead Co. and president of the Central Vermont R.R., and ordered that the case go to trial. This is a case of where the plaintiff demands that the directors sue certain coal companies in the Middle West that substituted Standard coal on Carterville coal contracts, causing the lead company to lose several hundred thousand dollars.

Shamokin, Penn.—An interesting and important case affecting the miners of this section was recently heard before Justice Heslop. The question involved was whether a contractor or the mining company is responsible for the pay of the men employed on a mine contract. A few months ago Louis Randall took a contract at the Colbert colliery. The work was more rifficult than he had anticipated, and he did not make sufficient money on the contract to pay his employees the full amount of their wages. The men appealed to the company for pay which was refused. It is claimed that the operator or mining company is responsible for the pay of the men if the contractor fails. Justice Heslop upheld the contention of the workmen and entered a judgment in favor of the plaintiff for $40. It is understood that this case in the form of a test suit will probably be appealed from the justice's decision in order to get the court's opinion on the question.

Johnstown, Penn.—As a sequel to the purchase by John D. Rockefeller of a controlling interest in the Consolidation Coal Co., an important trackage agreement has just been concluded between the Baltimore & Ohio and Western Maryland railroads, whereby the latter will gain access, with comparatively little construction work, to two coal fields off its present lines, and will share in the tonnage of a third field. It is estimated the Baltimore & Ohio's revenues will be affected to the extent of between $700,000 and $800,000 annually by the new arrangement. It will receive a rental for the use of its tracks. The coal fields involved in the competition for tonnage are in the Somerset and Fairmont districts. The Pennsylvania R.R. is already in the Somerset field and the New York Central recently completed a joint line into a portion of the Fairmont field. The future increase in production in these important fields may be the object of much more active competition than now exists.

Coal Trade Reviews

General Review

Anthracite trade active in all departments. Improved sentiment in bituminous though movement continues light. Less tendency to force the market and contract prices are fair. Unfavorable outlook in Lake trade a depressing feature.

The anthracite trade is shaping up in better form than anticipated, and the market will have no difficulty in absorbing the maximum production throughout the current month with the possible exception of some of the steam grades which are showing a tendency to drag. Shipments to Down East points are going forward as rapidly as the barge fleets can move. The general demand is undoubtedly less than normal which is due, in part, to the fact that collections are so slow that dealers are unable to purchase as heavily as usual. Shipments in the Lake trade will be slow in getting under way because of the large ice fields in Lake Erie. In the Middle West the demand is somewhat stronger, and the tonnage will closely approximate that of previous years.

There are undoubted indications of an improved undertone in the bituminous situation though the market continues irregular and rather mixed. Current prices undoubtedly rule slightly under the 1914 level, but there is less distress coal being forced on the market, and it is a significant fact that no particularly low bids are developing on any of the large public contracts, while there is a growing disposition to wipe out the differential over last year's prices. There is less tendency on the part of the operators to force the market, and the more cautious buyers are showing a greater interest.

The poor outlook in the Lake trade continues to exert a depressing influence in the Pittsburgh district, and buyers are still adverse to committing themselves on contracts, preferring to take their chances in the open market; they evidently plan to hold off contracting until late in the fall when they will endeavor to cover their requirements so as to insure a supply during the active period, occasioned by the possibility of a general suspension Apr. 1. Domestic coal has ceased to be a factor in the situation, but the steam demand has increased slightly though it is still substantially below the average.

The usual between-season dullness prevails in the Ohio market though there is a slightly better undertone. Coal is beginning to move towards the Lakes, but chartering is slow and it is clear that there will be no shipments of importance before July 1. What little demand there is centers entirely on slack coal, the supply of which is much curtailed as a result of the restricted mining operations.

In the Middle West the domestic coals have been more buoyant due essentially to the generally cool weather though some of the agencies are inclined to interpret this as an indication of an upturn in the trade. An improved sentiment is noted in the prompt market which is causing buyers to show more interest in contracts, and the steam coals are somewhat steadier. Mining operations are now on about the usual summer basis, and there is less free coal on the market. Unusually favorable crop reports are creating an improved sentiment in this section.

BUSINESS OPINIONS

Bradstreets—This week's reports, trade and industrial, are the best noted for some time past, being in some respects the most favorable received since the spring of 1914.

Dun's Review—Influences favoring business are now more numerous and potent and there is unmistakable trend toward expanding activity. In certain lines conservatism continues the controlling policy and thus there is some irregularity, with the aggregate of transactions below producing capacity, trade development naturally being subject to the changes and checks produced by the international crisis.

Financial Chronicle—The performances now being witnessed on the Stock Exchange cannot be viewed with unconcern. The element of artificiality in them is altogether too patent to be ignored. The improvement in the situation is being used as the lever for boosting prices with a dazzling recklessness. If one may judge from Stock Exchange records, manipulation is the governing factor in the speculation. Many of the stocks which have been taken hold of and whirled up so furiously must be assumed to have considerable intrinsic merit, but their worth remains to be tested, and in the meantime future prospects are being discounted with a freedom that staggers the beholder. The movement has now been continued for several successive weeks; and with each succeeding day the manipulators have been getting more bold, until it seemed as if, frenzied by success, they had now completely lost their heads, and become possessed with the idea that there was no limit or bound to which their daring and recklessness might not go without risk of ill-consequences.

Boston News Bureau—If general trade has not improved to a point that indicates enlarged wants and buying power, it is certainly in a position that warrants more hope and cheerfulness. There is a better undertone prevailing everywhere, and this is gradually changing sentiment and causing an inclination to expand. If the crop outlook continues promising, we shall probably see a quickening of activity from coast to coast. The time will come when the country will feel the effects of the economy which has been such a potent factor in the affairs of both corporations and individuals.

American Wool and Cotton Reporter—A duller season in the wool market for the last 25 years is not recalled, and the reason ascribed is the retrenchments made in the expenditures for clothing. This applies to the domestic business, of course, for Government orders have created an abnormal situation. If it were not for the foreign trade many mills would be idle.

The Iron and Steel Industry—The production of pig iron in March amounted to more than 2,000,000 tons, the highest record since May of last year. It is at the rate of 75% of the pig iron capacity of the country. Unfilled orders decreased 90,000 tons in March as compared with 350,000 tons in the corresponding month last year; the total unfilled orders now aggregate 4,200,000 tons. Foundry iron business has been slightly better. The automobile makers in Detroit took about 10,000 tons, and there have been other sales of merchant iron. Stocks of foundry iron decreased rapidly in March, and undoubtedly took care of the increase which piled up during January and February. Finished steel products are not in so good demand. There is quite a little heavy work, notably bridge work, which has come out within the last fortnight.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River prices fail to show expected weakness. More hopeful tone. Contract demand slightly improved. Georges Creek and Pennsylvania grades quiet at tide. Water freights easier. Anthracite being shipped freely.

Bituminous—Prices on Pocahontas and New River are holding better than was expected. Recent bids on public contracts show no particularly low figures and there is more of a disposition on the part of shippers to accept the situation as they find it and not to try to force coal on a reluctant market. At the distribution points for inland delivery supply is still in excess of demand. Cargoes are absorbed very slowly. Only a few season orders are being placed now, and those mostly in the same channels as last year. Prices for the year on a delivered basis are usually found to be somewhat under the 1914 level.

The market for Georges Creek is not much improved. The shippers are very actively canvassing for business but prices are being held along the usual lines. The unfavorable weather has tended to retard arrivals and there has therefore been somewhat less pressure to move cargoes this week.

Cambria and Somerset coals are quiet at Tidewater but are still aggressive in the all-rail territory. New England is being thoroughly combed over for new business but buyers are rather unresponsive. Prices on these grades show small concessions as compared with a year ago.

Boston retail dealers reduced the current price for bituminous this week from $4.65 to $4.40 per short ton for delivery by team. This is the lowest current price for more than two years and is the result of friction between some of the larger distributors.

Water Freights are easier, if anything; 80c. has been quoted on barge transportation, 3000 tons upwards, Hampton Roads to Boston, and the same figure still prevails on bituminous in anthracite barges from Philadelphia; 40c. is the current rate on barges from New York to Providence, 700 tons and up.

Anthracite—Shipments are coming forward as fast as the barge fleets can move, although some of the smaller dealers have already taken on all they can receive for the present. All the regular shippers are well supplied with orders for April, but May is expected to be slower. That some of the individual shippers have coal here on the market only serves to emphasize 1915 as a notably easy year to get anthracite forward on minimum prices.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*	2.15@2.65	2.40@2.85	2.92@3.02	
New York*	2.45@2.95	2.70@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.60@2.75
Boston†	....	....	....	3.55@3.73
Providence†	....	....	....	3.50@3.73

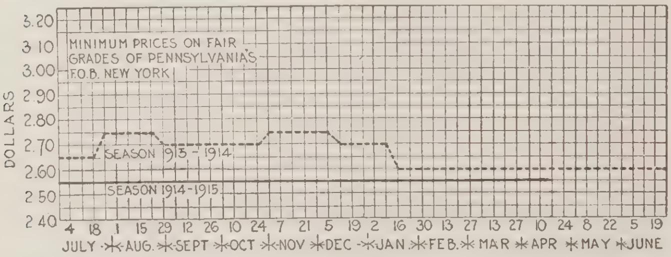
* F.o.b. †On cars.

NEW YORK

The situation on new bituminous contracts regarded as favorable. Improved sentiment in the trade. Anthracite more active as the month advances. Summer outlook more optimistic.

Bituminous—Now that the religious holidays are over and the men back at work, coal is beginning to come forward again on a more uniform basis and a considerable tonnage is being moved over the piers, relieving any immediate prospect of demurrage conditions such as existed during March and before.

Reports from the leading soft-coal distributors indicate that contracts have been closing up in encouraging fashion, nearly all of last year's business being accounted for and at fair prices, equal in many instances to those which prevailed during the season of 1914-1915. Some concessions have been made to secure the business of a certain element which usually seeks to set its own prices but this is a small percentage of the whole. It can truthfully be said that general conditions are improving and that the spirit of optimism which has become evident in the trade is but a natural reflection of the general business improvement so noticeable in financial circles. The market is now quotable on the following basis: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.05@3.10; Georges Creek, $3.15.



Anthracite—With the collieries working full time again the usual tonnage is now being produced, with sufficient orders from the retail dealers to absorb each day's output. As the last half of the month approaches the activity seems to become more pronounced, the retailers being eager to get under cover for as much coal as possible at the April circular. From present indications the retail trade will not be able to make all the deliveries now on their books during this month.

Whether those who last month predicted April prices to prevail in the summer feel the same now is questionable, for there is no apparent desire to await that time. This prediction may be verified but it is most unlikely as the fear of labor troubles at the expiration of the present agreement hangs heavily over the situation and will become more ominous as the season advances.

Egg and stove are about in equal demand. Chestnut is moving easily but is not so active as the former two sizes. Pea is active apparently for filling in apartment houses, which business is always heavy at this season. The buckwheats are in good demand and No. 2 buckwheat in the better grades is really short with loading delayed for several days. There is no doubt that these sizes will be the leading factor in a lively market which will characterize next fall and winter.

The anthracite market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.60	$4.60	$4.55	$4.55
Egg	4.85	4.85	4.80	4.80
Stove	4.85	4.85	4.80	4.80
Chestnut	5.10	5.10	5.05	5.05
Pea	3.55	3.35@3.55	3.50	3.15@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.30@2.40	2.00@2.25	2.10@2.35
Barley	1.80	1.60@1.80	1.75	1.40@1.75

PHILADELPHIA

Outlook on anthracite favorable for balance of month, although small sizes are weak. Domestic grades in good demand. Bituminous inclined to drag, with no prospect for immediate improvement.

Anthracite—From the present outlook, there is likely to be little or no difficulty in disposing of the output of the domestic sizes for the balance of the month. Operators report a distinctly better attitude on the part of the trade, which indicates that the dealers are rapidly disposing of the surplus carried over from the winter months, and are in the market for fresh supplies. The steam sizes are likely to hamper operations as the warm weather approaches, as the demand for these will fall off sharply. This applies to the large apartment houses, hotels, department stores, and many industrial establishments.

Dealers claim to be having difficulty in securing egg coal and it is understood that the large companies are drawing on their stocks for this grade. Broken has eased off somewhat, and will probably be reduced to supply the call for other sizes. Stove coal is considerably easier than egg, and dealers experience little or no difficulty in securing all they require, promptly. Nut appears to be absorbed readily although the market is far from bullish on this size. Pea coal is generally held at $2 at the mines. There is apparently a desire to push the sale of this grade coal rather than place it in stock, and this attractive price is having its effect, for the present at least; the circular is $2.50 plus the tax, for line and local delivery. Altogether, the market presents a favorable aspect, with only weakness here and there.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.25	$4.25
Egg	4.50	4.50@4.60
Stove	4.50	4.50
Chestnut	4.75	4.60@4.70

Bituminous—This branch of the trade still continues to evince little or no indications of improvement. It is understood that many contracts have been renewed on the old basis, but in some cases it has been necessary to make some slight reductions. The medium coals are still quoted about $1 to $1.10 at the mines, with the better grades $1.35 to $1.40.

BALTIMORE

Better feeling in the trade but spot business remains poor. Exports hold up well.

There is a stronger feeling in the trade. A number of large contracts were placed here the past week, and while prices are less than last years figures, there is a growing tendency to cut down the margin and purchasers who continue to hold off are likely to pay close to the old prices. That operators are stiffening up is evident. Interests in southern West Virginia have held a meeting at Fairmont with a view to fixing prices and the result will probably be no more cutting. Toward the end of the week operators refused to consider prices that have prevailed for several weeks past along contract lines.

Spot business remains very poor, however. In the gas coal section of West Virginia three-quarter and run-of-mine are about on a par, offering to the trade at the mines as low as 75 and 80c. Slack, is selling at 75c. and low grade steam coals from West Virginia were offering at 80 to 85c., with best grades around $1.20. Pennsylvania coals ranged from 90c. to $1.25.

The charters for the past week included the following:

Vessel	Nationality	To	Rate
Harrington	British	West Coast, Italy	$10.56
Rio Perahy	British	West Coast, Italy	10.56
Bedeburn	British	Savona or Genoa	9.60
Governor Powers		San Juan, P. R.	3.00

Note—Steamers are indicated by **bold face type**, all others being schooners

HAMPTON ROADS

Exports and coastwise shipments holding up satisfactorily. Government takings during week heavy. Prices relatively firm.

The movement has been satisfactory considering existing conditions. The government has taken a large tonnage during the week to supply the battleships which have arrived from Guantanamo. The coal movement by sail seems to be falling off somewhat as compared with March. Coastwise shipments were heaviest to Boston and Providence with other cargoes to Bath, Portland, Allyns Point and Everett.

All of the large cargoes of the week have been New River and Pocahontas mine run although there have been several fair sized cargoes of nut and slack and high volatile going to the New England ports. Prices seem to be firm. The accumulation is being reduced somewhat and a number of shippers are rather short and urging the railroads to rush coal forward from the mines.

The new Collier "Ulysses" recently completed for the Canal Zone trade arrived in port during the week and after loading will go on her trial trip.

Although it is difficult at this time to predict what the movement for the month of April will amount to the prevailing opinion seems to be that dumpings will show up well. Dumpings over the N. & W. Ry. pier for the week ended Apr. 10 amounted to 141,134 tons.

Vessels clearing from Hampton Roads week of Apr. 2 to 9 inclusive were:

Norfolk			Newport News		
Vessel	Tons	Destination	Vessel	Tons	Destination
Alban	673	Para	**Sif**	4700	Fort de France
Windermere	3700	Vera Cruz	Frank W. Benedict	750	San Juan
Songa	4029	Havana	(Bk.) Bruz Hawkins	860	Maranhan
Ellen Little	1268	Para			
Rufford Hall	8617	Gibraltar			
Nor	1750	Georgetown			
Barbara	1132	St. Georges			
Howard Palmer	4006	Rio de Janeiro			
Tabor	5000	Canal Zone			
Wegadesk	6000	Canal Zone			
Falk	1185	Manzanillo			

Note—Steamers are indicated by **bold face type**, all others being schooners.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Itasca		Norfolk	Bermuda	989	$4.00
Rio Pirahy	British	Baltimore	West cost, Italy	2297	
Bedeburn	British	Baltimore	West coast, Italy	2177	
Edward B. Winslow		Norfolk	Rio Janeiro	2482	8.50
Jacksonville		Philadelphia	Bermuda	547	3.00
St. Kilda	British	Virginia	River Plate	2469	9.36
Governor Powers		Baltimore	San Juan, Porto Rico	1578	3.00
White Wings		Philadelphia	Mayport	654	0.95
		Baltimore or Virginia	West Italy or Sicily		10.54
Gardiner G. Deering		Philadelphia	Guantanamo	1714	
Henry O. Barrett		Philadelphia	San Juan, P. R.	1564	
Three Marys		Norfolk	Bermuda	1024	3.00
A. & M. Carlisle		Philadelphia	Jacksonville	302	0.95
Edith		Norfolk	Rio Janeiro	1051	
Sallie C. Marvil		Norfolk	Pernambuco	546	
T. W. Dunn		Philadelphia	Para or Maranham	635	5.75
James T. Maxwell, Jr.		Norfolk	Maranhao	461	
Alice M. Colburn		Baltimore	San Juan, P. R.	1335	

Note—Steamers are indicated by **bold face type**, all others being schooners.

OCEAN FREIGHTS

Since our last report we have chartered a number of steamers for export coal, principally to South American and West Indian ports, and rates are practically the same as a week ago.

To	Rate	To	Rate
Havana	$2.50@2.75	Guantanamo	$3.00@3.25
Cardenas or Sagua	2.50@2.75	Demerara	5.50@6.00
Cienfuegos	2.75@3.00	Bermuda	3.50@3.75
Port au Spain, Trinidad	2.75@4.00	Vera Cruz	**3.50**
St. Lucia	3.50@3.75	Tampico	**3.50**
St. Thomas	**3.25**	Rio	**10.04**
Barbados	3.75@4.00	Montevideo, Buenos Aires or La Plata	**9.36**
Kingston	3.00@3.25	Mediterranean*	**10.80**
Curacao	3.75@4.00	Valparaiso†	8.40@9.60
Santiago	3.00@3.25		

Note—Rates noted in **bold face** type are only approximate.
* To a direct port not east of the West coast of Italy, Spain excluded.
† With 800 tons per day discharge.
W. W. Battie & Co.'s Coal Trade Freight Report.

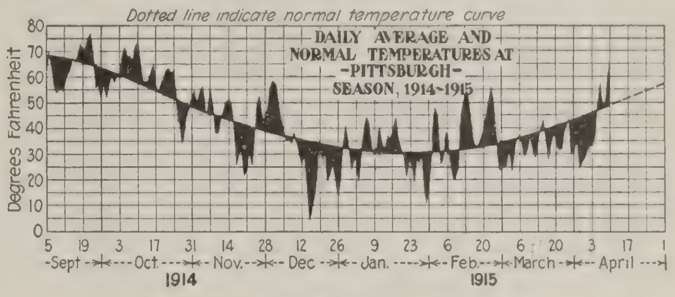
LAKE MARKETS

PITTSBURGH

Market shows no improvement and prices continue very irregular, with many consumers refusing to contract. Operations at 55 to 60% of capacity.

Demand for domestic coal continues light and no further activity of importance is expected in this branch of the market. Demand for steam coal has increased slightly but remains well below normal. Railroad demand has not increased to any noticeable extent as there is little more traffic moving than formerly. Demand for gas coal is very nearly normal, but prices are only a shade firmer for gas than for steam coal. What is injuring the market in particular is the poor Lake trade prospects as very little coal is likely to move before July 1 and unless industrial conditions in the Northwest improve greatly the total movement this season in the Lake trade will be poor, and perhaps below that of last year.

Buyers still show an aversion to making contracts for the twelve-month and it seems probable that unless there is a decided improvement in general conditions and coal market prospects many consumers will buy prompt coal from time to time and not make contracts until late in the year, when they will presumably desire to have contracts to carry them to Apr. 1, providing coal in the period in which buyers will be stocking up against a possible suspension of mining for adjustment of the wage scale. The contract market continues to be quotable roundly on the basis of $1.15 for mine-run, with shading possible on contracts at all desirable. Prompt lots are irregular, and asking prices, frequently shaded, may be quoted the same as last week: Slack, 90c@$1; nut and slack, 95c.@$1.05; nut, $1.05@1.10; mine-run, $1.05@1.15; ¾-in., $1.15; 1¼-in., $1.25, per net ton at mine. Mining operations are at 55 to 60% of capacity.



BUFFALO

Little activity shown in bituminous. Contracts not so numerous as in most years. Operators begin to ship coal to the Lakes. Anthracite business good, but not so large as a year ago.

Bituminous—The same dullness prevails in the bituminous market and everybody complains of trade being lighter than usual for the spring season. A notable unwillingness to enter into contracts is prevailing and many buyers evidently expect to confine their purchases to the open market for some time to come. They have no difficulty in getting plenty of coal, though mine operations are not at more than half capacity. Business in Canada is exceedingly quiet; plants manufacturing war materials are working over time, but the number is not large and the Canadian tonnage has fallen off largely with many contracts suspended.

Shipments of bituminous coal to Lake points have started. The season will begin within the next week or so, and the car ferries across Lake Erie are already in operation. It is doubtful if the Lake business will be heavy until late in the season; buyers are showing indifference at present, because of the large stocks left over from last fall. The outlook is for a poor volume of business at the beginning of the season.

Pittsburgh prices show some weakness and trade in spot coal has dwindled down to a small basis. Some cutting of contract prices is reported, though most sellers will not close far ahead at reduced figures. Prices are $2.80 for Pittsburgh select lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower than Pittsburgh.

Anthracite—The demand is running somewhat below that of last year, but most dealers are desirous of getting stocks at the April quotations. They are handicapped to some extent by the fact that their collections have been poor. Many have cut down their orders a third or so, while others are preparing to buy next month.

Shipments of anthracite up the Lakes will be slow in starting, because of the large ice fields at this end of Lake Erie. The nominal date for the opening is Apr. 15, but it will be some days after that before vessels can clear. The movement of water coal is likely to be on a less active basis than last spring.

TORONTO, CAN.

Trade quiet and marking time pending the spring discount.

The market is dull and featureless, the principal demand being for bituminous screenings. Supplies are now coming forward freely and the first cargoes by water are being received. Consumers are buying principally for immediate requirements until the spring reductions in price take place. Quotations for best grades are as follows: Retail anthracite egg, stove and nut $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $7.50; wholesale f.o.b. cars three-quarter lump, $3.56; screenings, $2.90.

TOLEDO

Some coal moving to the Lakes. Prices on certain grades well maintained. Pocahontas scarce.

The coal trade is improving some due in part to the cold weather of the past two or three weeks. Pocahontas egg is quite scarce and is holding firm at the circular price of $1.60. Splint lump is in good demand at from $1.15 to $1.25. Slack continues strong and somewhat scarce, selling at from 55 to 60c. Some operators are shipping small quantities to the Lake. Real Lake business, however, will not commence until late in the season.

COLUMBUS

Trade continues quiet. Domestic business about over for the season and little is doing in the steam market.

The domestic trade is about over for the season and dealers are devoting their attention to cleaning up stocks. The tone of the market is fair, despite the unfavorable conditions but future prospects are not considered particularly bright.

Some difference is reported on dealers' stocks. In some sections stocks are light but in others dealers have bought liberally and their supplies are large. Retail business is slow and only a few small orders have been received; prices remain the same as last week.

In the steam trade things are also quiet. Manufacturing does not appear to improve and consequently fuel requisitions are still small. Buying off the open market is the rule and cheap prices are given. There is considerable difficulty in renewing steam contracts, many of which expire at this time. Some railroad fuel business is reported but numbers of these contracts are still hanging fire.

Lake trade shows no signs of awakening. Chartering is slow and only a few bottoms have been contracted for. Reports from the docks of the Northwest show that the surplus carried over is larger than ever before and there is little likelihood of any Lake shipments until July 1 if that early.

Production in Ohio fields has been small during the past week. Reports received from the Hocking Valley, Jackson, Crooksville and Cambridge fields show an output of approximately 25% of normal. In the Pomeroy Bend field the output is about 40% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.60
Coarse slack	0.55	0.60	0.50

CINCINNATI

The demand for nut and slack has continued to strengthen. Other departments of the market are quiet.

The domestic market is extremely dull, although it can hardly be called abnormally so for a between-seasons period. The scarcity of screenings has increased, if anything; the obvious uselessness of trying to force the domestic market has caused producers to cut down their output of the prepared sizes still further, and nut and slack are strong. The general situation is regarded as fairly good, and hopes are expressed that the season will yet develop into a satisfactory one.

CLEVELAND

Fine coal shows an unaccountable weakness. Lake shipping officially opens. Freights and insurance for the season.

Fine coal showed marked signs of being sold for lower prices at the beginning of the week with no apparent reason for the tendency. Lake coal is beginning to arrive.

Fine coal sold Monday at $1.70 to $1.75 with an undercurrent to the market that indicated still lower prices. Some Pennsylvania and West Virginia Lake coal is being produced, but the fine coal that was on the market did not come from the districts producing three-quarter for the Lake trade. Three-quarter and mine-run coals are selling as low as $1.80. There was a good supply of coal on track Monday morning.

Lake Trade—In the Lake trade boats are being loaded for the first trip. The first cargo was loaded Saturday at Huron for St. Clair River points. Lake Superior coal is being loaded at Ashtabula and Lake Michigan coal is being offered, but not being taken. It is too early for most of the boats. Lake coal prices have not been made.

Navigation opened Thursday midnight but only a few boats sailed because it is not customary to send out ships on an opening trip on Friday. Insurance this year as 3$\frac{3}{8}$c. on steel vessels, but an effort is being made to advance cargo rates on coal and ore to $\frac{1}{10}$ of 1% as against the 1914 rate of $^1/_{20}$ of 1%.

The Sunday Creek Coal Co. has appointed W. S. & J. S. Manuel, agents for Lake transportation of Sunday Creek coal. About 500,000 tons will be shipped. The forwarding agents placed the coal for delivery at the principal Lake Superior and Lake Michigan ports at 30c. a ton.

Quotations on coal for shipment are:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$2.95	......	......	......	......
Lump, $\frac{3}{4}$ in.	......	2.20@2.25	2.00	$1.90	$1.90@2.00
Egg	2.95	......	......	......	......
Mine run	2.45@2.50	2.10	1.90	1.80	1.75@1.90
Slack	......	1.80	1.75	1.70	......

LOUISVILLE

Operations down to a summer basis and there is still surplus coal.

Part time operations are the rule, while some mines are shut down altogether, and even at that it is reported stocks are accumulating. The domestic market is practically over for the season and the industrial and stocking demand is the only business that can be expected for several months. Reports of new operations to be opened up, extension of the rail facilities and combinations of mining operations, indicate greater activity than ever the coming fall and winter.

The best grades of block coal range from $1.30 to $1.60; 2x4-in. round, $1.10 to $1.20; run-of-mine, from 85c. to $1, according to dimensions, with the top quality nut and slack 65 to 75c., all prices f.o.b. mines.

NEW ORLEANS

Domestic business was particularly good during the past season. Interest of the New Orleans dealers will center this month on the big Government contract for coal to be delivered to the mouth of the Mississippi River.

Despite a dull market at present, there is some activity on the river front. England's recent orders have kept a great many ships from putting into this port for bunkering. The New Orleans Coal Co., the Monongahela River Consolidated Coal & Coke Co. and the W. G. Coyle Coal Co., which control practically all of the river bunkering, were the principal sufferers.

COKE

CONNELLSVILLE

No general activity, but slightly better tone. Production decreased slightly, following recent increases.

The coke market has shown a slight stiffening, though the change is largely a sentimental one, operators having come to expect somewhat better things for the future than formerly and being a trifle stiffer in their views as to prices. In the past week or ten days prompt furnace coke has been bringing $1.55, apparently as minimum, whereas for some time it was easy to do $1.50 on fairly desirable brands. There are still quotations at $1.60 and $1.65. Contracts extending to Jan. 1 would be quoted more strictly at $1.75 than formerly and for any deliveries running into next year operators are talking above $2. Prompt foundry is bringing $2@2.35, according to brand, while contracts seem to be a shade stiffer at $2.20@2.30.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 3 at 281,251 tons, a decrease of 3986 tons, and shipments at 278,014 tons, a decrease of 6699 tons.

Buffalo—Lack of trade is still reported and the demand shows no tendency to increase. Local handlers have done much less business than formerly this year. Prices remain the same at $4.25 for the best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—Some tonnage shipped here on consignment has been sold at prices below usual quotations. Improvement is noted in the buying of domestic sizes. Furnace and foundry coke shows no change, but gas house has declined. Quotations are as follows: Byproduct, $4.45@4.75; Connellsville, $4.65@4.75; Wise County 72-hr. (select), $4.50@4.65; gas coke, $3.85@$4; furnace, $4.45@4.65.

MIDDLE WESTERN

GENERAL REVIEW

Some improvement noted. Contracting unsatisfactory. Screenings steady.

Domestic coals have been more bullish, due to cool weather and buying of retail yards for household purposes. Although the market is not buoyant, it is felt by many that an upturn is in progress. The volume of coal moved from Indiana and Illinois mines is still moderate, and steam coals, if anything, have a better tone. The supply of screenings is about equal to the demand, and in some districts the prices have advanced as much as 10c. per ton.

Renewals of contracts are unusually slow for this time of year and buyers continue holding back awaiting developments. The industrial situation looks brighter, however, and if the improvement is more marked the closing of contracts will soon be on in full swing.

Production has slowed down to what may be considered a normal summer basis and the minima prices for the Indiana and Illinois coals have now been seen. Mine operations are so restricted and prices better maintained that very little consignment coal is to be found. Reports on the coming wheat crop are favorable, and while a deficiency of moisture has existed, recent rains over nearly all the Western wheat-growing states have caused favorable prospects for another bumper crop. This condition should reflect favorably for the Illinois and Indiana operators later.

CHICAGO

Better demand for domestic coals. Contracts closed on same basis as last year. Very little free coal offered. Anthracite about normal but considerable complaint as regards quality.

Increased orders have been received by Indiana mines for domestic sizes, and screenings have been in demand. Such contracts as have been closed for Indiana coals are on the basis of last year's prices. The best quotations reported for domestic lump this week has been $1.45 at the mines.

Southern Illinois screenings have been frequently sold at $1 per ton, and many orders remain unfilled. The demand for domestic coals from this district has improved, and prices on all sizes are held steady.

In the Springfield district the situation shows slight improvement. More contracts have been closed for Springfield and Peoria coals than elsewhere, and it is said that some railroad business has been placed for another year at the same prices as last year.

Splint coals are flat, although there is little free coal on hand. But little contracting for these grades is reported thus far.

Eastern Kentucky coals are in a state of inertia, and few shipments have come into this territory. A little consignment coal has been sold at about 15c. per ton under regular quotations.

Hockings have been in fair demand, and prices well held. No free coal has been reported on the market this week.

The smokeless situation is spotty, although no consignment coal is reported on track. Contracting is slow, but jobbers in this territory are showing a good deal of activity in this respect. There is some placing of orders for prepared sizes for future delivery.

Anthracite buying is about equal to last year at this time. Independent anthracite shipments of inferior quality and preparation have come into this territory and sold at low figures. Some independents do not seem to realize that they cannot use the Western markets as a dumping place for their inferior production. Improvement is shown in buying at April storage prices, but retailers are slow in placing orders.

Prevailing quotations are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.20@1.35	$1.25@1.35	....	$1.25@1.30	$1.50@1.65
4-in. lump..	....	....	$1.35@1.45	....	....
Steam lump	....	1.25	1.25	1.15@1.25	....
2½-in. lump.	....	....	1.35@1.45	....	....
1¼-in. lump.	....	....	1.20@1.25	1.15@1.25	....
Mine-run...	1.00@1.10	1.00@1.05	1.05@1.10	1.00@1.10	....
Egg........	1.20@1.35	1.25@1.35	1.25@1.30	1.20@1.30	....
No.1washed	1.15@1.35	....	....	....	1.45@1.65
No.2washed	1.20@1.25	....	....	....	1.40@1.50
6x3-in. egg.	....	....	....	....	1.50@1.65
Nut.......	....	1.25	1.15@1.25	1.10@1.20	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.25@1.30	....		....	....
Screenings..	0.90@1.00	0.85	0.80@0.85	0.80@0.85	1.00

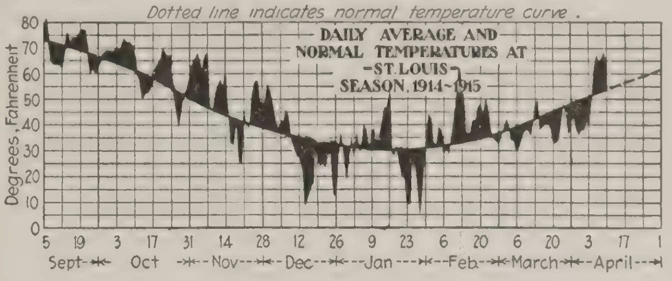
	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.20@1.35	$1.25@1.40	$1.50@1.60	$1.45@1.50	...
1½-in. lump.	1.15@1.25	....	1.00@1.15	....	$1.40@1.50
Mine-run...	1.05@1.10	1.10@1.15	0.90@1.25	1.00@1.15	1.00@1.15
Egg........	....	1.00@1.10	1.40@1.60	1.40@1.50	....
No. 1 nut..	1.25@1.40	....	....	....	....
No. 2 nut..	1.20@.135	....	....	....	....
Screenings..	0.90@1.00	....	...		...

Knox and Greene County 5-in. lump, $1.25; 3-in. lump, $1.10@1.15; 5-in. egg, $1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.15; screenings, 85@90c.

INDIANAPOLIS

Weather warm and consumption small in most lines. Contract-making proceeding satisfactorily at old prices.

Mines are not making better than half-time, prices are at the summer level, retailers are buying sparingly and the railroad and industrial demand is quiet. The weather has been the warmest of the spring and house fires were unnecessary many days. This reduced the demand for domestic lump and consumers have about completed their season's purchases. The retailers are apparently not going to reduce prices to the summer level until the first of May. Slack is easily sold at around 80c. to 90c. according to the grade, and mine-run ranges from $1 to $1.20. Contracts are generally being renewed at satisfactory figures to the operators.



ST. LOUIS

Market inactive and movement light. Important readjustment in marketing conditions. Anthracite movement normal.

There is very little activity even in the steam sizes which should be strong. There seems to be no tonnage of any consequence moving from either the Standard or the high grade fields, and there is nothing to indicate any improvement. The only size in demand is No. 4 washed, and this scarcity is due to the Chicago contracts being short.

Arrangements have been practically perfected, with a few exceptions, for the distribution of coal in the St. Louis market from the mines on the various railroads. Some of these arrangements are now in working order, and others will go into effect shortly. An operator is selected on each railroad, who handles the tonnage of all the mines on that road, and sees that it is evenly distributed. This has a tendency to group the coals from the different roads, and maintain a standard price for them. Similar arrangements have not as yet been made in the Williamson and Franklin County field. In carrying out this plan, the selling expense is reduced to a minimum and the jobber eliminated; it is expected that the public will eventually get its coal at a lower figure than heretofore, and the operator realize a better profit at the same time.

There is a fairly good tonnage of anthracite moving in, and orders are being booked well ahead. Smokeless is dull with very little doing, and no indications of any improvement. There has been practically no change in the circular prices.

KANSAS CITY, MO.

Both retail and wholesale business has suffered slight decrease. Prices unchanged.

The coal business has practically reverted to the summer conditions. There is plenty of coal on the tracks and many of the mines in this vicinity have completely quit operating and others are operating on a short time basis. Steam coals are in about the same demand that they have been all winter and no decrease is expected by the operators. The demand for slack has not changed while other types have decreased in demand.

Prices are as follows:

	At Mines	Freight		At Mines	Freight
Cherokee lump....	$1.85@2.00	$0.80	Waverly nut......	$1.75	$0.40
Cherokee mine-run............	1.40@1.60	0.80	Novinger coarse...	2.00	0.60
			Novinger nut.....	1.85	0.60
Cherokee nut.....	1.85@2.00	0.70	Arkansas semi-anthracite......	2.50	2.00
Cherokee mill.....	1.40@1.50	0.70			
Cherokee slack....	1.35	0.70	Arkansas sizes....	4.10	2.10
Lexington block...	2.00	0.40	Arkansas lump....	3.85	2.10
Parlor block......	2.10@2.50	0.40	Penn. chestnut....	7.10	2.50*
Richmond........	1.90@2.00	0.40	Penn. egg........	6.85	2.50*
Waverly lump....	1.85	0.40	Penn. grades......	6.60	2.50*

*To Chicago.

PRODUCTION AND TRANSPORTATION STATISTICS

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for November and December and the years 1913 and 1914:

State	November 1913	November 1914	December 1913	December 1914	Year 1913	Year 1914
Missouri...	290,958	252,105	266,335	285,547	2,924,728	2,762,211
Kansas.....	571,165	591,383	540,872	643,213	5,782,194	6,162,776
Arkansas...	187,703	141,554	138,678	123,737	1,943,861	1,643,881
Oklahoma ..	346,064	332,515	324,728	352,267	3,534,842	3,379,031
Totals...	1,395,890	1,317,557	1,270,613	1,404,764	14,185,625	13,947,899

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for February and the eight months of the fiscal years 1914 and 1915, in short tons:

	February				Eight Months			
Destination	1915	%	1914	%	1915	%	1914	%
Tidewater	263,523	19	240,684	21	2,360,656	17	2,264,181	19
East	188,078	14	190,530	16	1,680,452	12	1,745,565	15
West	862,940	62	663,868	58	9,299,365	66	7,232,229	60
Total	1,314,541		1,095,082		13,340,473		11,241,975	
From Connections								
Tidewater	....		....		187			
Bituminous	74,365	5	55,494	5	729,494	5	727,218	6
Anthra. (local)	143				248			
Anthracite	819		1,063		10,423		10,476	
Total	1,389,868	100	1,151,639	100	14,080,825	100	11,979,669	100
Coke	14,309		36,194		116,623		251,447	

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads for January of the past four years, in short tons:

Anthracite	1912	1913	1914	1915
Baltimore & Ohio[1]	175,185	195,667	137,270	123,077
Chesapeake & Ohio[1]	3,155	378	1,043	769
Erie[2]	674,168	673,614	791,070	646,248
Pennsylvania[1] [3]	1,040,535	1,014,259	915,027	894,529
Virginian[2] [1]		89		98
Total 5 roads	1,893,043	1,884,007	1,844,410	1,664,721
Bituminous				
Baltimore & Ohio[1]	2,573,468	3,187,956	3,097,640	2,438,091
Buffalo, Roch. & P.[1] [2]	716,888	774,052	817,259	595,512
Buffalo & Susq.[1] [2]	145,562	143,814	147,581	92,381
Chesapeake & Ohio[1]	1,316,621	1,263,892	1,644,152	1,689,771
Erie[3]	47,313	60,373	9,980	11,256
Hunt. & Br'd T. Mt.[1] [2]	99,612	150,149	105,739	21,839
New York Central[3]	761,810	886,742	835,458	825,761
Norfolk & Western[1] [2]	1,687,948	2,069,874	1,965,814	1,886,938
Pennsylvania[1] [3]	3,581,365	4,210,196	4,117,514	3,571,345
Pitts. & Lake Erie[1] [2]	916,993	1,033,330	830,804	577,706
Pitts. Shaw. & North[1] [2]	163,901	228,426	287,474	232,172
Virginian[1] [2]	306,766	453,886	407,109	344,139
Western Maryland	208,901[4]	289,342	291,002	314,334
Total 13 roads	12,527,148	14,752,032	14,557,526	12,601,245
Coke				
Baltimore & Ohio[1]	329,556	439,176	274,955	221,395
Buffalo, Roch. & P[1] [2]	38,548	57,831	28,780	33,834
Buffalo & Susq.[1] [2]	28,796	28,153	33,495	49,774
Chesapeake & Ohio[1]	17,440	30,764	34,256	11,437
New York Central[3]	7,920	7,548		
Norfolk & Western[1] [2]	131,640	148,251	118,745	70,215
Pennsylvania[1] [3]	940,931	1,288,514	853,412	685,546
Pitts. & Lake Erie[1] [2]	498,308	668,392	404,148	278,766
Pitts. Shaw. & North[1] [2]	1,437	3,212		
Western Maryland	7,072[4]	6,643	8,271	3,326
Total 10 roads	2,001,648	2,678,484	1,756,062	1,354,293
Total coal and coke 13 roads	16,421,839	19,314,523	18,157,998	15,620,259

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

[4] Does not include figures for Georges Creek and Cumberland R.R.

Note:—The Southern Railway hauled 296,919 short tons of bituminous coal during December, 1914, and 3,904,503 short tons during the twelve months ending December, 1914.

EXPORTS

Coal exports for January of this year were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	430	......	......
Maryland	......	89,779	668
Massachusetts	50	......	......
New York	3,095	1,543	70
Philadelphia	1,127	40,648	799
Porto Rico	......	290	......
Virginia	......	109,586	124
Mobile	......	424	......
New Orleans	30	427	60
Arizona	......	2,586	......
El Paso	......	33,828	14,151
Alaska	......	1	......
San Francisco	5	......	2
Southern California	......	34	1
Washington	......	2,741	3,582
Buffalo	122,166	210,778	27,665
Dakota	748	5,863	3,208
Duluth & Superior	462	5,263	19
Michigan	100	54,404	4,874
Montana	......	......	1
Ohio	......	38,632	194
Rochester	1,342	7,912	139
St. Lawrence	60,249	28,405	1,786
Vermont	445	1	104
Total	190,299	633,145	57,474

Bunker Coal laden on vessels in the foreign trade was as follows, in gross tons:

Maryland	41,496
New York	250,102
Philadelphia	30,098
Virginia (Norfolk and Newport **News)**	**101,741**

ANTHRACITE SHIPMENTS

Anthracite shipments for March and the first three months of 1914-15 were as follows:

	March		3 Months	
	1915	1914	1915	1914
Phila. & Reading	961,415	936,304	2,415,915	2,698,223
Lehigh Valley	894,031	926,701	2,735,370	2,419,132
Cent. R.R. N.J.	578,322	750,381	1,660,546	2,018,523
Del. Lack. & West	644,932	668,038	1,850,716	1,860,529
Del. & Hudson	617,605	446,135	1,785,877	1,475,406
Pennsylvania	544,023	585,190	1,367,597	1,547,408
Erie	593,250	660,924	1,706.140	1,900,534
Ont. & Western	151,820	191,030	472,879	542,131
Total	4,985,398	5,164,703	1[illegible],995,040	14,461,886

Stocks at Tidewater Mar. 31 were 873,698 tons.

THE CAR SITUATION

Gross surplus of idle coal cars Apr. 1 was 145,069 as compared with 158,293 on Mar. 1. Shortage on the same dates was 33 on Apr. 1 and 14 on Mar. 1.

I. C. C. No. 5591—New England Coal & Coke Co. vs. Norfolk & Western Ry. Co.

Defendants make a charge for dumping coal into boats from their piers in the harbors of Norfolk and Newport News, Va., in addition to the regular transportation rate applying to the port on business destined beyond the Virginia capes; **Held,** That this practice is not unlawful. Complaint dismissed.

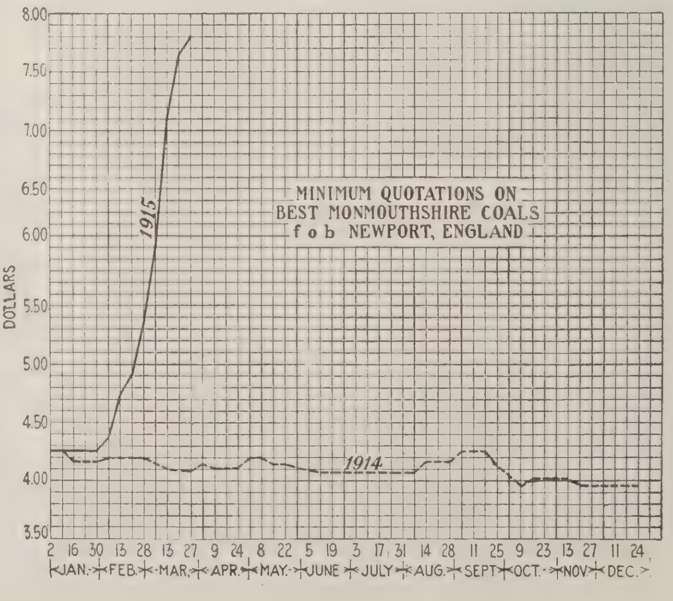
FOREIGN MARKETS

GREAT BRITAIN

Exports—British exports for February and the first two months of the past three years were as follows:

	February			Two Months		
To	1913	1914	1915	1913	1914	1915
Russia	107,742	138,417	....	333,782	377,421	....
Sweden	299,751	220,389	237,303	605,656	506,877	500,239
Norway	224,496	244,198	185,702	439,508	461,880	396,037
Denmark	270,765	202,057	238,343	530,229	448,074	447,127
German	594,211	584,564	....	1,262,617	1,137,997	....
Netherlands	186,459	139,634	137,234	388,881	267,046	268,612
Belgium	196,767	172,828	....	393,987	351,677	....
France	1,004,941	1,320,767	1,260,077	2,155,493	2,556,409	2,644,038
Portugal[1]	138,746	98,217	112,162	281,336	228,995	182,096
Spain[4]	343,732	293,684	223,305	705,205	639,305	382,655
Italy	765,695	865,145	575,144	1,587,082	1,655,750	1,045,029
Aus. Hung.	144,032	81,904	....	281,587	154,746	....
Greece	59,406	80,171	40,456	100,237	126,462	64,044
Roumania	3,049	....	....	3,049	8,334	....
Turkey	9,186	63,075	....	25,958	103,294	....
Algeria	37,045	23,138	31,470	60,872	44,049	40,907
Portuguese[5]	28,863	46,638	4,065	94,867	82,036	9,289
Chile	150,448	162,795	46,404	290,359	281,326	112,888
Brazil	50,568	64,302	35,613	128,919	120,825	85,305
Uruguay	309,334	326,176	190,704	628,743	680,946	369,304
Argentine	10,542	12,759	9,761	23,815	24,790	17,101
Channel Is.	26,551	19,868	40,019	63,345	52,349	70,288
Gibraltar	85,628	44,135	11,353	152,244	79,821	22,669
Malta	242,595	265,097	121,065	557,015	580,279	270,730
Egypt[2]	131,871	85,052	77,427	262,602	216,326	176,654
Aden[3]	16,483	11,481	11,841	27,636	23,560	22,095
India	26,540	19,845	365	31,313	21,682	9,290
Ceylon	13,678	26,206	9,022	38,054	64,745	15,626
Miscell'ous	90,793	113,335	30,655	185,844	223,646	90,430
Coke	98,755	94,595	74,296	205,850	218,851	166,893
Briquettes	154,253	154,136	81,108	350,992	324,081	145,146
Total	5,822,925	5,974,608	3,784,894	12,197,077	12,063,579	7,554,492
Bunker	1,539,410	1,615,132	1,301,083	3,297,089	3,346,144	2,678,164

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.



Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

Recast

This section gives a synopsis of items previously announced that will come up for consideration during the ensuing week, together with the number of the page on which the former notice appeared; also additional or supplemental information, such as bids, etc., on other old contracts.

No. 287—Chambersburg, Penn.—The Chambersburg Electric Light Department will be in the market during the current month for approximately 2000 tons of bituminous "Jerome" coal (p. 487). Address Supt. J. H. Mowrey, Chambersburg Electric Light Dept., Chambersburg, Penn.

+No. 288—Troy, N. Y.—The Board of Public Works will contract during April or May for about 1200 tons of egg and stove coal, to be used by the city schools (p. 487). Address Commissioner of Public Works, Troy, N. Y.

No. 289—Chicopee, Mass.—The Board of Education at this place usually contracts for coal in April (p. 487). Address Committee on Supplies, Chicopee, Mass.

+No. 290—East Orange, N. J.—The Board of Education will be in the market during April or May for about 1800 gross tons of anthracite coal (p. 487). Address Secy. Warren A. Clapp, Board of Education, East Orange, N. J.

No. 335—Terre Haute, Ind.—The Board of Education at this place will be in the market during the current month for approximately 4500 tons of 1¼-in. No. 4 vein soft coal (p. 528). Address Board of Trustees, Terre Haute, Ind.

No. 336—Albany, N. Y.—The Board of Education will contract either in April or May for about 5000 tons of egg, chestnut and stove coal (p. 528). Address Board of Contract & Supply, City Hall, Albany, N. Y.

No. 362—Portland, Ore.—The bids on this contract (p. 566), which provides for furnishing coal for the local schools, have been duly referred to the Supply Committee, and awards are expected to be made on Apr. 19. Address School Clk. R. H. Thomas, Board of Education, Portland, Ore.

+No. 372—Noblesville, Ind.—We have been advised by the Union Sanitary Mfg. Co. that the present contract does not expire until Apr. 1, 1916 (p. 567). Address Pur. Agt. C. H. Ritchie, Union Sanitary Mfg. Co., Noblesville, Ind.

No. 376—Marion, Ind.—The Marion Paper Co. advises that it will not contract as noted in a previous issue (p. 567), but will buy its requirements for the present in the open market. Address Marion Paper Co., Marion, Ind.

+No. 384—Savannah, Ga.—The Savannah Electric Co. advises that this contract (p. 557) is handled through its Boston office. Address Stone & Webster, 147 Milk St., Boston, Mass.

+No. 397—Lorain, Ohio—Bids will be received until noon, Apr. 19, for furnishing coal for the school year 1915-16 to the Board of Education (p. 567). Address Clk. E. Bruell, Board of Education, High School Bldg., Lorain, Ohio.

+No. 432—Minneapolis, Minn.—The Board of Education at this place will be in the market during April or June for about 15,000 tons of bituminous and semibituminous coal (p. 626). Address Business Agt. F. E. Reidhead, Board of Education, 407 City Hall, Minneapolis, Minn.

+433—Reading, Penn.—The Board of Education at this place will be in the market during April or May for approximately 2500 tons of pea, egg and stove coal (p. 626). Address Secy. F. Roland, Jr., Board of School Directors, Reading, Penn.

+No. 435—Gloversville, N. Y.—The Board of Education at this place will purchase about 800 tons of egg coal during May or April (p. 626). Address Supply Committee, Board of Education, Gloversville, N. Y.

+No. 436—West Point, N. Y.—Sealed proposals in triplicate will be received until 2 p.m., Apr. 26, for furnishing anthracite coal required at the U. S. Military Academy during the fiscal year ending June 30, 1916 (p. 626). Address Quartermaster, U. S. Military Academy, West Point, N. Y.

+No. 438—Fort Reno, Okla.—Sealed proposals will be received until noon, Apr. 22, for furnishing coal required during the fiscal year, commencing July 1, 1915 (p. 627). Address Depot Quartermaster, Fort Reno, Okla.

No. 440—Chicago, Ill.—The American Compound Door Co. will be in the market about Apr. 20 for a month's supply of Franklin County, Illinois, No. 2 nut coal (p. 627). Address the Purchasing Agent, American Compound Door Co., Chicago, Ill.

+No. 445—National Soldiers' Home, Tenn.—Sealed proposals will be received until 2 p.m., Apr. 19, for furnishing and delivering 10,500 tons of bituminous coal to the National Soldiers' Home, Mountain Branch, N. H. D. V. S. (p. 627). Address Treas. Oliver K. Marshall, Mountain Branch, N. H. D. V. S. National Soldiers' Home, Tenn.

+No. 453—Fort Keogh, Mont.—Sealed proposals will be received until 11 a.m., Apr. 26, for furnishing 600 tons of lump coal and 150 tons of pile-run coal, at the Fort Keogh Remount Depot, Mont. The storage capacity is 400 tons lump and 150 tons pile-run (p. 627). Address Depot Quartermaster Capt. Sam. Van Leer, Fort Keogh Remount Depot, Mont.

No. 465—St. Louis, Mo.—It is estimated that the tonnage on this contract (p. 627), which covers the requirements for the Board of Education at this place, will run about 10% ahead on the bituminous coal used last year, and slightly less on the anthracite. Address Supply Comr. E. M. Brown, 3431 School St., St. Louis, Mo.

+No. 473—Portland, Ore.—Sealed proposals will be received until Apr. 20, for furnishing the steam and lump coal required for vessels and stations of the 16th and 17th lighthouse districts (p. 628). Address Lighthouse Inspector, Portland, Ore.

+No. 476—Jeffersonville, Ind.—Sealed proposals will be received until 10 a.m., Apr. 21, for furnishing bituminous coal to the Jeffersonville depot during the period ending June 30, 1916 (p. 628). Address Maj. Joseph T. Davidson, Jeffersonville, Ind.

+No. 496—Malden, Mass.—The requirements of the local Board of Education as noted in previous issue (p. 665) are purchased by the Joint Standing Committee on Fuel, which at the same time contracts for all the city requirements. The tonnages required this year are as follows: 2500 tons of hard white ash furnace or egg coal, 250 tons of hard white ash stove or nut coal, 200 tons of bituminous coal. The anthracite coal is to be delivered in the bins of the several buildings as may be designated previous to May 1, 1916, and the bituminous is to be delivered as may be required by the Street and Water Commission. In addition to this, 250 tons of hard white ash stove or nut coal will be required for delivery in various parts of the city in quarter-ton lots as may be designated by the Overseer of the Poor or Soldiers' Relief Committee. All bids must be accompanied by a certified check for $500. Address Clerk of Committees John L. Gilman, City Hall Building, Malden, Mass.

No. 512—Chicago, Ill.—The Barber Asphalt Paving Co. will be in the market about Apr. 25 for one car per day of southern Illinois screenings (p. 666). Address Purchasing Agent, Barber Asphalt Paving Co., Chicago, Ill.

+No. 520—Jeffersonville, Ind.—Sealed proposals will be received until 10 a.m., Apr. 21, for furnishing the Depot of the Quartermaster's Corps with such quantities of bituminous coal as may be required during the year commencing July 1, 1915 (p. 666). Address Depot Quartermaster Maj. Joseph T. Davidson, Jeffersonville, Ind.

+No. 521—Front Royal, Va.—Sealed proposals in triplicate will be received until 2 p.m., Apr. 21, for furnishing about 345 tons of anthracite coal to the Front Royal Remount Depot (p. 666). Address Depot Quartermaster, Front Royal, Va.

+No. 523—Xenia, Ohio—Sealed proposals will be received until noon, Apr. 22, for furnishing about 470 tons of Pocahontas mine-run coal and 150 tons of Hocking lump coal (p. 666). Address Clk. B. Schlesinger, 33 East Main St., Xenia, Ohio.

No. 525—Washington, D. C.—Awards on this contract (p 666) are still being considered pending the results of tests now being conducted by the Navy Department on the coal of the Clinchfield Coal Co., which was the lowest bidder at $2.50. Address Paymaster-General of the Navy Samuel McGowan, Washington, D. C.

+No. 527—San Francisco, Calif.—Bids on this contract (p. 666) will be received until 11 a.m., Apr. 30, instead of Apr. 23, as previously announced. The requirements are as follows:

Posts	Domestic	Steam
Fort Davis, Alaska	785	430
Fort St. Michael, Alaska	1,250	250
Fort Liscum, Alaska	730	250
Fort Wm. H. Seward, Alaska	2,000	...
Fort Lawton, Washington	1,800	...
Fort Casey, Washington	2,000	...
Fort Flagler, Washington	1,750	...
Fort Ward, Washington	800	...
Fort Worden, Washington	2,500	...
Fort George Wright, Washington*	1,000	...
Fort Yellowstone, Wyoming	2,600	...
Fort Missoula, Montana	2,360	...
Fort Columbia, Washington	600	...
Fort Stevens, Oregon†	1,725	‡900
Vancouver Barracks, Washington†	5,000	...
Fort Baker, California	700	...
Fort Barry, California	1,200	...
Fort Mason, California	200	90
Presidio of San Francisco, California	10,000	...
Letterman General Hospital, San Francisco, Calif.	300	...
Fort Winfield Scott, California	1,000	200
Fort Miley, California	1,000	...
Fort McDowell, California	3,300	2,000
Alcatraz Island, California	900	...
Fort Douglas, Utah	1,500	...
Presidio of Monterey, California	3,000	...
Fort Rosecrans, California	360	...
Signal Corps Aviation School, San Diego, Calif.	300	...

*Railroad station at Fort George Wright, and if proposals are made for post delivery, same should be on basis of f.o.b. cars Fort George Wright, Washington.

†Railroad stations at Fort Stevens and Vancouver Barracks, and if proposals are made for post delivery, same shall be on basis of delivery into bins or other places of storage at post.

‡For delivery at Astoria, Ore., aboard harbor boats.

Bidders are required to state a base price for delivery at the mines or at seaboard, the cost of transportation to the various posts and the cost of handling in each case. Payment will be made on the basis of analysis of samples taken as provided for in the specifications. Other conditions being equal, preference will be shown to bidders in this country as against those in foreign countries. Address H. S. Wallace, care Quartermaster Corps, "Chronicle" Bldg., San Francisco, Calif.

New Business

No. 534—Chicago, Ill.—The Booth Fisheries Co will be in the market about May 15 for a contract for one year for five cars per week of No. 2 Illinois or Indiana washed nut. Address Purchasing Agent, Booth Fisheries Co., Chicago, Ill.

No. 535—Louisville, Ky.—The Whiteside Bakery Co. will be in the market in May or early June for one year's supply of gas house coke. They usually consume one car load a week. Delivery by rail on Pennsylvania terminal. Address, W. Raven, Whiteside Baking Co., 14th and Broadway, Louisville, Ky.

+No. 536—Menominee, Mich.—The Marinette Light & Traction Co. of this place will soon be in the market for approximately 4000 tons of gas coal. Prospective bidders may obtain a copy of specifications on request. Address A. R. White, Menominee & Marinette Light & Traction Co., Menominee, Mich.

No. 537—Vicksburg, Mich.—The Vicksburg Governor Co. at this place will contract shortly for 750 tons of Hocking mine-run coal. Address Secy.-Mgr. F. X. Cullinan, Vicksburg Governor Co., Vicksburg, Mich.

No. 538—Kalamazoo, Mich.—The Kalamazoo Stove Co. at this place will soon be in the market for its annual requirements of coal, which will be approximately 3000 tons. Address Secy. to Gen. Mgr. Morgan E. Persnig, Kalamazoo Stove Co., Kalamazoo, Mich.

+No. 539—North Madison, Ind.—Bids are requested for furnishing the Southeastern Hospital for the Insane, situated near this place, with approximately 15,000 tons of the best quality Pittsburgh nut and slack coal mixed, or its equivalent, deliveries to be as required at the Power House, which is situated on the P. C. C. & St. L. switch from North Madison. Bids will also be received for the same grade of coal as may be required at the Water-Works Pumping Station near West Madison, delivery by wagon. Address Medical Supt. E. P. Busse, Southeastern Hospital, North Madison, Ind.

+No. 540—Knoxville, Tenn.—Bids will be received on or before Apr. 24 for furnishing the Southern Ry. Co. with a large quantity of Alabama mine-run coal. The following information is to accompany each bid: Price, f.o.b. mine; freight rate to Southern Ry. point; name and location of mine; average daily output; method of mining coal; name of seam worked; whether company is incorporated; name of operator; analysis of coal. Shipments are to be made in equal monthly installments beginning July 1, 1915, and ending June 30, 1916. Address Fuel Agt. E. G. Goodwin, Southern Ry. Co., Knoxville, Tenn.

+No. 541—Toronto, Can.—The Public Works Department of the Provincial Government of Ontario requests bids for coal as follows: Parliament Buildings, 2300 tons of pea coal; 100 tons of small egg coal. Ottawa Normal School, 405 tons of small egg coal; 15 tons of soft coal. North Bay Normal School, 75 tons of small egg coal. Osgood Hall, Toronto, 1100 tons of anthracite; 5000 tons of slack. Normal School, Toronto, 450 tons of hard egg coal; 30 tons of soft coal. Government House, Toronto, 175 tons of stove and nut; 20 tons cannel coal. London Normal School, 140 tons of small coal. Peterboro Normal School, 175 tons small coal. Stratford Normal School, 125 tons of small coal. Brantford School for the Blind, 90 tons anthracite; 80 tons soft coal. Belleville School for the Deaf, 130 tons hard and 1600 slack coal. Address Department of Public Works, Toronto, Can.

+No. 542—Chicago, Ill.—The Buda Foundry Co. will purchase from time to time on the open market, about three cars per week, Illinois or Indiana lump, commencing about May 15. They will also purchase about six cars per annum of Youghiougheny ¾-in. screenings and three cars of good blacksmithing coal; they will be in the market about June 1 for this latter supply. Address, Purchasing Agent, Buda Foundry Co., Chicago, Ill.

No. 543—Toronto, Can.—The Board of Education will contract next month for 7500 tons of soft coal and 7500 tons of hard coal, including egg, nut and stove. A large percentage of this is to be delivered at various city schools after July 1. Address, Wm. Kerr, Clerk of Supplies, Board of Education, Toronto, Can.

No. 544—Louisville, Ky.—The new Galt House Co. uses between 10 and 12 tons of coal, nut and slack, daily, but makes its purchases in the open market. Address Pres. Jacob Greenberg, New Galt House, Louisville, Ky.

No. 545—Louisville, Ky.—Ballard & Ballard, miller, is preparing to let its annual contract, effective July 1, for approximately 15,000 tons of nut and slack and pea and slack coal. The contract is let in accordance with the company's test system. Address Chf. Engr. Charles W. Clayford, Ballard & Ballard, Louisville, Ky.

No. 546—St. Joseph County, Ind.—The Board of Commissioners will receive sealed proposals for 600 tons of Pocahontas or New River smokeless coal, mine-run, 60% to be lump coal, to be delivered at the county jail. Dealers must submit analysis and the name of the mine in the bid. Also 500 tons of 6-in. lump steam coal, to be delivered on board cars at Muessel's switch for county asylum during the months of July, August and September, at the rate of two cars per week; one car of chestnut anthracite coal will also be required at this place. All proposals must be on forms furnished by the County Auditor and must be in on or before Apr. 26, together with the proper bond. Address Auditor Clarence Sedgwick, South Bend, Ind.

No. 547—Louisville, Ky.—The Louisville Milling Co. (local branch of the Washburn, Crosby Co.) has completed tests of several grades of steam coal and is preparing to let a contract for its annual supply of 8000 tons. It uses nut and slack principally. Address Auditor Leonard C. Lang, 222 West Burnett St., Louisville, Ky.

+No. 548—Washington, D. C.—Proposals will be received until 2 p.m., May 3, for furnishing the Government of the District of Columbia with coal as follows: Bituminous: 2000 tons of mine-run for delivery at Blue Plains, D. C.; 700 tons for delivery at the Industrial Home School and the Tuberculosis Hospital; 15,000 tons for delivery at any point in the District of Columbia; 125 tons of semibituminous (splint) for use in the Fire Department steamers; 6000 tons of mine-run for use at the District Pumping Station; 6000 tons for the District Pumping Station to be called for when required; 2500 tons for delivery at District Buildings; 4800 tons for delivery at the Sewage Pumping Station; 6000 tons, 1000 tons and 4000 tons for delivery at the Workhouse. Anthracite: For delivery at any point in the District of Columbia, 450 tons of Lykens Valley stove; 650 tons of red ash stove; 100 tons of white ash chestnut; 5000 tons of white ash egg; 1000 tons of white ash furnace; 1400 tons of white ash stove. Anthracite for delivery at the Industrial Home School and the Tuberculosis Hospital, 550 tons of white ash furnace; 40 tons of white ash stove; 40 tons of white ash chestnut. For deliveries in car lots at Institutions at Blue Plains, D. C., 75 tons of white ash stove; 50 tons of white ash chestnut. Forty tons of Connellsville coke will also be required to use at the District Pumping Station. Deliveries are to be made during the fiscal year beginning July 1, 1915. Prospective bidders should apply for specifications and proposal form. Address Purchasing Officer, D. C., Room 320, District Building, Washington, D. C.

+No. 549—St. James, Mo.—Sealed bids will be received at the Federal Soldiers' Home up to 12 o'clock noon on May 1, for 40 carloads of coal to be delivered during the next year. Address Supt. J. P. Brinegar, Federal Soldiers' Home, St. James, Mo.

+No. 550—Norfolk, Va.—Sealed proposals will be received at the United States engineer office until May 7, 1915, for furnishing about 3000 tons of bituminous coal. Address Lieutenant-Colonel of Engineers Pervey, United States Engineer Office, Norfolk, Va.

No. 551—La Porte, Ind.—The Great Western Manufacturing Co., manufacturer of crank hangers and cycles, will be in the market for a contract covering steam coal for next season, and will test out various coals to see which is most economically suited for their purpose. Address Pres. E. J. Lonn, Great Western Manufacturing Co., La Porte, Ind.

No. 552—Rochelle, Ill.—The Geo. D. Whitcomb Co., manufacturer of mining machinery, is in the market for its steam coal requirements for next season. The company prefers Southern Illinois coals. Address Gen. Mgr. W. C. Whitcomb, Geo. D. Whitcomb Co., Rochelle, Ill.

No. 553—Toronto, Can.—The Manitoba Division of the Canadian Pacific Railway, which formerly obtained its coal supply from the East, will in future use coal from the mines in the Crow's Nest Pass district and will require at least 1000 tons per day.

+No. 554—Governors Island, N. Y.—The Department Quartermaster, Eastern Department, U. S. Army, received bids until Apr. 14, to supply the fuel requirements at the 69 army posts of the department for the fiscal year beginning July 1. The requirements include anthracite, nut, stove, egg, furnace, and pea coal, and mine-run bituminous in various tonnages, running up to as high as 4048 tons. Payment will be made on an analysis basis. Complete details, together with blank forms and specifications may be had on application. Address Department Quartermaster, Eastern Department, Governors Island, New York.

+No. 555—Bridgeport, Conn.—The Board of Education at this place will be in the market for approximately 3500 tons of the best quality Lehigh anthracite some time during May. This business is let on a yearly contract, the figure last year being $5.75. Address Board of Contract and Supply, Dept. of Education, City Hall, Bridgeport, Conn.

+No. 556—Grand Rapids, Mich.—The local School Board will be in the market some time during May for its annual supply of coal. The call for bids is advertised, and the sale negotiated on a specification basis. Kanawha slack coal is used in the stokers and Pocahontas or New River mine-run for hand firing. Last year's contract provided for 3700 tons of Kanawha at $3.13 per ton, and 3750 tons of Pocahontas at $3.82 per ton. Address the Board of Education, Grand Rapids, Mich.

+No. 557—Brockton, Mass.—The Highway Commission at this place will contract some time during May for the annual supply of coal for the local school. Both anthracite and bituminous are required, the gross tonnage aggregating about 3000 tons last year. Address Highway Commission, City Hall, Brockton, Mass.

+No. 558—Hamilton, Ohio—The local Board of Education will contract about the middle of May or the first of June for its annual supply of coal. Last year about 1400 tons of smokeless mine-run was bought. The call for bids is advertised, and the business goes to the lowest and most desirable bidder. Address Clk. Charles F. Holdefer, Board of Education, 209 S. Second St., Hamilton, Ohio.

+No. 559—Bremen, Ind.—The local Light and Water Department at this place will be in the market about May 15 for its annual requirements of coal. Last year about 2000 tons of Youghiogheny was purchased at $3.15 delivered in bins. The business is done on a competitive basis. Address Light and Water Plant, Bremen, Ind.

+No. 560—Auburn, N. Y.—The local School Board will contract some time during May for their annual supply of coal involving about 900 tons of anthracite egg. This business was closed at $6.10 last year. Address Supply Committee, Board of Education, 144 Genesee St., Auburn, N. Y.

+No. 561—Racine, Wis.—The local School Board will contract some time during next month for their annual requirements of coal involving about 2000 tons of Pocahontas mine-run. Last year this business was closed at $4.40, $4.45, and $4.50 per ton. The contract is let to local dealers and the price is more or less dependent upon the haul. The call for bids is advertised. Address Board of Education, Racine, Wis.

+No. 562—Clarksdale, Miss.—The city government will contract some time next month for their annual requirements of coal, amounting to approximately 5500 tons, this business being closed at $2.64 per ton last year. The contract is let on a competitive basis, and mine-run coal is required. Address W. S. Bobo, City of Clarksdale, Miss.

No. 563—Lanett, Ala.—The Lanett Cotton Mills at this place will contract some time during the summer for their annual requirements of fuel, involving about 10,000 tons of nut coal. On last year's business "Empire" coal was used, the price being about $2.50 per ton. Address Supt. George S. Harris, Lanett Cotton Mills, Lanett, Ala.

+No. 564—New Orleans, La.—Sealed proposals will be received for furnishing the United States Plant at South Pass, La., for its annual requirement of coal, until 11 a.m., May 3. About 13,500 tons will be required at the government coal yard at Port Eads, or Burwood, La., delivery in lots of 1000 tons, and about 800 tons will be required for delivery on barges or boats at Port Eads or Burwood or for other ports as may be designated. Address Major Edward H. Schulz, Corps of Engineers, United States Engineer Office, Room 325, Custom House, New Orleans, La.

+No. 565—Whitehall, Mich.—The Whitehall Municipal Electric Light and Water Works Plant at this place will contract about May 15 for their annual requirements of coal involving approximately 1000 tons of three-quarter lump. Address Supt. E. Nelander, Whitehall Municipal Electric Light and Water Works Plant, Whitehall, Mich.

+No. 566—Boston, Mass.—The Board of Education will receive bids until noon, Apr. 20, for furnishing the fuel requirements at the public schools for the period from June 15 of the current year to Jan. 31, 1916, with the provision that deliveries shall be continued until June 15, 1916, in the event that an appropriation is made therefor and the School Committee so orders. Prices quoted are to include delivery in the bins as designated. About 60% of the tonnage may be put in during July and August of the current year. The approximate tonnages are as follows: City proper: Anthracite furnace, 1900 tons; egg, 470 tons; bituminous, 4900 tons. South Boston, anthracite furnace, 750 tons; egg, 200 tons; bituminous, 2300 tons. East Boston, anthracite furnace, 380 tons; egg, 250 tons; bituminous, 2100 tons. Roxbury, anthracite furnace, 1400 tons; egg, 220 tons; bituminous, 5200 tons. Dorchester, anthracite furnace, 1200 tons; egg, 500 tons; bituminous, 4600 tons. Charlestown, anthracite furnace, 250 tons; egg, 50 tons; bituminous, 1600 tons. Brighton, anthracite furnace, 700 tons; egg, 100 tons; bituminous, 800 tons. West Roxbury, anthracite furnace, 650 tons; egg, 300 tons; bituminous, 1200 tons. Hyde Park, anthracite furnace, 50 tons; egg, 230 tons; bituminous, 500 tons. The gross requirements are: Anthracite furnace, 7280 tons; egg, 2320 tons; bituminous, 23,200 tons. Prospective bidders must furnish a certified check for $50 for each district on which a bid is submitted and the successful bidder must furnish a satisfactory bond for 20% of the estimated amount of the contract awarded. Address Business Agt. William T. Keough, Room 801, City Hall Annex, Boston, Mass.

+No. 567—Brookline, Mass.—Sealed proposals will be received by the local city government until 3:50 p.m., Apr. 26, for furnishing approximately 2963 tons of anthracite coal and 2000 tons of bituminous. Specifications in detail can be had on application. Address Secy. of Board Edward A. McEttrick, Town Hall, Brookline, Mass.

+No. 568—Albany, N. Y.—Bids are requested by the State Government for coal to supply the public buildings, deliveries to be made during the fiscal year beginning May 1, 1915. The approximate tonnages required are as follows: 10,000 tons of No. 1 buckwheat, 2500 tons of bituminous slack coal, 600 tons of anthracite grate, 50 tons of anthracite stove or chestnut. The No. 1 buckwheat and bituminous coal is to be delivered at the coal bunkers of the Capitol Power House, and the other sizes are to be delivered as required at the Executive Mansion, State Hall and Geological Hall. Address Superintendent of Public Buildings, Capitol, Albany, N. Y.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

+No. 199—Albany, N. Y.—The awards on this contract (p. 400), which provides for furnishing and delivering coal to the various State Hospitals, were as follows: **Empire Coal Mining Co.**—Broken, (W.) $2.39; (Bu.) $2.44; (Mo.) $2.79. Chestnut, (W.) $2.55; (Mi.) $2.53; (Bu.) $2.59. Stove, (W.) $2.44; (Mi.) $2.42; (Bu.) $2.48; (Mo.) $2.83; (K. P.) $2.70. Pea, (K. P.) $1.96. **J. F. Schmadeke**—Broken, (Mo.) $2.60; (L. I.) $2.50. Buckwheat, (L. I.) $1.20. **J. W. Peale**—Broken, (St. L.) $2.60. Buckwheat, (H. R.) $1.455; (Ma.) $1.14; (Ci.) $1.16; (Bi) 96c. **A. Larner**—Broken, (Mo.) $2.74. Pea, (Go.) $1.94. **Dodson & Co.**—Broken (H. R.) $2.45; (St. L.) $2.79. **Nealen Co.**

—Chestnut (H. R.) $2.59; (Mi.) $2.44; (Mo.) $2.77; (Ci.) $2.81. **James T. Holahan**—Chestnut (St. L.) $2.87. Screened nut (Ro.) $1.45. Stove (R.) $2.72. **Weston & Dodson**—Chestnut (H. R.) $2.63; (St. L.) $2.81. **H. E. Meeker**—Stove (H. R.) $2.52. Buckwheat (H. R.) $1.38. **Bowns Co.**—Stove, (Ma.) $2.397. **Neale Co.**—Stove, (H. R.)$2.48; (Mi.) $2.32; (Bi.) $2.35; (Ma) $2.66; (Ci.) $2.70; (Mi.) $1.65; (Mi) $1.31. **Bacon Coal Co.**—Stove, (L. I.) $2.95. **Wm. Farrell & Son**—Pea, (Ma.) $1.60. **H. H. Linneweaver**—Buckwheat, (K. P.) $1.15; (Ci.) $1.17. G. **D. Harris**—(Ci.) $1.5375; (K. P.) $1.5175. **C. D. Norton**—Mine-Run, (W.) $1.245. **Dexter & Carpenter**—(St. L.) $1.48. **C. D. Norton**—(K. P.) $1.53. **Geo. Hall**—Slack, (St. L.) anthracite $1.385; bituminous $1.435. **Geo. D. Harris**—(L. I.) $1.71. **Morris Run Coal Mining Co.**—(Bi.) $1.24. **Emmons Coal Co.**—(Bi.) $1.24.

The abbreviations used designate the following places of delivery: Utica State Hospital, (U.); Willard State Hospital, (W.); Hudson River State Hospital, (H. R.); Middletown State Homeopathic Hospital, (Mi.); Buffalo State Hospital, (Bu.); Binghamton State Hospital, (Bi.); St. Lawrence State Hospital, (St. L.); Rochester State Hospital, (Ro.); Gowanda State Homeopathic Hospital, (Go.); Mohansic State Hospital, (Mo.); Kings Park State Hospital, (K. P.); Long Island State Hospital, (L. I.); Manhattan State Hospital, (Ma.); Central Islip State Hospital, (Ci.). Address Purchasing Committee for New York State Hospitals, Room 138, Capitol, Albany, N. Y.

+No. 306—Algoma, Wis.—This contract (p. 488), which provides for furnishing the local City Water and Light Plant with approximately 900 tons of coal for delivery over the next year, has been awarded to the **Hilton Fuel & Transportation Co.**, at $3.55 per ton, as compared with $3.70 last year. Address Supt. J. O. Posson, City Water & Light Plant, Algoma, Wis.

+No. 347—Burlington, Ia.—The award on this contract (pp. 528 and 566), which provides for furnishing the local municipality with coal for the fiscal year ending Mar. 31, 1916, was made to the **Cave Coal Co.** at the following prices: Lump, $2.70 and $2.90; mine-run, $2.30; Fulton County, 1¼-in. screenings, $1.75; Franklin County, 2-in. screenings, $2.25. Address City Clk. Robt. Kroppach, Burlington, Ia.

+No. 383—New York, N. Y.—Awards on this contract (pp. 567, 664), which provides for furnishing and delivering coal to the Bellevue and allied hospitals, Departments of Correction, Public Charity, Bronx and Queens Parks, were as follows: **Bacon Coal Co.**, (18) egg, 260 tons at $6.05; (21) 245 tons at $6.15; (24) stove, 20 tons at $6.59; (19) 40 tons at $6.05; (22) 20 tons at $6.15; (20) 250 tons of pea at $4.44; (23) 95 tons of egg at $6.59. **Philip Ditez Coal Co.**, (28) 106 tons of egg at $5.90. **Pattison & Bowns**, (31) 1400 lb. of egg at $5.27; (32) 600 lb. of stove at $5.27. **George D. Harris & Co.**, (34) bituminous mine-run at $2.77; (35) 200 tons of gas coal at $3.40. **Meeker & Co.**, (33) 7800 tons of buckwheat at $2.68. **M. L. Bird**, (9) 330 tons of pea at $4.73; (10) 700 tons of buckwheat at $3.73. **John E. Donovan**, (11) 438 tons of egg at $5.98; (12) 50 tons of anthracite at $5.98. **William Brennan**, (4) 786 tons of egg at $5.95; (5) 8 tons of stove at $5.95. **Burns Bros.**, (7) 1112 tons of egg at $6.09; (8) 30 tons of stove at $6.68; (14) 499 tons of egg at $6.09; (15) 320 tons of stove at $6.34; (17) 407 tons of egg at $6.09. **Meyer Denker Sinram**, (3) 1000 tons of pea at $4.25. **John F. Schmadeke**, (16) 2650 tons of pea at $4.57. **John W. Peale**, (6) 1000 lb. of buckwheat at $3. **Jamieson & Bond Co.**, (27) 18 tons of egg coal at $6.90. **Burns Bros.**, (26) 190 tons of egg coal at $6.09. **A. M. Ryon**, (29) 65 tons of egg coal at $6.90. **J. E. Backus Sons**, (30) 218 tons of egg at $6.84. **John W. Peale**, (25) 250 tons of pea at $4.75. **Jurgen-Rathjen Co.**, (30) 218 tons of egg at $6.77. Address Contract Clerk, Room 1226, Municipal Bldg., New York.

+No. 410—Lebanon, Penn.—This contract (p. 568), which provides for furnishing the local light company with coal during the next year has been awarded to **C. G. De Huff**, the lowest bidder, on the following basis per gross ton: Egg, $5.42; stove, $5.72; nut, $5.87; pea, $4.37. Address Sec. John H. Seltzer, Lebanon School Board, Lebanon, Penn.

+No. 455—Clinton, Mass.—This contract (p. 627), which provides for furnishing the local school department with coal, has been awarded to **Connery Bros.** on the following basis: 457 tons of Pardee Bros. Lattimer Lehigh egg coal, $7.65, and 70 tons of Pardee Bros. Lattimer Lehigh broken coal at $7.45. Address Secy. of School Comm., F. E. Clerk, Clinton, Mass.

No. 528—Boston, Mass.—We are informed on good authority that this contract (p. 666), which provides for the requirements of the Boston Elevated Ry. Co., has been closed with the **New England Coal & Coke Co.** It is said that New River coal has been contracted for, and prices involved are not available. The contract provides for 275,000 tons per annum. Address Pur. Agt. Edward Mahler, Bureau of Purchase, Boston Elevated Ry. Co., 101 Milk St., Boston, Mass.

Contract Notes

Argentina—Due to the coal shortage in Argentina, there has been a decided advance in price. The local price at Buenos Aires is now $15.57. The freight rate from Cardiff, Wales, is $8.76.

Europe—An American consular officer in Europe cables that there is need in that country for 1,000,000 tons of American coal.

New York, N. Y.—Effective Apr. 1, the output of the Sterrick Creek Colliery of the Temple Iron Co. will be marketed through the Thorne Neal Co. Heretofore the product from this mine has always been handled by Williams & Peters.

Buffalo, N. Y.—The lowest bidders for furnishing the Buffalo Hospital with slack coal for the period from April to October were the Frick Coal & Coke Co. and the C. L. Amos Coal Co. at $1.90.

Baltimore, Md.—The Keystone Coal & Coke Co., Baltimore, Md., has closed contracts for furnishing 40,000 tons of bituminous coal to be delivered at Mediterranean ports, beginning May 1. To fulfill this contract, the company will use two steamships a month, carrying 5000 tons each.

Louisville, Ky.—R. E. Wathen, 104 West Main St., will act as the purchasing agent for various distilleries and breweries throughout Kentucky. He will contract for approximately 600,000 tons of slack, nut and lump coal, the contracts to be closed about July 1. Specifications stating grade of coal required, place and conditions of delivery may be secured at any time.

Foreign—A communication has been received by the Bureau of Foreign and Domestic Commerce from a business man in Europe who wishes to secure the names and addresses of exporters of coal and coke.

St. Louis—On the 1st of April contracts expired in St. Louis for approximately 647 cars per month of steam coal for St. Louis proper. This was divided into 418 cars of 2-in. screenings, 74 cars of No. 4 nut and 155 cars of lump and egg. For the past year, three-fourths of all the steam users in St. Louis have been buying in the open market. For the coming season it is expected that about one-fourth will continue buying in the open market, the remainder signing up on contract.

New York—The Lehigh & Wilkes-Barre Co. has been awarded a large contract for broken coal by the Standard Oil Co. Delivery is to be made at Constable Hook and Bay Ridge.

Fall River, Mass.—The American Printing Co. recently awarded a contract to the Chesapeake & Ohio Coal Agency for furnishing about 75,000 tons of New River coal.

The Central New England Ry. Co., a subsidiary of the N. Y., N. H. & H. R.R. Co., has awarded a contract for 150,000 tons of locomotive coal to the New England Coal & Coke Co. The West Virginia gas coal of the Federal Coal & Coke Co. will be used.

The Reading Circular—Taking effect Apr. 1, the prices of this company's coals, delivered on board vessels at Port Richmond, Philadelphia, for shipments beyond the capes of the Delaware, and New York shipping port, are as follows:

Grade	Philadelphia (Port Richmond)				New York			
	Broken	Egg	Stove	Chest.	Broken	Egg	Stove	Chest.
Free white ash	$4.75	$5.00	$5.00	$5.25	$5.00	$5.25	$5.25	$5.50
Hard white ash	4.85	5.00	5.00	5.25	5.10	5.25	5.25	5.50
Shamokin	.....	5.25	5.25	5.25	.....	5.50	5.50	5.50
Schuylkill red ash	.....	5.50	5.50	5.50	.....	5.75	5.75	5.75
Lorberry	.....	5.50	5.50	5.50	.....	5.75	5.75	5.75
Lykens valley	5.75	6.00	6.00	6.00	6.00	6.25	6.25	6.25

Prices f.o.b. mines are:

Sizes	Mahanoy and Shenandoah	Locust Mountain and Schuylkill White Ash	Shamokin	Lorberry and Schuylkill Red Ash	Lykens Valley Red Ash
Lump	$3.50	$3.50	.....	.....	.....
Steamboat	3.50	3.50	.....	.....	.....
Broken	3.50	3.50	.....	$3.75	$4.10
Egg	3.75	3.75	$3.75	4.00	4.35
Stove	4.00	4.00	4.00	4.25	4.60
Chestnut	4.15	4.15	4.15	4.25	4.60
Pea	2.50	2.50	2.50	2.60	2.75
Buckwheat	1.50	1.50	1.50	1.60	2 35

Orders that are accepted will be subject to ability to ship during the month of April, and all unfilled orders will be canceled at the end of the month. The railway company's manifest weight to govern in all cases.

The company reserves the right to change prices at any time without notice, and orders sent in will not bind the company until accepted.

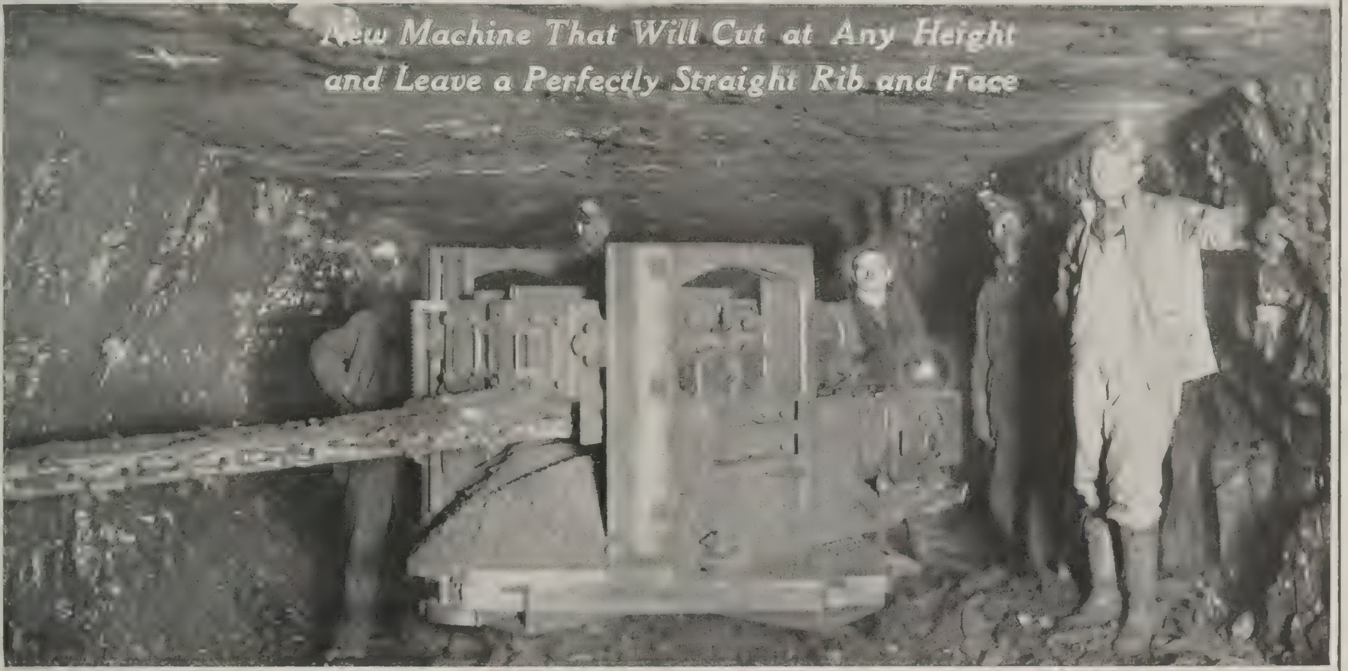
A reduction of 50c. per ton from the above prices will be made on broken, egg, stove and chestnut, shipped during the month of April, 1915.

COAL AGE

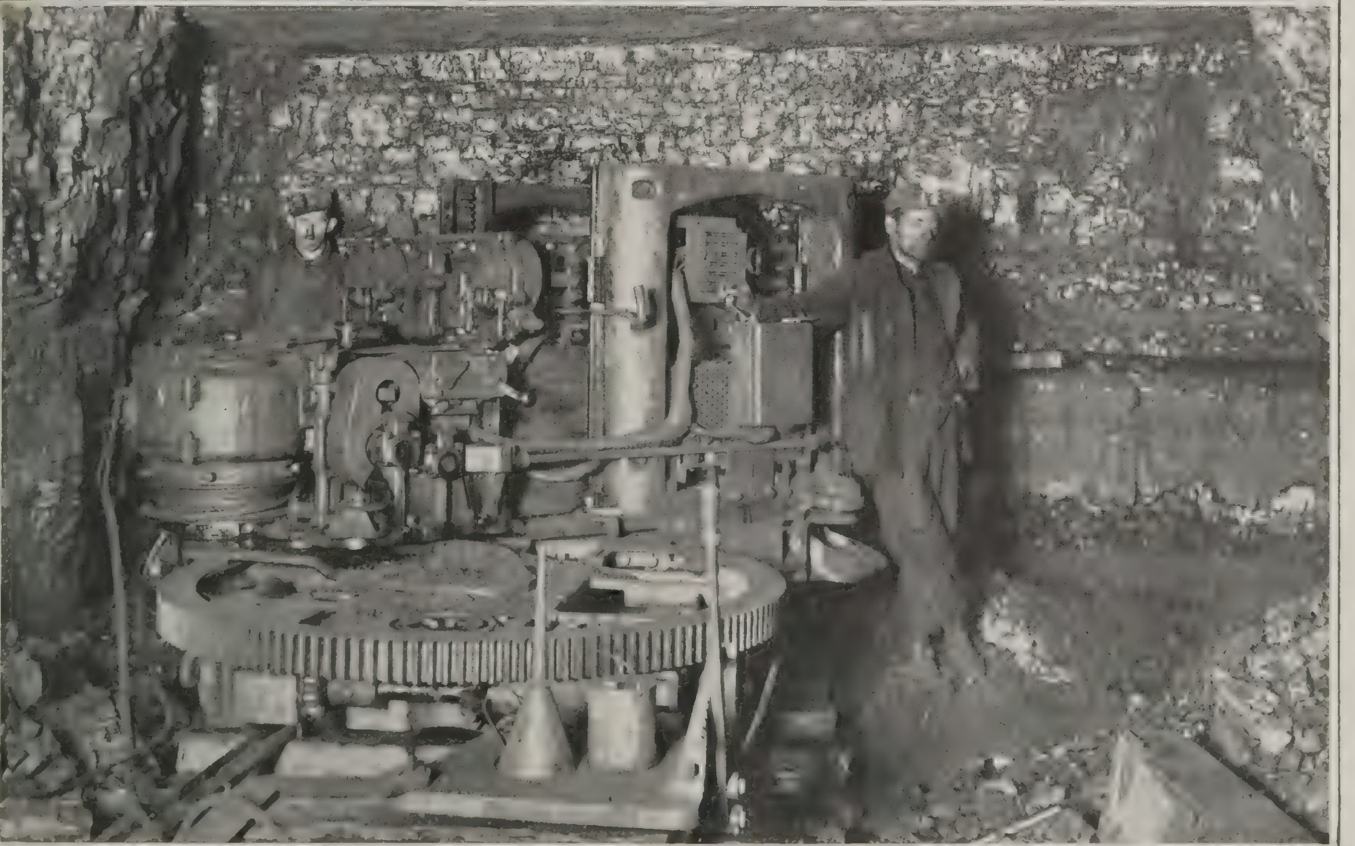
Volume 7, No. 17
Issued Every Saturday
Hill Publishing Company

NEW YORK, APRIL 24, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page



New Machine That Will Cut at Any Height and Leave a Perfectly Straight Rib and Face



RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

MR. W. L. SAUNDERS, head of the Ingersoll-Rand Company, in an address before the Technical Publicity Association of New York, told of an incident which is worth our attention on this page.

Some time ago the Ingersoll-Rand Company designed and started to introduce a new valve on their air compressors. Previously this valve had always been on the outside and quite easily accessible. The new type was placed in the piston and was hard to get at quickly.

Naturally it had other features which the company considered sufficiently valuable to warrant its adoption on their machines.

But almost immediately the salesmen began to report that prospective buyers were shying at the inaccessibility feature, and competing concerns were helping this feeling along by calling attention to the location of the new valve, in the piston.

"Supposing there's a break and repairs are necessary, what then?" they asked—and the best salesmen on the Ingersoll-Rand staff couldn't sell those compressors with the new valve.

What was to be done? Here was an improvement that people refused to accept simply because they were afraid of it. Obviously confidence must be aroused and aroused quickly.

So Mr. Saunders hit upon the plan of buying full pages in all the leading technical papers and in those page advertisements he said, simply, "The —— valves on our compressors are guaranteed against breakage for five years, Ingersoll-Rand Company."

That was enough. In a week the engineering profession, in all its branches, all over the world, knew that those valves were all right. The Ingersoll-Rand people staked their reputation on them, by backing them with a five-year guarantee in black and white.

And after that more compressors containing the valves in question were sold than had ever been sold of any other type before.

Now the point is, advertising saved the day for Ingersoll-Rand *because* it offered *complete protection* to the readers. They knew, the moment they saw those five-year guarantee ads, that they would be safe in buying.

Just as you know that you will be safe in buying any of the products advertised in your technical paper today.

And this is one of the greatest values of modern advertising—it has put out of usage that old-time phrase, "buying a pig in a poke."

COAL AGE

Vol. 7 NEW YORK, APRIL 24, 1915 No. 17

Let The Other Fellow Help

MR. MINE BOSS: You don't know it all. If you were to be sick for a month, the mine would not stop. If you were to die, the mine would keep on running. You have heavy responsibilities, but there is no need to carry them with a grimace.

The plant must be kept going, but there is no need for you to do it all yourself. You have subordinates who are able and willing to help as soon as you lose your frown.

When you lay off that north switch you can get some valuable pointers from your boss-tracklayer. He helped locate switches when you were in school.

When you put those new men on the tipple, ask the weighboss a question or two. He knows something about the disposal of the tipple force; his work has been on the tipple and nowhere else since the time he began to work at the mines.

When you have the repairs made on that motor-road trestle, do not say, "Do it thus," but say instead, "It can be done in this manner. Can anyone suggest a better plan?" And that new carpenter you put on last week will step forward with some helpful suggestions. He understands that class of work, for he spent two years in a railway bridge-gang.

That little trapperboy in the eighth east visited a neighboring mine one idle day last month, and if it were not for your stern expression he would like to tell you of a trap-door he saw there.

Learn that the collective experience of men is more valuable than the individual experience of a man.

Keep an open mind and a civil tongue.

Observe—ask questions.

Listen to Advice

ENCOURAGE *your men to make suggestions. You will thereby increase their interest and loyalty, the result of which will be higher efficiency all around.*

Longwall Mining in Alberta

By E. L. Leblanc*

SYNOPSIS—A successful longwall lignite mine which is worked only during the winter months, but is apparently in fit condition for operation after the long summer idleness.

Longwall advancing is being operated successfully in the lignite coal field of southeastern Alberta. The operation is known as the Block coal mine and is located about 3½ mi. north of Taber. The lignite is covered by 150 ft. of measures, the cross-section of the bed and its overlying strata being as follows:

CROSS-SECTION OF BED AND COVER

Strata	Thickness
Mixed clay and shale	
Sandstone	20 to 40 ft.
Soft shale	3 to 15 ft.
Bone	4 to 7 in.
Clod	8 to 18 in.
Lignite	3¼ to 4 ft.
Soft fireclay	

APPROXIMATE ANALYSIS OF THE COAL

Constituent	%
Fixed carbon	50
Volatile matter and moisture	44
Ash	6

The face cleats run N 62° E, and the butts at right angles (N 28° W). The seam dips N 22° E, 7 in. in every 100 ft. and outcrops along the banks of the Lethbridge River.

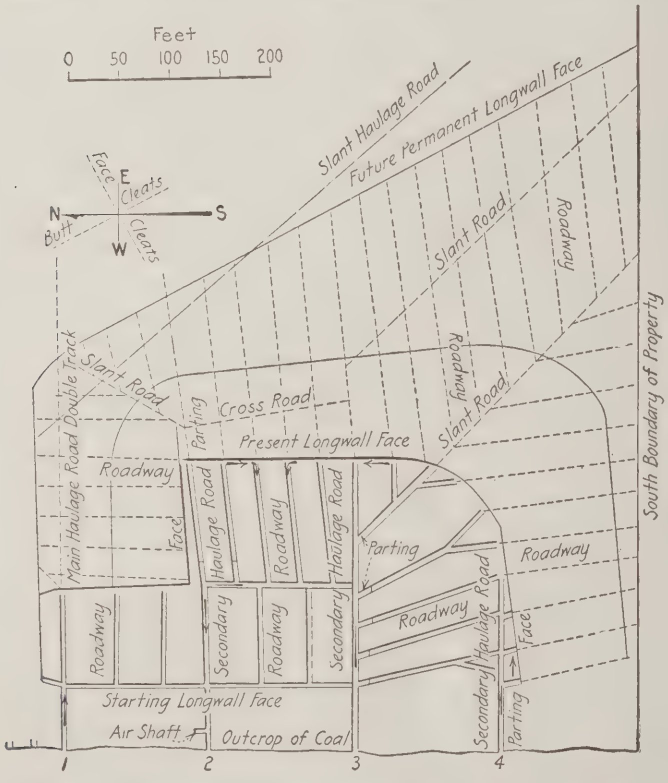


Fig. 1. General Plan of the Block Coal Mine, Taber, Alta.

The mine was opened in July, 1913, by four parallel single entries driven due east on 140-ft. centers. Three of these entries were connected as soon as marketable coal was reached, and longwall advancing was started with a 280-ft. face. Roadways were turned off the crossroads at 46-ft. centers.

Giving the Longwall a Rest of about Five Months

Mining was discontinued in March, 1914. The coal was well spragged under the last undercut, and a few cribs were built along the face. As a result when the mine was started up in September, 1914, the only trouble experienced was from the increased percentage of slack in the coal of this one cut which had been holed five months previously. But the next undercut was made under fresh roof, and here the percentage of lump was normal. Instead of the roadways being driven with 46-ft. centers, thereafter they were started every 30 ft. As this demanded less handling of the coal at the face, the percentage of lump increased.

Coal Works Best if Longwall Follows the Butts

As seen in Fig. 1, the cross and slant roads are turned off usually every 150 ft., with 175 ft. as a maximum. At present the longwall face is nearly 600 ft. long, 250 ft. of which is parallel to the butts and 320 ft. more or less in the direction of the face cleat. In the near future the entire longwall face will be made to follow the line of the butts. Experience has proved that if the longwall face is made in this direction the largest lumps of coal will be produced.

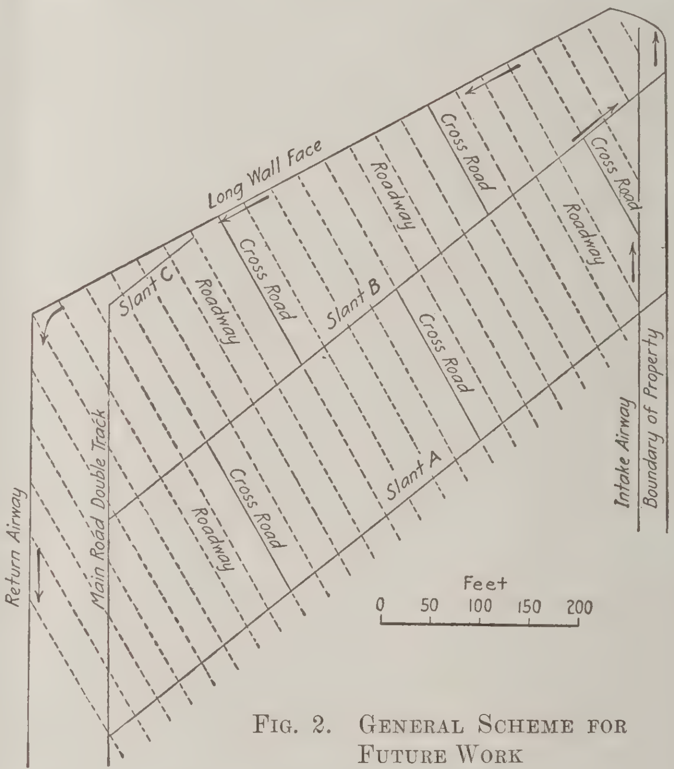


Fig. 2. General Scheme for Future Work

The mine was opened up to have the longwall face at an angle to the butts, because the roof was bad and conditions unfavorable; a few mines had tried this system but failed. So to make longwall a success, it had to be worked carefully and the system modified. Results have proved it successful with these changes. As shown in Fig. 2, when slant *C* will reach the boundary, slant *A* will already be cut off. As the coal will always come from only two slant roads an endless-rope haulage may be used in the main road as soon as distance renders the change advisable.

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*Taber, Alta., Can.

In future slant roads will be turned off the main haulage at 175-ft. centers. Secondary-haulage roads, or crossroads, will be turned off the slant roads at 240-ft. centers, and ordinary roadways will be spaced 30 ft. apart, center measurement (see Fig. 2).

UNDERCUTTING IS DONE IN CLAY OR IN BOTH CLAY AND COAL

In mining the coal, it is first undercut by electrically operated Pick-Quick bar coal-cutter longwall machines. On the average a cut 4½ ft. deep and 350 ft. long is made per day, the holing being done in the clay bottom. Where, however, the bottom clay is wet, the holing is made partly in the coal. A 6-in. kerf is cut, and four men are required to operate the machine—a machine runner, a barman, a scraper and a timberman.

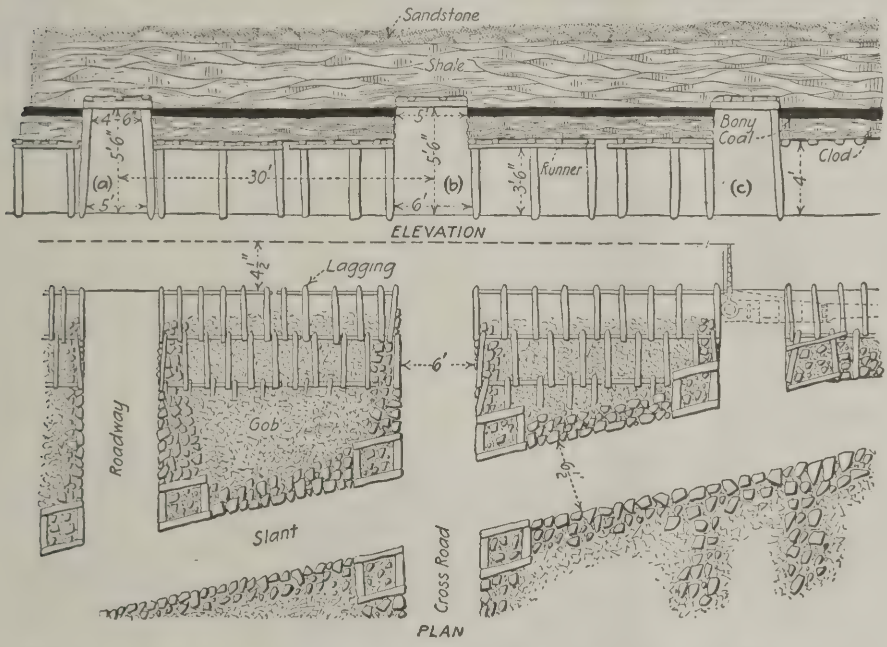


FIG. 3. PLAN AND VERTICAL CROSS-SECTION OF LONGWALL WORKINGS, SHOWING MANNER OF PROPPING AND CRIBBING

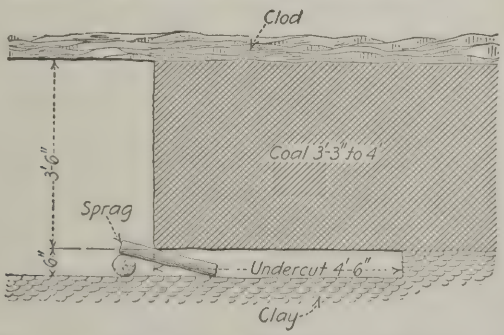


FIG. 4. SPRAGGING METHOD ADOPTED FOR LONGWALL FACE

As the machine proceeds, the barman gobs the dirt brought out by the machine bar and sets sprags under the coal every 15 ft., after which the timberman timbers the face (see Fig. 3). Laggings are set up under the clod or draw-slate and are supported by runners 12 ft. long. Each runner is propped by three posts 4 in. in diameter. The runners measure from 6 to 8 in. in diameter, but are sawed along their length so that they measure only 3 in. by 4 in. by 12 ft. The scraper cleans out the dirt lying below the undercut and pulls out all the sprags, or at least some of them.

The advantage of this Pick-Quick machine is that if the coal should fall on the bar, the machine can proceed and the bar will clear itself. The power consumption is low, and no narrow work in developing is required. After the coal is undercut and the sprags drawn, if the roof pressure does not bring the coal down, the cut is shot, a half a stick (or ⅛ lb.) of Monobel being used to bring it down.

The coal is loaded with a fork, and the slack remaining is then put into a car, so that as little of the coal as possible is gobbed and all the room required saved for the brushing of rock. Brushing at the face of the roadway is done by loaders, and timber is then set up at 4½-ft. centers. Timbering in the roadway is set up as shown at *a, b, c,* in the upper part of Fig. 3, conditions determining which plan is chosen.

PROTECTION AGAINST UNDUE PRESSURE BREAKING POSTS AND SHEARING ROOF

It will be noticed that all posts set up at the face are tapered so that they will sink in the floor as the roof settles under the weight. When the ribs are moderately hard, it is better not to put any posts to the booms.

Where the roads meet, cribs are built to strengthen the corners as in the lower part of Fig. 3. These cribs are built on top of 10 to 12 in. of dirt, so as to yield to the roof pressure and prevent shear in the roof. The slants and crossroads are brushed after the roof has completely settled, so that they are 6 ft. high above the rail and timbered whenever possible, as is shown in the center road in the upper part of Fig. 3, the dirt being taken out of the mine or stowed in old roadways.

The mine has not been worked regularly because the coal has had to be hauled 3½ miles by teams to the Taber station. If a railway spur were built to the mine, 200 tons of screened coal could be produced daily, and this output could be increased rapidly as the longwall face can be extended at will. A second longwall machine would double the output in a short time.

The mines in the lignite field do not work during the summer months, which is a disadvantage to the longwall system of mining, but by spraggng the coal properly and strengthening the timbering of the last cut before discontinuing, this disadvantage is easily overcome.

⁂

Electric conductors and telegraph wires are often either tinned or galvanized. The wire is first passed through a tank of acid, which cleans it; next through a tank of water, where the acid is washed off, then through a flux, and finally through molten tin or zinc. It is not difficult to get the tin or zinc to adhere over almost the entire surface, but the perfection demanded requires that every portion of the wire must be covered with a uniform thickness of metal, which must be bright and which will not peal off nor crack.

A Square Working-Place with an Overcutting Machine

By E. C. De Wolfe*

SYNOPSIS—This center-cutting machine is so constructed that as the cutter-bar makes its sweep across the coal face its end travels in a straight line from rib to rib. This movement of the bar end assures at all times a square working-place.

Natural standards of practice develop as time and experience demonstrate what is really best. Nothing in coal mining is more definitely established as a feature of good practice than the squareness of face for which all miners strive.

The pick-worker prides himself on the uniform squareness of his place. Operators of the puncher and the breast and shortwall types of chain machines all have aimed to undercut a uniform depth across a straight face. It is eminently proper, then, that a further development in coal-cutters should avoid violation of this well-established requirement of economy and general desirability.

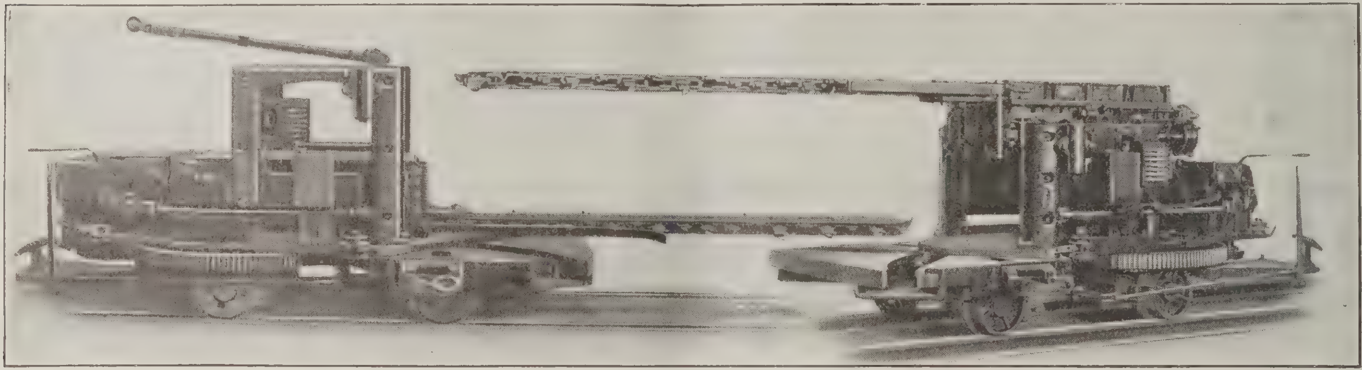
An overcutting machine has just been developed which operates wholly by power, from a position on the track, makes its kerf at any height from low center to top of seam, cuts a straight face and leaves straight ribs. It thus combines the advantages of overcutting, in seams wherein this method is preferable, with maintenance of a square face in entries and rooms.

There should be no ill-considered adoption of the overcutting method in coal mining. Only an overflow of unrestrained enthusiasm would urge that any overcutting machine can be best adapted for use under all conditions, and the cautious operator will proceed only on proper consideration of the physical conditions to be met and the economic results to be attained.

The overcutter, in work to which it is suited, will often be the means of practical and profitable operation in situations otherwise extremely difficult. It may increase the production, lower the costs and improve the general mining conditions in many workings which today are quite satisfactorily served by the shortwall and breast types of undercutters, yet there are unquestionably circumstances under which the undercutter will still make the better showing. For the more special conditions to which it is particularly well fitted, however, the overcutter is assured a definite field of utility.

The "Straightface" overcutter, made by the Goodman Manufacturing Co., Chicago, is a full-functioned machine, doing in simple manner everything that the coal operator can reasonably wish his cutting equipment to do. In cutting a straight face and straight ribs it does what no other continuous cutter has attempted, and to this extent it does what no other machine is expected to accomplish.

Fig. 1 shows the machine as arranged for "center cutting," while in Fig. 2 it is shown with the cutting element inverted to make it a "top cutter." This feature is at the disposal of the operator for conversion of the machine at any time to suit his conditions or preferences. For each arrangement there is a considerable range of vertical adjustment for the height of the cutting.



Figs. 1 and 2. Showing the Machine with Cutter-Bar Lowered for Center Cutting and Raised for Top Cutting

Construction and Operation

The base of the machine, mounted upon four truck wheels, is a steel casting with finished top surface. On this base the operating portion of the machine moves, and by it is guided and controlled.

The bed of the operating portion is of steel casting, with vertical steel casting guides for the adjustable cutting element, and carrying also the secondary motor and mechanism for feeding and auxiliary functions.

In each of the four vertical guides for the cutting element is a rack, into which meshes a pinion by which the elevation of the cutter arm is adjusted and determined.

At the front the machine base carries a V-shaped slot, with steel sides properly curved for guiding the forward end of the machine so as to make the straight face-cut across the room, the swing being effected by a spur pinion in mesh with the circular rack at the rear of the base.

In traveling into a room the cutter arm extends forward. The machine advances until the arm is close to the face, as shown in the first position, Fig. 3. The lever-and-quadrant brake is then set and a telescoping anchor-drill rod is adjusted, extending forward to the face. The drill is driven by the secondary motor, and the anchor hole is quickly cut in the face directly ahead of the machine.

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*Editor "Electrical Mining," 537 South Dearborn St., Chicago.

The anchor being set, the wire rope from a drum on the rear of the machine is led ahead and attached, while at the same time the feed is thrown in to swing the cutter arm to the right-hand corner of the place. This brings the machine into position 2, Fig. 3.

The brake is then released and the feed thrown out. The wire rope drum is thrown in, and the sumping cut is made by drawing the machine forward on the track to a point corresponding to position 3, Fig. 3. Evidently the sumping makes a rib cut as straight as the track.

As the sumping is completed the drum drive is thrown out, the feed thrown in and the cutter arm starts its running cut across the room. The feed pinion, as it works around the circular rack, guided by the radius arm, acts in proper combination with the V-cam and roller in front to cause the cutter arm to withdraw until a central position is reached (position 4, Fig. 3) and then advance to the left (position 5, Fig. 3), so that the end of the arm follows a straight line across the room and thus cuts a straight and square face.

The drag of the bits in cutting holds the machine to the face, so while the cross-swing is being made the sumping rope may be shifted from the anchor ahead on the right to a jack behind on the left (position 5, Fig. 3), so that by throwing out the feed and throwing in the rope drum drive the backing out begins as soon as the swing-cut is complete, thus making the entire cutting operation continuous—sumping, swinging and withdrawing.

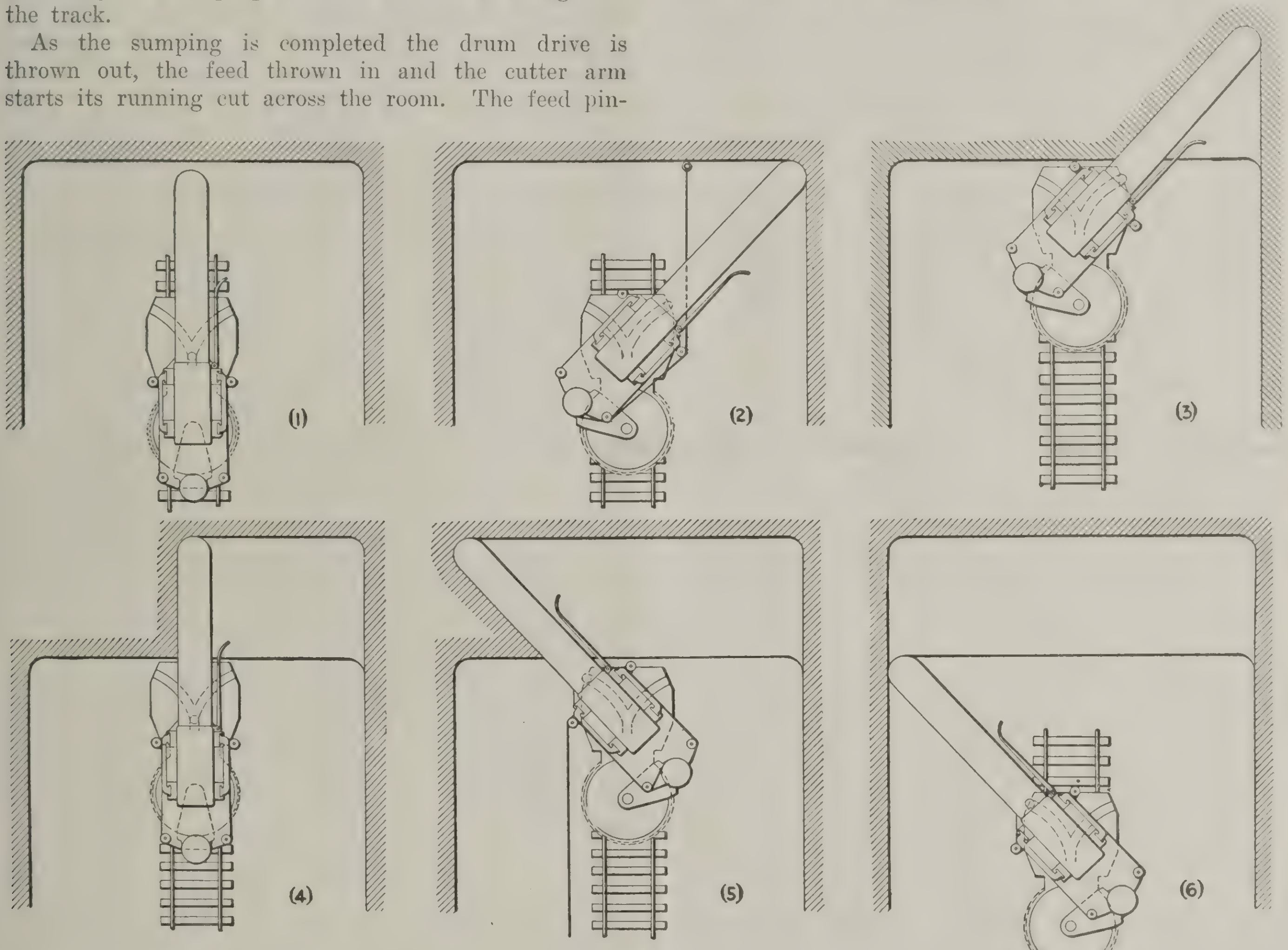

Fig. 3. Showing Six Principal Positions Assumed by the Machine in Cutting a Working Place

In backing out, the machine reaches position 6, Fig. 3, leaving the cut at the lefthand rib as straight as at the right and giving a perfectly squared place 20 ft. wide, undercut to a depth of 7 ft.

Swinging the arm again to a central position, the machine is ready at once to travel to the next working-place.

Narrow Work and Room Turning

The operation is exactly the same in entry driving, except that the full swing of the machine is not utilized. An indicator shows always the width of swing to right or left from the center for all positions of the cutter-arm, enabling the runner readily and definitely to govern the width of his cutting. In a 12-ft. entry, for instance, he sumps with the indicator at 6 on the right and backs out with it at 6 on the left, or at any other right and left figures totaling 12 if his track is not in the center. He can widen at one side for a passing track by working full 10-ft. swing on one side and only the regular 6-ft. on the other.

Entries can be widened or slabbing done anywhere by continuous running cuts, the cutter-arm being swung to one side the proper distance and locked while the machine is drawn along the track by the wire rope.

Room turning is started by one or two short slabbing cuts, after which the room track curve brings the machine into position for operation in the usual way, driving the room neck as in any narrow work. Widening out the room is evidently an easy matter with this machine, by simply increasing the swing for successive cuts until the full width is reached.

The front cover shows some of the machines in use by the Main Island Creek Coal Co., at Omar, W. Va.

The main motor on this machine, besides driving the cutter chain, operates also the pinion shafts for raising and lowering the cutting element. The arrangement is such that the arm is raised or lowered only while the chain is running. This not only prevents untimely use of the elevating drive, but also insures its operation along with the cutting, enabling the chain to cut its way gradually upward or downward, thus following any desired line of cutting.

All other operations of the machine, such as the drilling for the face anchor, the rope winding for sumping and backing out, the feed on the cut across the face, and the propulsion from place to place, are effected by the secondary motor. The secondary motor is of the crane type, series wound, and gives the variable speed desirable for automatic adjustment to suit the conditions of the cutting, drilling or traveling. For the feed drive this is of special importance, because it enables realization of ideal conditions in cutting—a uniform speed for the chain and a variable speed to allow slower advance through hard places. The same advantage applies to the operation of the drill, the wire rope and the propelling mechanism.

This is not a turret machine. It does not swing about a fixed center, with a comparatively short radius of application for the turning forces. Fig. 3 shows that the cutting element operates as a lever of nearly equal arms. The "work arm" is the overhung length of the cutter-bar; the "power arm" is the distance from the cam roller at the front of the moving frame to the pinion at the rear. There is therefore a long leverage at all times for forcing the cutter arm to its work.

Automatic stops are provided for limiting the swing to any desired point on either side. Either stop may be raised to permit farther swing, and in such farther swing no harm can result from failure to stop the feed by hand, as the feed pinion simply runs off the end of the circular rack and continues idly turning until the drive is thrown out or the power interrupted.

A trolley pole is regularly supplied for use on haulage locomotive entries. The machine runner rides on a small platform at the rear, on which also are mounted the brake lever and quadrant. He here has full control of the machine movement, just as has the motorman of a haulage or gathering locomotive.

The cable reel for delivery of current to the machine for traveling and operation in rooms is carried upon a separate two-wheeled trailer truck, which pays the cable out freely in entering the room and winds it in automatically as the machine comes out.

In hard cutting it may sometimes be necessary to use the brackets at the sides of the base, just over the forward wheels, for setting jacks to the roof to hold the machine firmly to the track. These jacks are needed but seldom as the weight of the machine and its steady, powerful action render such special devices unnecessary.

Extracts from a Superintendent's Diary

A delegation of ladies from the city paid me a visit today. They are canvassing the state in the interest of a proposed child-labor law. I had been expecting them for some time, having heard of their campaign from some of the superintendents who had already been honored.

Being naturally rather timid in the presence of strange ladies, I decided to take advantage of the warning I had received and commit a few arguments to memory, hoping thereby to be able to deliver them effectively in spite of all embarrassment.

It was a waste of good time; they came to deliver arguments and ideas and not to receive them.

The chief spokeswoman began about as follows: "We realize, Mr. Stewart," (Stewart is the name of the superintendent at one of the other mines owned by our company, but I did not correct the ladies, fearing that their talk might seem less personal after such a correction) "that you are only a representative of this monster corporation, and we don't want you to become offended at any insinuations we make against it, because we know that you must follow instructions, no matter how much they may outrage your ideas of justice. But we feel that because the owners of your corporation cannot be approached in person you ought to pass on to them our ideas and in turn insist that they issue instructions to you that will permit you to take a prominent part in this fight."

Think of it! Here they were telling me that I must believe as they did or be ranked in the same class as my terrible absentee owners and directors.

Realizing the futility of trying to justify my own opinions or the acts of my directors in the face of such prejudice, I silently manifested great interest in their arguments and allowed them to continue. Truth is, some of their opinions were so ridiculous that I became very much amused at their conversation.

After they had relieved themselves of all of their set speeches and were preparing to depart, I suggested that they lay aside the burden of the campaign for an hour or so and take a look at the men of our camp. It happened to be payday, and our men had all quit work at noon and were waiting for the paymaster to arrive.

I remarked to the ladies that they might interview some of the men and boys and get their ideas about child labor, but this suggestion did not meet with their approval. "Workingmen have no opinions on such matters that are worth considering," remarked one of the ladies. "They always have to be educated up to such progress, and as a rule, in the beginning, they always oppose legislation intended for their betterment and protection."

That remark was worthy of being classed as argumentative to say the least, so I took courage and made another effort: "But surely grown men can offer evidence as to whether they are being treated as human beings or being made mere slaves by employers who live thousands of miles away from them and for that reason can have no sympathetic interest in their doings." That from me.

This from them: "Mr. Stewart, one of your labor leaders addressed our club for two hours last week, and as he intimated that he would rather not have us make his talk public because his job might be in danger we probably know more of your men's feelings than you do."

I made no further effort to delay their departure.

Death of F. C. Keighley

Frederick Charles Keighley, a resident of Uniontown, Penn., and general superintendent of the coke operations of the Oliver & Snyder Steel Co., was found dead in his garage Wednesday evening, Apr. 14, at about 6 p.m., by his son, Henry Keighley. He was the victim of a self-inflicted wound, the shot having entered his mouth and emerged from the top of his head. When discovered he was lying on the floor in a pool of blood.

The bullet which caused the coke man's death is believed to have been fired at about 10 a.m. The deceased spent the early part of the morning at his office in Oliver, and it was noticed by his associates that he was somewhat nervous and excited. He left at 9 a.m. and went to his home, handed some papers to a daughter and left the house without removing his overcoat. It is believed that he immediately went to the garage.

Frederick C. Keighley

It is said that Mr. Keighley had been despondent for some time, owing partly to the illness of his daughter, Mrs. William A. Hogg, who is a patient in a Pittsburgh hospital; but the actual motive is thought to have been financial worries incident to the closing of the First National Bank of Uniontown, Penn.

Following the report of the tragedy and the issuance of a newspaper extra with the sad tidings, the home of Mr. Keighley was besieged by sorrowing friends. So great was the number arriving at the home that police officers were detailed to the residence, and only a few intimate friends of the family were admitted.

For a number of years Mr. Keighley has been a member of the Board of Education, and until last year he officiated as president. In politics he was a Republican, being influential in the counsels of his party.

For many generations the Keighleys have been prominent in England, their home being in Yorkshire. There Jeremiah Keighley, a wool-buyer, lived and died in the city of Leeds. His youngest son, Charles Keighley, was the father of the Oliver superintendent. He was a jobber in dressgoods in his native country, but when he came to the United States in 1865 he became chief bookkeeper for the Mahoning Coal Co., at Youngstown, Ohio.

Ten years before his father came to America, F. C. Keighley was born at Victoria Terrace, Keighley, Yorkshire, May 5, 1855. He attended school in England and on arriving in America studied for one year in the public schools of Youngstown, Ohio. After this brief preparation he began work, securing a position as office-boy under his father's supervision. Strict attention to his duties led to his promotion until he became his father's assistant.

After gaining an insight into the business methods of the company, young Keighley began work with the engineering corps. He was shortly promoted to the superintendency of one of the mines of the Mahoning Coal Co., and for four years preceding 1880 was manager of two of the company's stores.

On Sept. 15, 1880, Mr. Keighley arrived in Fayette County as manager of a store operated by the Youngstown Coal Co. After six months' meritorious work he was promoted to the superintendency of the plant. His father followed him 11 years later, becoming store manager for the Youngstown Coal Co.

Later he began to operate coal mines on his own account at Toms Run, Allegheny County, Penn. He operated a mine there for 18 months, sold it out and returned to Uniontown as general manager of the Youngstown Coal Co.'s operations, holding that position for two years.

Fred Keighley was superintendent of the Mammoth plant of the H. C. Frick Coke Co. for a short time, and then in 1891 he became identified with the Oliver & Snyder interests. He assisted in the erection of the Oliver coke plants north of Uniontown, and in 1897 was made general superintendent of the coke operations of the three large plants.

He was held in high esteem among the men engaged in the mining of coal and the manufacture of coke in this section, and his advice was not infrequently sought by some of the most prominent coke producers when solving the problems of their business. With the men at his mines and coke works, Mr. Keighley was very popular. He was regarded as one of the most likable men in the coke region.

Not only in Fayette County, where he was intimately known by thousands, but throughout the entire country wherever coal is mined, Fred Keighley was a prominent figure. For six years he was president of the Coal Mining Institute of America, and for two years previous to the appointment as superintendent of the Mammoth plant of the Frick company he was the state mine inspector of the Fifth bituminous district, filling the position now held by Inspector I. G. Roby.

Mr. Keighley was a trustee of the Methodist Episcopal church of Uniontown and also a member of the Elks. His handsome residence on East Fayette St., Uniontown, was erected in 1904. He was married to Miss Lucy J. Burnett, daughter of James Burnett, a former contractor and builder of Trumbull County, Ohio, on June 1, 1876. His wife and the following children survive him: Mary Grace Keighley, Mrs. Florence Hogg, widow of the late William A. Hogg, Thomas, Charles, Rose, Henry and James Keighley.

Importance of Safety Inspection by Company Inspectors*

By J. W. Groves†

SYNOPSIS—State inspection is usually inadequate and limited by the provisions of the mining law. The author urges that private inspection is not only ethical, but economical.

We consider that project successful which accomplishes the object for which it was established. The statistics of the companies which have adopted safety inspection prove beyond a doubt that the measure is successful as it reduces both the number of accidents and their harmful effects. During the past eight years nearly all the large coal companies and many of the smaller ones and many corporations engaged in other lines of work have employed inspectors whose duties are to report upon all dangerous conditions and to suggest safety measures.

State Inspection Inadequate, Limited and Apt to Appear Unfriendly

They have found that the inspectors, appointed and paid by the state, cannot visit the mines with the necessary frequency, are primarily interested in the enforcement of the state mining law and have time insufficient for a detailed inspection such as a private inspector is required to make. The state inspectors are not in the same friendly relation to the corporations as is a company inspector, and they do not feel free to make suggestions that are outside the law. The company inspector should, and usually does, have the authority to require miners or laborers about the mine to leave other work and assist in making places safe.

Some mining-men contend that an inspection, especially of bad roof, does but little good unless the inspector remains at the point of danger until the risk is removed. It is true that in many cases the miner, instructed to timber his place, will not do so or will put off this duty until a more convenient time. Such a delay often proves disastrous.

Foreign miners are more given to taking chances than Americans. They either do not understand the instructions or do not wish to spend time doing anything that is not directly concerned in the making of money. Possibly also the greater number of bosses in foreign mines has led aliens to believe that they will receive a second or third warning before anything happens. I believe that it should be left to the inspector to decide whether he can depend upon the miner or not and whether it is his duty to stay and see that the danger is removed or to go on and spend his time more profitably in discovering new dangers.

Inspection Has Reduced the Frequency of Accidents

The fact that many of the companies have adopted inspection is a testimony to its importance. Because of the safety movement insurance companies now consider mining less hazardous and are planning to readjust their long-established mortality tables.

Inspection has greatly reduced the accidents, both fatal and nonfatal. For a while, after rigid inspection and accounting were established, the nonfatal accidents seemed to increase. This was due to the fact that many minor injuries now reported were formerly not regarded as reportable accidents.

In those days when a man pinched his finger or knocked off a piece of skin he tied it up with a piece of cloth torn from the lining of his coat and said nothing about it. No one then knew he had been hurt except his family, unless the slight injury developed into something more serious. Nowadays such an accident must be reported and counted in the total, and it has its effect on the averages. The apparent increase in accidents was due to such cases, but so great has been the improvement in conditions that now less accidents are recorded than appeared in the old and unreliable reports.

A reliable account of fatal accidents has, however, been kept by the state inspectors for years, and with their figures as a basis it is clear that the number of fatalities has steadily decreased.

Inspectors Aid Safety as Much by Their Presence as by Their Action

The inspector is a periodical reminder of safety, or possibly I should say of danger. He is like the warning-board at a railroad crossing or the big red signal of danger. I am told that some mine foremen "see red" every time he comes about the mine. The miner will "stop, look and listen." He stops only for a short time, and then hurries away to put his caps in their appropriate hiding-place, to examine his powder-box and to place his carbide a sufficient distance from his explosives. This spasmodic effort at safety will soon beget a habit which will continue to grow and will insure the permanency of the safety movement.

Safety inspection, of course, receives its primary sanction from its humanitarian aspect. There are thousands of people yearly saved from suffering cuts and broken bones; there are women and children protected from becoming widows and orphans, from sorrow and poverty. Many of these are subject to a risk they do not realize and cannot prevent. Who is there that will say it is not the business of a company to protect these people when it can be accomplished with a reasonable amount of safety inspection?

Financial Justification of Safety Inspection

But most important is the business side of inspection—its cost and its profits. I call it important because it is the one factor that will keep the work alive and make all the other advantages possible. We are accustomed to consider inspection as an expense with nothing to balance it on the credit side of the ledger. It must, I suppose, continue to be so, for it is most difficult to place an actual cash value on inspection. The work never shows a balance on the credit side of the account. We consider it generally as an expenditure equal to the salary and expenses of the inspector, and this is charged against the cost of coal.

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*Paper read before the Alabama Safety Association at Birmingham, Ala., Mar. 13.

†Lecturer, Tennessee Coal, Iron & R.R. Co.

The fact that the inspector prevents wrecks on the haulage-road, the caving of rooms and the loss of coal and that he occasionally saves a life valued at $5000 or a mule at $150 are all operating advantages. If we would only be fair to inspection and give it credit for a portion of these things we would find that it is most profitable.

There are a number of states that have compensation laws whereby injuries and the loss of life are paid for at fixed prices, and in these states inspection is becoming a regular part of business. "Safety First" is urged and promoted in such commonwealths in all possible ways.

This law operates to prevent old men and children from getting employment. It is to the advantage of a company to keep out of its employ those who are most likely to be injured. This may work a hardship on some people, but in general will accomplish much good. Companies are requiring their employees to retire at a certain age and are lowering the age limit at which they employ men and raising that at which they will employ children. This self-protection, moreover, is making companies more careful to prevent intoxicated men from going to work.

But the inspector does not economize solely by saving human life. He may also by suggesting some device occasionally save a wreck which would, even if no one was hurt, cause a delay of a few hours and a reduced tonnage. The saving of cars from breakage by this provision may effect an economy of many dollars. The safety inspector may even prevent a mine explosion, but if he does no one will ever know it; but that does not alter the fact that his one act may mean prosperity or bankruptcy for his company.

The man who can accomplish results as a safety inspector should be capable of superintending the operation, must understand efficiency and have both a theoretical and a practical knowledge of the work; for only by having the respect of the employees can he get results.

The Alabama Safety Association should, I believe, encourage all employers of a large number of men to put on an inspector, showing them, wherever it is possible, that it is to their financial advantage to employ such a man. The argument of economy appeals to everyone, and so the cynical expression, "We can hire as many men as we wish, but mules cost money," is not so pertinent as it once was.

Inspection is not to be urged alone because it is right, but because it constitutes good business.

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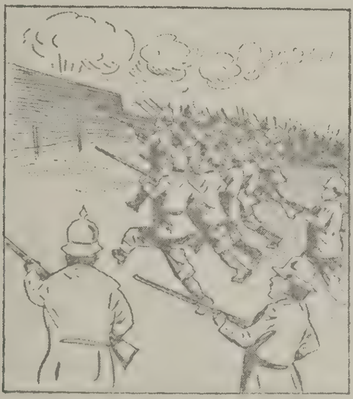
Spain Now Admits Coal Free

A royal decree of April 7, 1915, says *Commerce Reports,* suspends until further notice the import duty and transportation tax on coal, the exemption to apply to all shipments made to a Spanish port on or after the above date. The combined import duty and transportation tax on coal imported from the United States amounted to $1.06 per metric ton (2204.6 lb.). The Director General of the Spanish Customs Department has requested quotations of current prices for coal shipped f.o.b. and c.i.f. from the United States to Spain.



They Fight to Maim and Kill

The Nobler Army

By BERTON BRALEY

Written Expressly for
COAL AGE.

We Fight the Bloodless Battles

The men who fight in Europe—they fight to maim and kill,
They heap the dead in windrows with cold and cruel skill,
They fight to wreak destruction, to lay a country bare,
And death, disease and famine are with them everywhere,
With guns and belching cannon they drive the people forth
To face the raging winter that sweeps from out the North,
The men who fight in Europe with deadly ruthlessness
Have filled the world with terror and sorrow and distress!

The men who fight in Europe—they fight to lay men low;
WE fight with drill and powder, and nature is our foe,
We fight against the darkness, the secret deeps of earth,
To win the buried treasure of which we know the worth;
We fight that men may labor and love and live and dream
Amid the modern magic of iron and of steam,
And all the loot we capture the hosts of toil shall burn
To foil the winds of winter and make the engines turn.

The men who fight in Europe—they fight with courage bold
To make a people hungry and suffering and cold;
We fight to warm the hearthstone, to turn the wheels of trade,
To utilize the riches that God himself has made;
Our army digs its trenches that comfort may increase,
We fight the bloodless battles of industry and peace,
We fight for life and happiness—and not for death and dole,
This army that goes underground to mine the gleaming coal!

Extraction of Oil from Coal

By F. R. Wadleigh*

SYNOPSIS—A brief history of the development of the distillation of oil and tarry products from coal. Typical analyses and yield of cannel coals. Estimated yield and cost of the Del Monte process. Brief outline of method employed. Advantage of low-temperature distillation. A Wyoming proposition—analysis of the coal and estimated yield. Other coals in this country.

The question of extracting oil from coal has been attracting much attention recently in England, owing to the largely increased consumption of fuel oil by the British Admiralty and the growing demand for motor spirits.

Early History and Development

The distillation of mineral oil from the Scotch shales, Boghead cannel and Torbanehill mineral—the latter being originally found in Linlithgowshire, Scotland—has been going on for many years. The first mention of the manufacture of pitch, tar and oil from coal and shale was in 1681. It had become an established industry in Shropshire in 1711. Later experiments made at Bristol in 1779 by the owners of a lampblack factory, on the oil produced from coal at their plant, showed that by boiling this oil it could be reduced to the consistency of tar or pitch. In 1816 mention is made in Holmes' "Treatise on the Coal Mines" of a manufactory at Sunderland for extracting tar, petroleum and ammonia from coal.

The origin of the modern mineral-oil-distillation industry now carried on in Scotland was due to James Young, a chemist of Manchester, who died in 1883. In 1847 Mr. Young began his experiments with the oil obtained from a petroleum spring at Alfreton, in Derbyshire. From this he distilled a light thin-burning oil as well as a thicker lubricating oil. After this supply failed, Mr. Young noticed drops of petroleum coming from the sandstone roof of a coal mine; and supposing that this came from the action of heat on the coal seam, he succeeded after many experiments in obtaining a substance resembling petroleum, by distilling the coal at a low red heat. This substance treated in the same way as natural petroleum gave similar products—chiefly oils and paraffin.

As this process became known, numerous factories were started up, both in Great Britain and the United States. Cannel coal and Boghead coal were used, quantities of it being sent to the United States, where in 1860, according to statistics, there were about 70 factories for extracting oil from coal and other mineral sources, as bituminous shales, etc.

Source of Oil in Coal and Shales

Cannel coals, boghead coals (called also "torbanites") and various bituminous shales have been the main sources of oil production. Torbanites were first worked at Torbanehill, whence the name is derived. They do not look like ordinary coal, but in 1853 the English courts decided that they were coal. In Germany and France, however, they are not classed as coal.

The formation of boghead cannel is now considered to be due to the presence of a large proportion of resinous bodies in the original beds of vegetation, such as lycopodia spores, which, subjected to high temperatures, became more or less liquid and, mixing with the surrounding earth deposits, gave rise to the boghead cannel, having the same organic composition but a high percentage of ash—over 30 per cent. The hydrogen content is high, as is also the yield of volatile hydrocarbons. A typical analysis is as follows:

	Per Cent.		Per Cent.
Carbon	78.10	Fixed carbon	12.20
Hydrogen	10.43	Volatile hydrocarbons	87.80
Oxygen	11.47		
	100.00		100.00

The shales now used in the distillation process, instead of being (like coal) a compound of carbon and hydrocarbons, contain hydrocarbons with mineral or earthy matter, so that they do not coke when heated to redness, but leave from 70 to 80 per cent. of mineral residue. With the exception of the tar oils obtained at gasworks and byproduct coke ovens, the shale oils are the only source of production of high-grade fuel oils in Great Britain. The yield varies from 18 to 40 gal. of crude oil per ton of shale, the average being about 23 gal.

In 1909, 3,000,000 tons of shales, etc., was treated in Great Britain, giving a commercial production of 68,000,000 gal. of crude oil, which yielded by further treatment the following products:

Naphtha	4,000,000 gal.
Lamp oil	22,000,000 gal.
Gas oil	40,000 tons
Lubricating oil	40,000 tons
Sulphate of ammonium	60,000 tons

From the intermediate oils was extracted 25,000 tons of paraffin wax.

Details of a Projected Plant

Following are the important details of a recently projected plant designed to handle 500 tons of cannel coal per day by the Del Monte process, the object being the production of oil and motor spirit:

The chief product obtained will be crude oil, which on being further treated will yield motor spirit, fuel oil, paraffin wax, pitch, etc., in varying proportions, as well as sulphate of ammonium. The cannel coal to be used is not of high grade and is said to be unsuited for other use, being more on the order of Torbanehill mineral, which carries about 10 per cent. of hydrogen. Experimental results have shown that a ton of this cannel will yield 58.5 gal. of crude oil and 54.5 lb. of sulphate of ammonium, together with 58,000 cu.ft. of producer gas.

The total cost of production, including distillation, refining, cracking*, etc., is given as $4.31 per ton of cannel, showing an estimated net profit of $3.04 per ton. The yield on 500 tons will be as follows:

Motor spirit	17.4 gal.	Pitch	51.0 lb.
Heavy fuel oil	17.6 gal.	Sulphate of ammonium	54.5 lb.
Paraffin wax	37.5 lb.		

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*Mining engineer, Philadelphia, Penn.

*The term "cracking," which is said to have originated in the old Pennsylvania refineries some 50 years ago, means a partial alteration of the oil treated, as distinguished from the more complete decomposition that would disrupt the molecules largely into carbon and permanent gas. The "cracking" simply alters the molecule in a way that cannot be done by simple distillation, and may or may not be accompanied by any considerable production of permanent gas, the product being largely a liquid condensate, though of very different character from that obtained by simple distillation.

Design of the Del Monte Process

The Del Monte process mentioned above is a new one, designed to effect the carbonization of the coal at a low temperature, say from 900 to 1300 deg. F. The retort in which the coal is carbonized consists of a number of mild-steel tubes slightly inclined, the coal being fed in at the lower end and carried up the tubes by an Archimedean screw. Through the middle of the screw is run a tube, and into the upper end of this tube air and gases are injected and burnt. At the same time the exterior of the tube is heated by a series of gas burners, which heat the coal on all sides.

The temperature is so regulated that it is raised from the lower end to just beyond the middle and drops again at the top of the tubes. In operation, a stream of cold gas is forced in at the upper end of each tube and passes through to the lower end. This air current carries off the hydrocarbons liberated by distillation and takes them to the cooler part of the retort where they are condensed.

The advantage claimed for this method is that the yield of hydrocarbons is increased, because they are not subjected to a high temperature that would break them down. The use of low temperatures reduces materially the output of gas from the coal, but largely increases the yield of tar oil, the latter being of good quality, much resembling petroleum. The coke is quite as good as ordinary gashouse coke and suitable for all ordinary purposes. The gas obtained is said to be more than enough for firing the retorts and for the operation of the plant.

A Del Monte Plant in England

At Chiswick, near London, a Del Monte plant has been operating continuously on a commercial scale since Jan. 1; it was specially designed for the treatment of cannel coal and is yielding 130 gal. of oil per ton. Steps are being taken to give the coal operators of this country an opportunity to investigate this process, which may show them a way of utilizing slack and other low-grade fuels. The remarkable results attained in England certainly suggest future possibilities, and coal-mine owners should take up the matter, as they are the ones most vitally interested. There is no question but there are ample supplies of coal in this country suitable for low-temperature distillation that would give large yields of tar oils, as well as sulphate of ammonium.

Proposed Treatment in Wyoming

In 1907-08 a coal company in Wyoming, operating in Uinta County, announced its plan for the operation of a plant for extracting oils from their coal. The chemist reported that the value of the oils that could be extracted was about ten times as great as the value of the slack coal; he also reported that there was a residuum after the oils were extracted that had considerable fuel value and could be briquetted, using the pitch extracted from the coal as a binder. This coal had the following analysis:

	Per Cent.		Per Cent.
Moisture	15.24	Ash	2.91
Volatile matter	37.46		
Fixed carbon	44.39		100.00

The coal contained 0.53 per cent. of sulphur and had a calorific value of 12,084 B.t.u. when air dried. The nitrogen content was 1.34 per cent., and the experimental yield of ammonium sulphate was 26 lb. per ton, while the entire coal-tar product was 220 lb. per ton, the latter being unusually high. I have no knowledge, however, whether this plant is now or ever was in operation on a commercial basis. The above data were taken from a report made by Mr. Peterson, of the Agricultural College of Utah, July, 1908.

Coals Available for Extraction of Oil

There are cannel coals in West Virginia and Kentucky with from 43 to over 50 per cent. of volatile matter and as high as 8 per cent. of hydrogen. There are also coals in this country with a high nitrogen content that would give large amounts of ammonia. Of all coals in this country, probably some of those in Pierce County, Washington, have the highest nitrogen content, many analyses showing over 2 per cent. and some as high as 2.65. The New River coals average about 1.52 per cent. and Pocahontas coals about 1.14 per cent., while some of the coals of the Pittsburgh bed run as high as 1.80 per cent. of nitrogen.

Today the cost of mining these coals is high and the market so limited that they are not being developed to any extent. Their future development may lie in the extraction of oils and byproducts by low-temperature distillation. The Mond process, used largely abroad, yields from 80 to 90 lb. of sulphate of ammonium per ton besides the tar and gas, from ordinary coal having about 1.4 per cent. of nitrogen. Both the Solvay Process Co. and the Pennsy Salt Co. had and probably still have plants of this kind in operation, where producer gas was the prime object and the ammonium sulphate and tar only byproducts. One of the large operating companies in the Pittsburgh, Penn., field is now experimenting along the same lines and has erected a complete plant, using the Mond process, with a modification designed by their own engineer.

In a paper published in the May, 1914, *Journal* of the Franklin Institute, L. C. Jones, of the Solvay Process Co., Syracuse, N. Y., gave some results of experiments made on the low-temperature distillation of coals, for the purpose of determining the nature of the products that could be obtained. These experiments, however, are said to be as yet incomplete. Mr. Jones makes the following suggestive statement:

"At any rate, such slow artificial carbonization is strikingly suggestive of Nature's process. These residues show a decided resemblance to the natural product. That they are not identical, both physically and chemically, may be due to the high pressure used in nature, which we have made no effort to duplicate."

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Course in Coal Mining for Illinois Employees

The Illinois Miners' and Mechanics' Institute, coöperating with the Department of Mining Engineering of the University of Illinois, will offer a short course in coal mining at Urbana, Ill. , from June 7 to July 17, 1915. The same subjects will be studied during the short course as are taken up in the regular schedule of the two-year course, four hours each morning being spent in lectures and discussions and three hours in the afternoon devoted to courses in the mining laboratory, electrical laboratory, drafting-room, surveying on the campus and in first-aid work at the University Mine Rescue Station.

There is no charge for enrollment or tuition, and no textbooks are required other than those furnished free by the institutes.

Economic and Moral Phases of Safety First*

By Milton H. Fies†

SYNOPSIS—Several instances are cited where safety work has largely reduced accidents, fatal and nonfatal. The author shows the effect of safety propaganda on the relations between employer and employee and urges that all work for safety is incomplete so long as it is not accompanied by a movement against alcoholism.

The value and importance of the Safety-First movement—the greatest social advance of our age—no more need proof than the geometrical axiom that a line is the shortest distance between two points. A few years ago the safety movement might have been regarded as a fad; today it is known to be an economy—even more, it is the very foundation of efficient management. The majority of us in Alabama may have been slow to realize the value of this movement: but we are fast beginning to know that safety means humanity, conservation, industrial peace, coöperation and business economy.

Years ago, at the mine we placed output of coal before conservation of life. Railroads were putting dollars first and men second and were mindful of maintenance-of-way, but forgetful of maintenance of men. Steel plants were "making steel and killing men." To quote President Wilson:

> We have squandered a great part of what we might have used; we have not stopped thoughtfully enough to count the human cost—the cost of lives snuffed out, of energies overtaxed and broken, the fearful physical and spiritual cost to the men and women and children upon whom the dead weight and burden of it all has fallen pitilessly the years through.

In the brief time allotted to me I shall discuss only the economic and the moral, or humanitarian, phase, which latter is the most important phase of all.

Railroad Successes in Safety Propaganda

It has been conservatively estimated that the yearly loss in America from disability to workingmen is $250,000,000. Practically all this loss could be avoided. It is a debit due to ignorance and carelessness.

The results obtained from well-organized and concerted safety movements may be illustrated by the following examples: In the first year of its safety work the Chicago & North Western R.R. Co. reduced its deaths from injuries 35 per cent. and its nonfatal accidents 25 per cent. The St. Louis & San Francisco R.R. (the "Frisco" line) in 11 months reduced the deaths on its road 33 per cent. and other injuries 22 per cent.

During the year 1913 the freight and passenger locomotives of the Southern Pacific Co. ran 59,738,000 miles, a distance equivalent to an encircling of the globe every 3½ hours. Nevertheless 41,783,000 passengers were carried an aggregate distance of 1,756,482,000 miles without a single fatality resulting from a train accident. The Harriman memorial gold medal was awarded to the New York Central & Hudson River R.R., in competition with all other great systems, by a committee appointed by the American Museum of Safety. The award was made because in the year ending June 30, 1914, that road, which operated 3,000,000 freight and passenger trains, killed 102 and injured 1063 fewer persons than in the preceding year. This improved record resulted from its safety propaganda. During the year ending Dec. 31, 1914, this great railroad system reduced its fatalities 32 per cent. and its injuries 33 per cent. as compared with the previous calendar year.

Steel Mills Reduce Losses

The results obtained by one of the pioneers in safety work, the United States Steel Corporation, is also remarkable. The most effective work done by any of its subsidiaries was that at the South Chicago plant of the Illinois Steel Co. Even after 1906, the year when the corporation set about establishing universal safeguards and the safety spirit, it was and still remains the leader in safety work in the steel industry. It has reduced its record of injuries 66⅔ per cent. and lowered the number of deaths from 46 until there were only 6 in 1912 and 9 in 1913, 3 of which resulted from heat prostration.

Progress in Mine Safety

In the coal-mining industry the value of concerted and systematic work is proof of its value. Statistics compiled by the U. S. Bureau of Mines for the period between January and October, 1914, show a reduction of 389 fatalities as compared to the same period in 1913. While these figures are gratifying, there still remains much to be accomplished; and in no other occupation is there greater opportunity for effective safety work than in coal mining.

In the West the excellent safety organization of the Colorado Fuel & Iron Co. has enabled it to attain a fatality rate far lower than that of the rest of the state. In 1911 at the coal mines of the Colorado Fuel & Iron Co. there were 19 fatal accidents as against 72 for the balance of the state. In that year the company mined 172,947 tons per fatal accident as against 96,002 in the other coal mines of the state. In 1912 the company had 17 fatal accidents as against 81 in the rest of the state and mined 206,830 tons per fatal accident as against 92,604 for the balance of the state.

Safety First, Quality Second and Cost Third

It is gratifying to know that in 1911, after the Bureau of Mines had become well organized, a reduction of 43 per cent. was made in that class of accidents in which over two men were killed. All efficiently managed corporations realize the value and necessity of "safety first." The H. C. Frick Coke Co. has adopted with decision an uncompromising policy of safety first, quality second and cost third.

I regret that limited time forbids my going into detail as to results obtained by the National Cash Register Co., International Harvester Co., United States Shoe Manufacturing Co. and other progressive business concerns in their commendable efforts to preserve the life and limb of their employees. I have no figures as to results obtained by the Tennessee Coal, Iron & R.R. Co., but its broad-minded efforts, system and efficiency in safety work are a matter of general knowledge, and the officials deserve the praise and gratitude of the entire community.

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*Paper read before the Alabama Safety Association at Birmingham, Ala., Mar. 13.

†Superintendent Gipsy mines, Maryland Coal Co., Gipsy, Ala.

Moral Phase of "Safety First"

The attitude of employer to employee is of great importance in the United States, as it is a land of democratic traditions and equal privileges. The success of our government is only possible when employer and employee are in harmony. To my mind one of the largest factors toward the solution of this problem is the Safety-First movement. By his interest in it the employer gives evidence of the fact that he is paternal rather than predatory.

Many accidents occur indirectly from the employer's lack of human interest in the employee. Any one who has made a careful study of the characteristics of the workingman knows that he appreciates sympathy and kindness. I believe that the indifference of many men toward their own safety is due to the fact that they feel that no one cares just what becomes of them. The boss' attitude of indifference toward the welfare of his men reacts, and soon the workman becomes discouraged and disheartened. The employee's attitude is immediately reflected in his work, and carelessness becomes his chief characteristic. Aptly is such a man described:

> The emptiness of ages in his face,
> And on his back the burden of the world.
> Who made him dead to rapture and despair,
> A thing that grieves not and that never hopes,
> Stolid and stunned, a brother to the ox?

Laying Overmuch Stress on One Ungrateful Man

You may consider this aspect of the matter purely idealistic; you may insist that it is far-fetched; you may even argue that such a philanthropic attitude is not appreciated. I know that a man who practices this doctrine gets many a hard knock; that he often thinks, "What's the use?" that frequently those to whom he shows the greatest kindness often show the greatest resentment when they have occasion to resent. But I maintain such an attitude does not characterize all workingmen, but only a small minority. A boss may be firm and still remain human. The principles of "safety first" are most effectively applied when an appeal is made to a man's reason and sentiment.

It is generally conceded that safety rules are usually resented by the employee. Especially is this true if they make him perform extra work or put him to some expense or make him deviate from certain of his own fixed rules or standards. This is more particularly the case in large corporations, where the relation between employer and employee is less friendly than in smaller business concerns. There is a reason for this lack of congeniality, and in my opinion it is due to the fact that the relation is impersonal.

The "Verboten" Sign and Its Consequences

Let us consider an example: In a conference of the management of a certain company a change in safety rules is to be inaugurated. The suggested changes affect the employee to his slight detriment, but nevertheless are necessary and right. The general manager writes a letter to the superintendent that on such and such a day such and such changes will be effective.

The superintendent usually copies the letter and posts it about the plant, but in some cases the foreman tells the men that these new rules will be in force after a certain date. The employee never knows why such a change is necessary, and even if he does know the reason an explanation is due him.

Safety with Satisfaction

Cold-hearted, impersonal, "red-tape" safety begets results occasionally, but it does not beget the happiest sort of safety; namely, safety with satisfaction. Superintendents and official heads of large corporations must get away from thoughtless impersonalism if they would successfully fulfill their mission.

The right sort of attitude of employer toward employee will eventually accomplish more in eliminating the prejudice of the public toward the employer than years of expensive publicity work or an insincere interest in applied sociology. In spite of a serious accusation to the contrary, I insist that a man may work for a corporation in an official capacity and still retain his honor and his self-respect.

Big Business Will Suppress Alcoholism

There is one other phase of the moral side of "safety first" to which I would call your attention. I have no interest in the political phase of this subject nor have I any desire to stir up discord. I only ask your consideration because the subject deserves thought. I refer to the relation of "safety first" to alcohol. I believe that the end that temperance fanatics have been unable to accomplish, that a political party has failed to secure, that even religion has been unable to bring about is shortly to come to pass—alcohol is going. Efficiency and safety demand it. Industry calls for it.

Science has shown us the true nature of alcohol; that it is responsible for insanity, imbecility, disease and degeneracy, and now comes "big business" showing us that it is to blame for most of our inefficiency.

Only a Miner Is Permitted to Drink

None of us would employ a timekeeper or a supply clerk or a cashier that drinks; we prohibit our store managers from drinking. But daily, here in Alabama, we permit men to go into our mines, carrying enough explosives to wreck them, whose hands are unsteady and brain befuddled as a result of a previous night's debauch. For such a man a danger-board has no meaning, nor does loose rock impress him. What does he care for his own safety or for that of others?

Let me bring the matter closer home. I have carefully studied the causes of the mine explosions in our state and have found that the incipient reasons of three explosions in Alabama, in which over 200 men lost their lives, may be traced to alcohol.

The railroads have long realized the necessity of taking a stand in this matter. Why should the coal or ore operator lag behind? With the last ten years, the idea was prevalent that a miner *must* have his whisky. There are scores of mine operators who still think this true and accept it as a principle. The coal operator must get away from this rule if he would successfully practice "safety first."

Thomas D. West, manager of a Cleveland steel foundry, writes in the *Survey* as follows:

> The law says to our industries: "If a man in your employ loses his fingers, an eye or a limb, you or your insurance agencies are liable for heavy indemnity." Yet saloons are

licensed to be located next door to factories, to sell employees drink that will weaken their limbs, befuddle their intellects and thus render them liable to accidents that even the best safety appliances and watchfulness of superintendents cannot prevent. This outwitting of justice, commonsense and humanity, supported by laws, is responsible for many of the 2,000,000 injuries and 35,000 deaths that occur annually in American industries.

Wallace H. Rowe, president of the Pittsburgh Steel Co., which employs more than 5000 men, recently filed a petition with the judges of Westmoreland County, Pennsylvania, against the saloon. Mr. Rowe's petition declared that the high cost of living was made more burdensome upon the families of workingmen because 20 per cent. of the worker's earnings, on the average, go to the saloons. At the same time, he said, the cost of steel is increased by an overhead charge for accidents, 85 per cent. of which are due directly or indirectly to liquor.

Railroads Can Have Temperate Men; Why Not Coal Companies?

The Pennsylvania R.R. has 125,000 employees. But so rigidly is the "no drinking" rule enforced that few of them ever touch liquor. During the year 1913 the company's "spotters" made 784,675 "observations," but found only 158 men who were violating the rule against liquor. Surely when a great corporation like the Pennsylvania R.R. will make an average of six observations per year on each of 125,000 men it means to make an end of alcohol in its army of workers.

Most men concede that an effective workingmen's compensation law will soon be passed in every state in the Union, and I for one will welcome it in Alabama. The Safety-First movement is a step toward the preparation for this inevitable system, and in this preparation the saloon must go.

While the Saloon Exists There Can Be No Safety

Machinery may be guarded; safety devices may be installed; human ingenuity may be exerted to the utmost to guard the worker, and in spite of it all accidents continue. While the saloon exists there can be no safety. The campaign of the manufacturer or operator against alcohol is one for "safety first." Public opinion long ago drove the saloon from the church and the school, and it is not going to tolerate it as it directly causes the maiming and killing of men, thus putting a needless burden on industry, labor and the state.

I have laid particular stress on the moral or human phase of "safety first" because if we practice it with this idea in view economic results will follow. The human aspect of this question involves an issue of greater importance to corporations than any other; namely, its relation to the public. As one interested in a small corporation and as one who believes in the good which corporations can accomplish, I have no dread of socialism, but I do fear a public the judgment of which is influenced mainly by the relation of the corporation toward its employees.

Each executive employee of a corporation can become an effective force in combating this evil of a biased and prejudiced public opinion by being considerate in his attitude toward the workingman, by practicing "safety first" and by means of human kindness.

  For the deeds men do together
  Are what saves the world today—
By our common public work we stand or fall—
  And your fraction of the sin
  Of the office you are in
Is the sin that's going to damn you after all.

Safety Meets at the Panama-Pacific Exposition

It has been proposed by H. M. Wilson, the secretary-treasurer of the American Mine Safety Association, that the contestants at all state mine-rescue and first-aid meets pay an entrance fee of $25 or thereabout, the proceeds to be expended for the benefit of the winning team, enabling it thereby to represent the state at the mine safety demonstration and third annual joint field meet of the Bureau of Mines and the American Mine Safety Association, Sept. 23-24, 1915, at San Francisco, Calif.

It is anticipated that this meet may be even larger than that held in Pittsburgh in 1911 in which a team from the state of Washington participated. State meets are already arranged to be held in May at Pineville, Ky.; McAlester, Okla.; Huntington, W. Va.; Billings, Mont.; Moberly, Mo.; Pittsburg, Kan.; Canton, Ill.; Birmingham, Ala.; Fort Smith, Ark., and Des Moines, Iowa. The preliminary program follows:

Sept. 23—10 a.m., mine-rescue demonstration; 2 p.m., first-aid demonstration; 4 p.m., coal-dust explosion.

Sept. 24—10 a.m., first-aid contest for interstate supremacy; 2 p.m., rescue contest for interstate supremacy; 4 p.m., rock-drilling contest; 8 p.m., award of prizes and souvenirs in the Convention Hall.

The following organizations will hold indoor conferences about the same time:

Sept. 17-18, American Institute of Mining Engineers; Sept. 20-22, American Mining Congress; Sept. 20-25, International Engineering Congress; Sept. 22, California state mine-rescue and first-aid contest; Sept. 27-30, National Safety Conference, under joint auspices of the National Safety Council and the California Industrial Accidents Commission (Sept. 28 to be devoted to mine-safety conference); Oct. 6, the World's Insurance Congress discussion on the relation of insurance to mine safety.

"Thank Heaven! It's Over!"

Need of Better Discipline in Mining*

By F. G. Morris†

Recent statistics on coal-mining fatalities in the United States for the year 1914, compiled by the Bureau of Mines, show that 2451 lives were lost, or 334 less than in 1913.‡ Even though this reduction is encouraging, surely we cannot congratulate ourselves so long as so many as 2451 lives were lost. We shall doubtless find when the accident statistics of other coal-mining countries of the world for 1914 are secured that, as in former years, our fatalities have been greatly in excess of those in most countries.

We may reasonably ask, Why should our country suffer the loss of 2451 men, for we know that some other occupations and trades of a more hazardous nature suffer less loss of life per number of men employed and that England, Belgium, Germany and some other coal-mining countries which have more unfavorable natural conditions have a lower death-rate?

A thorough analysis of the nature and causes of all accidents fatal and nonfatal will show that at least 90 per cent. are preventable and only 10 per cent. might be classed as being beyond our power to prevent. The advantage of analyzing the causes of accidents and searching for a remedy is therefore most evident.

Should Not Blame the Law

We do not reason with justice when we place all the blame for our accidents on apparent defects or omissions in our statutory mining laws. We should rather lay the blame at our own door because we have failed to interpret the real intent of our mining laws and because we have not exercised the proper diligence in their enforcement nor made our employees follow the unwritten laws of the industry. The law clothes certain of us with written authority to discipline our subordinates; beyond that, our success in discipline lies in our initiative.

Too often the statement that an accident is due to the carelessness of an employee is thought to exonerate from blame everyone but the unfortunate victim. This is not true; the carelessness may well be due to the fact that the man had never been properly disciplined. He may have been similarly careless several times and his persistence in wrong methods have been overlooked. Finding that disobedience to rules of safety did not result in any personal inconvenience he continued his unsafe practice until finally it proved fatal or he was injured.

Culpability May Be Indirect, but Responsibility Is Clear

Moreover, sometimes the accident arises from the fact that the foreman fails to examine a working-place, being satisfied with the assistant's investigation, which indeed may satisfy the law, but should not quiet the conscience. And the foreman is not always wholly to blame, for he may have too large a territory to supervise or too little assistance. The superintendent may thus be, in part, the guilty party. "John Doe," the killed or injured workman, may have been careless; yet when that has been stated, it does not relieve all others of their responsibility.

Moreover, many men are careless because they do not know how to be careful. They have never been taught. In short, if we would reduce the fatality rate we must not accept the legal requirements as a measure of our accountability, but place the obligations of assuring safety on a high moral plane.

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Causes of Mine Fatalities in Pennsylvania in 1914

The following official tabulation of fatalities in the State of Pennsylvania during the year 1914 will be found of interest:

CAUSES OF FATALITIES INSIDE MINES AND PERCENTAGE FOR EACH CAUSE, BITUMINOUS REGION OF PENNSYLVANIA

Inspection Districts	By Falls of Roof, Draw Slate and Coal	By Cars	By Gas and Dust Explosions, Including Suffocation	By Electricity	By Miscellaneous Causes	Totals
First	2	3	.....	1	.....	6
Second	18	6	.....	.....	1	25
Third	8	1	.....	.....	1	10
Fourth	3	2	.....	1	3	9
Fifth	5	1	.....	.....	1	7
Sixth	8	1	.....	.....	3	12
Seventh	13	2	.....	3	1	19
Eighth	1	.....	1	.....	.....	2
Ninth	10	5	.....	.....	1	16
Tenth	6	3	.....	.....	1	10
Eleventh	8	.....	2	.....	.....	10
Twelfth	6	2	.....	2	.....	10
Thirteenth	7	.....	1	.....	.....	8
Fourteenth	6	5	1	2	1	15
Fifteenth	6	2	.....	.....	1	9
Sixteenth	8	4	.....	1	3	16
Seventeenth	2	2	.....	1	1	6
Eighteenth	8	.....	3	.....	.....	11
Nineteenth	13	3	.....	3	3	22
Twentieth	13	10	.....	1	.....	24
Twenty-first	15	16	.....	2	1	34
Twenty-second	12	1	.....	1	1	15
Twenty-third	2	2	.....	.....	.....	4
Twenty-fourth	8	2	.....	.....	1	11
Twenty-fifth	10	8	.....	4	.....	22
Twenty-sixth	16	4	.....	2	.....	22
Twenty-seventh	14	2	.....	.....	.....	16
Twenty-eighth	4	3	.....	.....	1	8
Totals	232	90	8	24	25	379
Percentages	61.21	23.75	2.11	6.33	6.60	100.00

CAUSES OF FATALITIES INSIDE MINES AND PERCENTAGE FOR EACH CAUSE, ANTHRACITE REGION OF PENNSYLVANIA

Inspection Districts	By Falls of Roof, Draw Slate and Coal	By Cars	By Explosions of Gas	By Electricity	By Explosions of Powder and Dynamite	By Blasting Explosions	By Falling into Shafts, Slopes, Etc.	From Miscellaneous Causes	Totals
First	20	7	1	.....	1	4	.....	1	34
Second	11	4	.....	.....	1	6	.....	.....	22
Third	6	1	.....	.....	.....	6	15	.....	28
Fourth	10	1	.....	.....	2	5	.....	.....	18
Fifth	9	2	.....	.....	1	2	.....	.....	14
Sixth	20	5	2	1	.....	11	1	3	43
Seventh	21	8	9	.....	1	7	2	3	51
Eighth	17	5	.....	.....	.....	10	2	1	35
Ninth	15	4	6	.....	1	4	1	3	34
Tenth	20	3	2	.....	1	4	1	1	32
Eleventh	13	6	.....	.....	.....	.....	1	1	21
Twelfth	5	5	2	.....	1	1	2	1	17
Thirteenth	3	2	2	.....	.....	3	1	6	17
Fourteenth	4	1	1	.....	.....	1	.....	2	9
Fifteenth	8	5	6	.....	.....	2	3	1	25
Sixteenth	11	2	2	.....	1	4	6	3	29
Seventeenth	6	6	12	1	.....	.....	1	5	31
Eighteenth	7	2	2	.....	2	3	7	1	24
Nineteenth	9	2	2	1	.....	2	4	3	23
Twentieth	4	2	3	.....	.....	.....	.....	1	10
Twenty-first	9	3	.....	.....	.....	3	.....	1	16
Totals	228	76	52	3	12	78	47	37	533
Percentages	42.78	14.26	9.76	0.56	2.25	14.63	8.82	6.94	100.00

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*Brief abstract of paper read before the Alabama Safety Association, Mar. 13, 1915.

†General superintendent, Republic Iron & Steel Co., Sayreton, Ala.

‡Though the fatalities in 1914 were lower than those in 1913, they were more numerous than in 1912 by 91. Moreover, in 1912 more coal was produced than in 1914. The tonnage per fatality in 1912 was 226,469, and in 1914 about 208,078.—EDITOR.

The Labor Situation

SYNOPSIS—The Gallagher amendment fails to pass the Ohio Legislature, leaving the Green Anti-screen act in full force. The validity of the agreement not to strike was finally withdrawn from the court by the Elk Coal Co. A contract has been signed in British Columbia and Alberta.

The Ohio House of Representatives defeated the Gallagher amendment, which would have given the coal operators of Ohio the right to pay their men either on a run-of-mine or screen basis. The Ohio Senate had passed the measure by a good margin, and the House Committee on Mines and Mining had reported out the bill without any recommendation.

The vote stood 53 to 52, but as a two-thirds majority was needed, it would have been necessary under the provisions of the State Constitution for 9 votes to have been reversed if the amendment was to become law. Many members absented themselves rather than vote on the measure. Before a vote on the amendment itself was taken, the emergency clause practically making it effective at once was submitted to the ballot and defeated.

It Is Said that Miners and Operators Are Playing Politics

The eastern Ohio operators are angry and openly declare that the legislators were playing politics. They allege that some of the members of the House do not want the question brought before the Governor for his approval or veto. It is claimed that the tax decentralization bill, a pet administration measure, is being held up in the Senate by those who favor the Gallagher amendment and will not be passed until the House passes the latter. There is little hope that the Gallagher bill will be reconsidered.

In other ways the strike situation in eastern Ohio is unchanged. The operators are still waiting for something to turn up, and since the Gallagher bill has failed of passage some believe that President Wilson and the federal officials will take action—what action is a matter of conjecture.

The miners have been notified that the free seeds of the federal Department of Agriculture have already been distributed to the extent of the congressmen's allotment. Consequently the miners cannot depend on that source for the planting of the small farms which they have secured. A collection is being made for funds, so that seeds may be purchased in the market.

"General" Coxey Signs the Eastern Ohio Scale

"General" Jacob S. Coxey, the one-time famous leader of tramps who invaded Washington in the nineties, is now a coal operator or expects to be. He has signed the 47c. scale with the miners' organization, and has secured an option on the mine of the Meister Coal Co., at Flushing, Belmont County, Ohio, for 20 days, the purchase price being, it is said, $100,000. He has agreed to take back all the men now on strike who formerly worked at the mine. The contract is signed in the name of the Massillon-Belmont Coal Co. It is said he will operate the mine on the coöperative plan. In 1913 this mine employed 105 men.

Meanwhile the Ohio mining department and philanthropists in Columbus have made an appeal for supplies, including food and clothing, for starving miners and their families in the Sunday Creek valley of the Hocking Valley district. Mines in that section have been closed and many of the miners are destitute.

End of the Roseville Litigation

The strike at the mine of the Elk Coal Co. at Roseville, Ohio, was settled last week, and the 145 men involved have returned to work. As has been stated in these columns the coal company discharged three miners for breaches of discipline and all the men went on strike. The union officials tried to keep the men working and to have the trouble adjusted in the usual way, but they failed. Finally the charter of the Roseville local was forfeited by the state union officials. At the same time the Elk Coal Co. brought a suit for $25,000 damages against the miners individually for failing to carry out their contract. The miners countered with a number of suits to collect wages due, amounting to approximately $4000.

By the terms of the settlement the men go back to work, and the cases of the three discharged miners will be adjusted by arbitration under union rule. All of the suits have been dropped.

The men in two of the five mines of the Boomer Coal & Coke Co., Boomer, Fayette County, W. Va., a town on the north branch of the Kanawha River, went on strike Apr. 15 and returned to work on the following day. Two men were discharged as a result of a dispute regarding the yardage rate for the removal of slate. The two men were reinstated by the company, and an effort is being made to obtain an agreement which will remove possibilities of further misunderstandings. There are 1200 men working at the Boomer mines, but barely 500 of these were affected by the strike.

Three hundred men of the Hutchinson Coal Co. at Mason, Mason County, W. Va., a town on the south side of the Pomeroy Bend on the Ohio River, went on strike on Apr. 12. There is a strike also at Mucklow on Paint Creek, resulting in some way from the abandonment of room-driving and the concentration on heading work. It does not involve the Paint Creek Collieries Co.

The Vesta Trouble at an End

The Vesta Coal Co. at its operation at California, Washington County, Penn., on the west bank of the Monongahela River, has agreed to reinstate John Dale as checkweighman, to withdraw the charges against the men and women arrested and the eviction notices against seven men in the company employ. As a result the company will resume work at No. 5 mine. About 800 men were affected by the dispute and consequent strike.

Recent Oklahoma Wage Settlements

On Apr. 10 Peter Hanraty, of McAlester, Okla., the new president of the district union, made an agreement with the Blue Ridge Coal Co., of Chant-McCurtain, Okla., relative to the wage scale. A union-wage contract was also signed with the Samples Coal & Mining Co., near McAlester. This mine is small and produces about 200 tons per day; it has been worked by the Osage Coal & Mining Co., receivers. Hanraty has also made an agreement with the Kali-Inla Coal Co., one of the Bache-Denman subsidiaries operating near Gowen, Latimer County, Okla., on the Chicago, Rock Island & Gulf Ry. This company was involved only as a creditor of the ten Bache-Denman companies which went into receivers' hands as a result of strike violence.

New Agreement in British Columbia and Alberta

A new agreement has been made between the Western Coal Operators' Association and the representatives of the coal miners of Alberta and the Crowsnest district of British Columbia, which together comprise District No. 18 of the United Mine Workers of America. The miners voted on the acceptance of the terms of this contract on Mar. 28, upward of 4000 men casting their ballots. Seven of the locals—Corbin, in British Columbia, and Bellevue, Blairmore, Canmore, Georgetown, Kipp and Nordegg, all in Alberta—voted against acceptance of the new agreement, while 11 favored its ratification. While official figures are not available, it is reported that the majority in favor of the new agreement was about 1200 votes.

The minority showed much strength, for which the increased cost of living and several new clauses in the agreement were no doubt responsible. It is also safe to add that had industrial conditions been more propitious few indeed would have cast their vote in favor of any proposition that did not give an advance commensurate with the abnormally high prices of commodities. The mines throughout District No. 18, which supplies coal to northeastern Washington and northern Idaho and Montana, however, are not being worked on full time, so with the coal supply much in excess of the demand there was nothing for the miners to do but accept the best terms which their representatives had been able to secure.

A Short-Time Contract with Fines for Violations

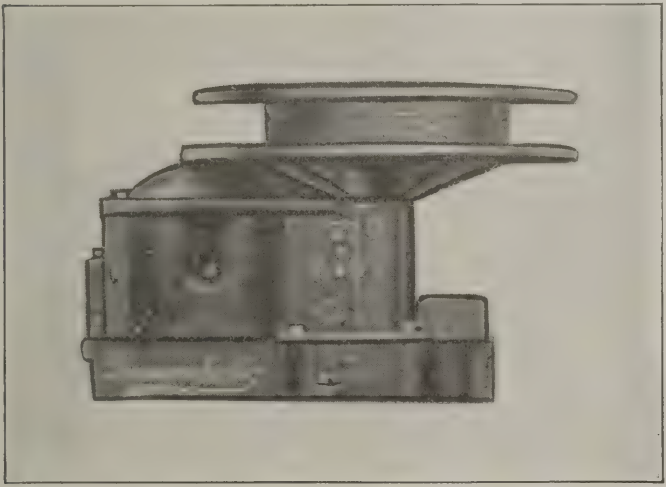
The term of the new agreement is for only two years, while that which expired on Mar. 31 had been made for three. The operators contended for a four-year term, but eventually gave way. The number of persons on the committee for the settlement of disputes was changed, allowing three representatives each for miners and operators instead of one as formerly provided. The procedure for settlement remains as before. To prevent local strikes by the employees and lockouts by the operators, a fine of $1 a day is levied on each man who refuses to work; a similar fine is placed on the operator of $1 a day for every man involved in a lockout. All decisions and rulings in connection with the settlement of disputes under the old agreement stand under the new. It is provided that no rulings of the United Mine Workers of America, either now in force or hereafter passed, shall have any effect on the new contract.

New Apparatus and Equipment

Believing that one of the greatest services that a journal such as Coal Age *can render its readers is to acquaint them with new and improved equipment which may be employed directly or indirectly to the benefit of the coal-producing industry, this department is inaugurated. For the present it will appear in the second and fourth issues of each month. We shall therefore be glad to receive from builders, manufacturers or dealers brief descriptions of new or improved pieces of apparatus in which they are interested, the use of which will tend toward better results in or the economic development of the fuel industry or any of its numerous ramifications.*

Gathering Attachment for Mine Locomotives

It is frequently desirable to use the larger locomotives about the mine for work other than that for which they have been primarily installed. It is often convenient to be able to use these machines for handling a few cars or for even handling one car from points which cannot be reached by means of the trolley wire, such as in the extension of headings, in rooms, around the tipple and under other similar conditions. There are also many occasions when these locomotives are not being operated to their maximum capacity and when they could be used in place of the smaller gathering locomotive with a considerable reduction in the cost of operating the mines on short tonnage.



The Gathering Attachment

An inexpensive, compact and powerful little device has been introduced for this purpose and is being manufactured by the Pneumelectric Machine Co., Syracuse, N. Y. It is called the Pneumelectric gathering-attachment for mine locomotives. It is at present being used successfully and lends itself admirably to the purpose for which it was designed.

A motor built especially for mine service, a low flat spool or drum, motor-pinion, drive-gear and band-brake are the elements making up this attachment, and owing to the few parts involved it will be noted that it is most simple. The motor and gearing are completely inclosed, and fully protected from dust or damage of any kind, while the motor is of sufficient capacity for an 800-lb. rope pull, which is amply sufficient for the work which has to be done by a device of this nature.

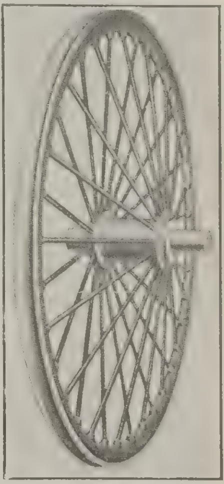
The base is so designed that it can easily be attached to the end frame of the locomotive, and as the extreme dimensions are but 18 in. height, 18½ in. width and diameter of drum or spool over the flange 23 in., it can be placed on any of the standard locomotives without in any way interfering with the operation of the machine in the usual way or occupying space required for any other purpose.

A New Bicycle Type of Hoisting Sheave

The Medart Patent Pulley Co., of St. Louis, Mo., has recently placed upon the market what is called the Medart bicycle type of hoisting sheave. This is not particularly dissimilar in appearance from many bicycle-type sheaves that are at present in use. It is, however, so constructed that expansional stresses in the rim and hubs are entirely avoided.

The spokes may be made of either wrought iron or mild steel, and the rim and hubs are ordinarily composed of cast iron. For extremely heavy duty, however, these parts may be made of semi-steel, which for this class of service is more durable and satisfactory.

These wheels may be furnished in any size up to 15 ft. in diameter, the size of course depending upon the nature of the work to be done and the diameter of the rope or cable which passes over the sheave.



One of the New Sheaves

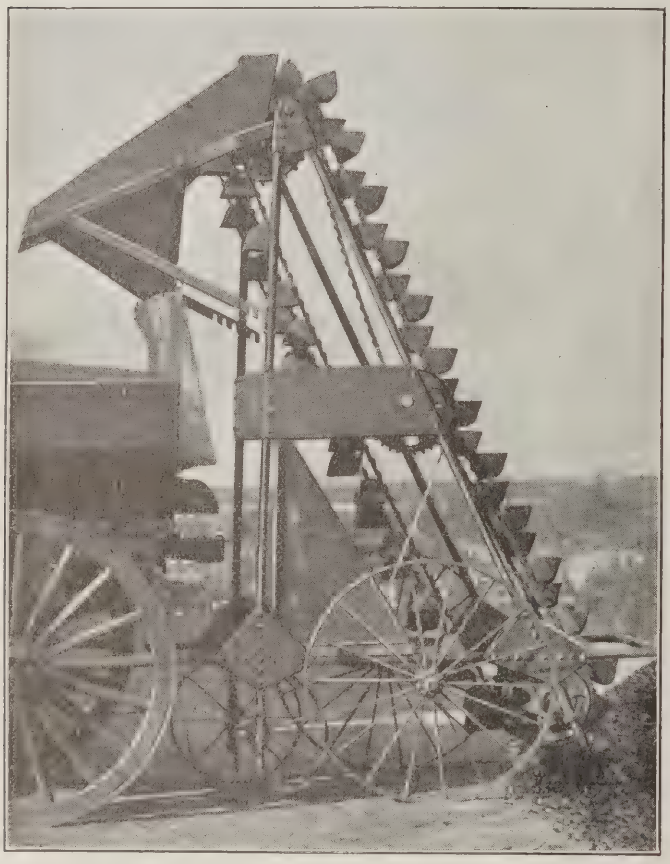
A New Wagon Loader

A new device for loading coal, sand, gravel or other granular material upon wagons from stock-piles or cars has been placed upon the market by the Hudson Machinery Co., Park Row Building, New York City.

This device consists of a triangular framework of pipe mounted upon suitable wheels and carrying a double conveyor chain driven by either a gasoline engine or an electric motor. An adjustable chute, which may be equipped with a screen, is also provided.

This machine weighs 1400 lb. and may be easily handled by two men, while one man may readily move it upon a suitable platform or other comparatively smooth and unyielding surface. When equipped with a 2-hp. motor or engine it will handle from 50 to 60 tons of coal per hour.

The particular advantage of the double chain provided with small buckets is that a more uniform torque is brought upon the engine or motor. This also eliminates the severe strains produced by large buckets. The elevator and chain shafts are all provided with ball bearings, which at once reduce the friction of these parts and render frequent oiling or greasing unnecessary.



The New Loader Filling a Wagon from a Stock-Pile

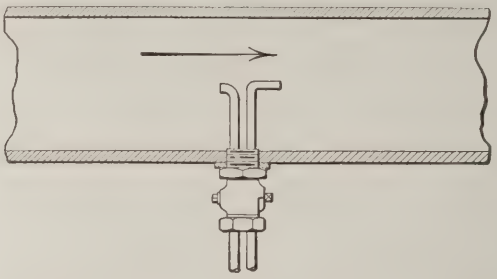
Since the material is delievered from the elevator chain to the chute in a practically continuous and unbroken stream, the efficiency in screening is maximum. A suitable hopper for the screenings is provided, and when it is not desirable to screen the material being handled a plate may be substituted for the perforated screen.

A New Steam Flow Meter

A new steam flow meter which has met with success in England is being placed upon the American market by James G. Biddle, of Philadelphia, Penn. This instrument is known as the Curnon steam meter and is especially applicable to the medium size or small industrial power plant for measuring the amount of steam generated or consumed by any one unit.

This instrument, which draws a continuous curve upon a 24 hr. chart, utilizes the basic principle of the Pitot tube in its measurement of steam flow. The connections in the steam pipe (see sketch) consist of a leading and trailing tube opening; the first squarely facing the flow while the other faces away from it. The difference in pressure registered by means of these two tubes will therefore be in maximum.

This difference in pressure is communicated to the drawing pen through a series of levers so arranged that the height of the line above a given datum is at all times a measure of the number of pounds of steam flowing per hour in the steam pipe. The total amount of steam generated or consumed during any period of time may be calculated by integration of this curve.



The Leading and Trailing Pitot Tube Nozzles in the Steam Pipe

Recent Legal Decisions

Inspection of Mine Machinery—A coal operator cannot delegate to an employee the duty of inspecting a coal-cutting machine or other mining machinery, so as to avoid liability for injury to another employee, but the operator may impose the duty of inspection upon employees who are required to use such machinery, so far as they are competent to make an intelligent inspection, and thereby avoid responsibility for injury to an employee caused by his own failure to make proper inspection of an appliance used by him. (Virginia Supreme Court of Appeals, Hairston vs. Pocahontas Consolidated Collieries Co., 83 Southwestern Reporter 1041.)

Abandonment of Coal Leases—A coal lease covering several tracts of land, and providing different time limits for removal of the coal from them, will be deemed to be abandoned by the lessee where nothing has been done by him under the lease until expiration of the time limits on more than half of the tracts, and after the remaining tracts have been leased to a third person. "Mere nonuse of a right acquired by contract does not, in itself, constitute an abandonment of that right, but nonuse coupled with other circumstances and conditions which expressly show an intention to abandon, when acted upon by the other party interested, has the effect of destroying the rights acquired." (Iowa Supreme Court, Ray Coal Mining Co. vs. Ross, 151 Northwestern Reporter 63.)

Operation of Mines by Independent Contractors—When an owner of coal property contracts with another for its development, he is under no obligation to the latter's employees to provide safety appliances. It is even held that where a mine, with certain existing tracks, etc., was worked under such a contract, the owner was under no duty to provide a derail at the mouth of the mine to avoid injury to miners through cars running away down the track. The miners must be deemed to have assumed the risk of negligence of their coemployees in permitting the cars to escape control, if they knew that a block was the only means of stopping the cars. (Alabama Supreme Court, Connors-Weyman Steel Co. vs. Kilgore, 66 Southern Reporter 609.)

Authority of Representatives—In a suit involving a coal company's liability for a contract made by a representative for purchase of certain mining rights on credit, it is held that where agency is disputed by the person sought to be held as principal it cannot be proved merely by showing declarations of the supposed agent as to his authority. A principal is responsible for contracts of an agent made within the scope of his apparent authority, although they may not have been expressly authorized. An agent has power to pledge his principal's credit only when there is express authority to that effect or the power is inferable from the fact that no funds have been provided to enable a purchase for cash. By retaining the benefits of a contract made by an agent, his principal ratifies the transaction, regardless of whether it was expressly authorized. (Kentucky Court of Appeals, White Plains Coal Co. vs. Teague, 173 Southwestern Reporter 360.)

Editorials

Royalton, Ill., Rescue Work

Some time ago we published an account in small type of the Royalton, Ill., explosion. Our action in thus soft-pedaling the achievement of the Illinois rescue corps was as "small" as the type in which it was printed. Since Layland, we have learned better. For at Royalton, the mine was explored in less than 24 hr. and in foul air.

No one was saved; no fires were extinguished, because no living persons remained in the mine and the coal had not become ignited. But what was done was done right, and had the opportunity presented, men would have been saved and the mine truly salvaged. As it was, it remains a feat which lacked only occasion to make the public herald it as glorious.

It is fortunate that Illinois has such rescue corps, for it greatly needs them. The coal is quite susceptible to fires. Wherever black powder is used it is customary to employ runners to put out the many conflagrations which are started by the shot-firers, and this precaution is often taken even in many mines where permissibles are employed.

In fact in all mines, except perhaps those of Pennsylvania, the risk of coal fires following an explosion and causing another disaster must always be considered, and exploration should largely be done in foul air. The first duty is to look for fire and for live men; a secondary consideration indeed is the removal of bodies and the restoration of the air current.

It is true that the Pennsylvania and perhaps even the West Virginia mine inspectors may be justified in their defense of fresh-air work. In those states it is possible that the advantage of oxygen apparatus is alone in the speed of exploration possible with its help. The main work in those states is to find entombed men. The possibility of fire and a second disaster unless caused by an open light is remote in Pennsylvania. In fact we do not recall a case, though instances of a second explosion are not unknown even in the anthracite region. These secondary disasters have, however, been due to ignition of firedamp by open lights as at the Brookside mine.

To our mind the Layland rescue work is a forcible exhibit of the value of oxygen apparatus, because it shows how slow fresh-air methods must be even with the best of management. No one doubts that the recovery work was valorously and skillfully performed as a piece of fresh-air work; but, like all recovery dependent on ventilation, it perforce must move slowly.

Rescue work with oxygen apparatus is like aëroplane work in war, while fresh-air methods resemble the advance of infantry. In the latter case the roads must be cleared to carry forward props and brattice cloth, the airways must be opened wide to supply air, and the progress of recovery must always be slow. The force engaged must also be proportionately large.

Viewed as fresh-air recovery, the Layland rescue work was a complete success by every account so far published, and also by records hitherto established, but oxygen-apparatus work would have been absolutely safe against the fire risk and more rapid in its performance. To this latter statement exception has been taken, because it has been said that work in advance of the air would have discovered the miners early only to expose them to the foul air and to end in their death.

It is true that had the entombed miners at Layland been discovered earlier by the oxygen-apparatus men they could not have been rescued at that time, and perhaps the rescuers might have been imprudently desirous of breaking into their prison house before the air was made fit and were prevented from so doing by the delay in discovering the men. We should not be asked to assume, however, that such a folly was possible on the part of the rescuers. Had they known where the live men were, safe methods of rescue might well have been put into operation and all the men removed in a short while.

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Muzzling the Ox Which Treads Out the Corn

Nemesis follows the unjust, but the unjust do not know it. Such an injustice was well exemplified in a conversation recently overheard. The fate which follows the injustice is perhaps not so obvious, but none the less inevitable.

A coal-man was discussing the ammunition question—just now such an acute subject for discussion—with two representatives of manufacturing concerns. The coal-man questioned whether the charter of a certain corporation manufacturing motors and containing "motor" in its title would permit it to make shrapnel.

In support of the probability of his surmise he instanced a case in his own experience where he had been hampered by unreasonable charter restrictions. He had a plot of ground in Pennsylvania underlaid with both coal and iron and wanted to charter a company to mine both, but found that Samuel W. Pennypacker, then governor, was strongly opposed to granting a charter giving a single company a right to mine all the minerals on one piece of land.

While the coal-man recovered his breath, his two manufacturing friends broke the silence together. It was clear to them, they argued, that a great difference existed between the mining of an essential product like coal and the manufacturing of any article whatsoever. The interest of the public was paramount. The integrity of your coal corporation might possibly be so sullied, if it had too liberal a charter, that the public interest would suffer. "Coal is coal," was the unanswerable argument—unanswerable because it made no pretensions of logic.

When the parties passed out of sight we heard the coal-man in vain protesting that the man who produced an essential of life was performing a service to the community, and in proportion to the importance of his service to mankind should be the solicitude of the public for his welfare. Because he was a benefactor was no reason why he should be plucked and made to pursue his business of mining coal and iron under exceptional restrictions while the man who specialized in billiard tables, golf-balls, ornamental ironwork or motor cars was free. The public did wrong to argue of the latter that "his are minor services; he is a negligible factor in the world anyway; therefore let him get rich as he will; it is no concern of ours." This argument makes a privileged character of the saloon-keeper and the manager of a faro table.

The coal-man was not a logician, but it may be well to add here to what he had to say. The public thinks that, in its private interests, in its desire for cheap fuel, it can override the coal producer. That it may have money for its beer and skittles, it can rob by unfair legislation and dishonest discrimination the man who supplies what we all must have. But justice forbids and the dishonest public must suffer for its folly.

As a result of this false reasoning, this tipping of the scales of justice, the coal industry has become the inefficient tool that it now is. As there are few profits, the plants are wasteful; the machinery installed is half what it should be. There are no coal conveyors in the mine; hand-drilling is universal; steel timbering and ties make slow headway; creosoted timbering is almost unknown; tipples are often of wood, and the houses are of the most impermanent construction.

But worse yet, bituminous coal is shipped to market as coal and not in an improved condition—as coalite, for instance; the byproducts are not taken from it, nor is its power to smoke removed. Of course, the coal is often coked, but even then the byproducts are usually wasted. The corporations which could sell power instead of coal waste effort by shipping fuel to the market, the burning of which pollutes our towns and cities. The lack of profits has held the industry back or long ago the coaling stations along the railroads would have given place to generating power-houses, and the best land would be along the railroad tracks instead of on the hillsides or several blocks from the station.

The coal companies despoiled by continued adverse action can never render the public an efficient service and have drifted steadily into the hands of the railroads as a natural consequence of the pauperization which unlimited competition has forced on the industry. Then the public, seeing the lack of progress of coal mining, baits the business for being unprogressive, for waste, for missing opportunities—for all the follies of which the public is really guilty. With their hands on the gullet of the coal-man they chide him for his reddening and blackening countenance.

Let the public be fair; let it beware of muzzling the ox which is treading out the corn. Fairness always pays. If the miner had not blackened the operator, the public might have permitted the latter to make remunerative prices and might have enabled him to give the miner the generous treatment a successful man can alone mete to his dependents. If the operator would think kindly of the miner he, too, would respond, and the relations would be more cordial. And if the public would unknight the "coal baron" and realize that he is an extremely useful citizen to be encouraged and not like a horse to be checked by the bridle at every turn of the road and jolted at every steep pitch, he might make, after a few years of development and invention, a generous profit at prices which now place him in the bankruptcy court.

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Technical-Book Writing

The writer of a technical book should visualize his reader and try to help the man thus defined. In the early part of many books the author assumes that his reader knows little or nothing. Toward the end that reader, if he is able to assimilate the information offered, must have become a perfect mint of knowledge along certain lines of inquiry, and there is no information contained in the volume whereby he could thus increase his learning in those directions. The book may be instructive in other lines, but it does not contain the key to the technical problems which are lightly passed over in succeeding pages as if already made patent to the impatient reader.

There is room for books for beginners, also for those covering the whole transition from A to Izzard of any department of knowledge, and there is a place for volumes written for the erudite only, but there is no excuse for those books which are ultra-elementary at the start and highly technical in the finish, yet which do not provide the means to pass from the simple to the abstruse.

A book on electricity may be written either for the motorman or for the chief electrician, but having chosen an humble audience the author does ill to forget for whom he is writing and is careless if he casts in a lot of recondite learning the meaning of which is not to be attained without a long course of study. A difficult word here and there can be overlooked, because dictionaries are common, but new concepts, undescribed devices and advanced mathematics are inexcusable follies. The man who buys such a book is like the man who thought he had a ticket from New York to San Francisco and found he had a pass to Chicago and one from Omaha to the Coast and none for the journey through the Middle West. Such a book is written to sell rather than to instruct.

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Indiana Operators Form an Exclusive Selling Agency

Numerous meetings have been held by Indiana operators recently to discuss and formulate plans to organize a selling agency in which all the producing companies will pool their interests, restrict output in accordance with market requirements, and generally coöperate toward eliminating unsatisfactory conditions which have prevailed in the sale of Indiana coals during several years past. Most of the large producing companies have signified their willingness to join this movement, and it is reported that 80 per cent. of the Indiana production will be represented in this coöperative organization.

Wasteful competition has become so serious that the producers who have been opposed to this plan in the past are now willing to promote any reasonable scheme which will promise living prices for their coal. It is stated that the Federal authorities at Washington will interpose no objections to this arrangement if organized on proper lines. This is one of the most important coöperative-sales ventures ever launched in the West, and must, perforce show beneficial results for the Indiana mines and set forth an example which can well be followed by other producing states.

Discussion By Readers

Fire Protection at Mines

Some time ago the necessity for adequate fire protection was discussed in COAL AGE. Notwithstanding the importance of the matter, as was then pointed out, there are but few mines where even ordinary precautions are taken. Some companies, however, have seen the necessity for fire protection and have adopted measures to insure themselves against unnecessary loss.

The system in use at the mines of the Lehigh Valley Coal Co. is, in my opinion, worthy of note and well worth copying. At the mines of this company, in addition to the usual fire extinguishers a sufficient number of fire-plugs are located at convenient points to protect the buildings. Each plug with its 300 ft. of 2½-in. hose attachment has a suitable housing to protect it against the weather.

The hose company at each mine is composed of a chief and five men, all of whom are temperate in their habits and reliable. As they receive extra compensation for the time spent they are always ready and willing for practice. The fire-drills, which occur semimonthly, are held at lunchtime so as to avoid unnecessary interference with the regular work of the mine.

The signal for fire is one long blast of the whistle, followed by a number of short blasts indicating the plug, and this signal is repeated three times.

By constant practice the fighting force becomes very efficient. Immediately after the first blast of the whistle a mad race takes place for the plug, and in a short space of time a stream of water is playing on the imaginary fire. At a recent drill at one of the mines the men covered a distance of 3000 ft. and had the water turned on the assumed fire in exactly 6 min.

THOMAS QUINN,
O'Gara Coal Co.

Harrisburg, Ill.

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Liquor Question in Mining

Letter No. 1—Referring to the liquor question, to which attention has frequently been drawn in these columns, permit me to mention one phase or condition that has not received the attention it merits; that is, the financial burden the drink habit imposes on a community.

I am not speaking now of the upkeep of jails, reformatories, hospitals, insane asylums and poorhouses, although the tax for the support of these institutions would be greatly decreased if the liquor traffic was abolished. An even greater burden, however, is that imposed on the thrifty miner by an improvident neighbor, making donations of clothing, food and money necessary to prevent suffering and starvation in time of distress and need.

A short time ago an incident occurred that is not uncommon in all mining communities. At a meeting of the men of the place, one of the speakers told briefly of the needs of a certain family residing among them, stating that the mother was left with the support of three small children and, being unable to pay the rent, had asked permission to store her household goods in a neighbor's toolhouse. The husband and father of this family, who was a hard drinker, had met with an accident that had crippled him for the time.

It was well known that during a temporary "dry spell" this man had been a "boot-legger." But a community of miners would never permit a fellow-workman to suffer, and a liberal donation was made in response to this appeal, although the givers could each have pointed to dozens of laboring men who, under the same circumstances, would have been able to tide over the misfortune without aid from others. In some communities where saloons abound, the subscription paper is as familiar an object as the pay envelope and in almost every case the trouble can be traced to the drink habit.

The difference between the man who spends his earnings for drink and the man who saves is more pronounced during the periods of enforced idleness so frequent about the mines. At such times the drinking man finds himself without money or credit and becomes the necessary burden of his more thrifty neighbors. If the suspension of work is prolonged, the industrious and sober class often find themselves short of funds; but their credit is generally good in the expectation of an early resumption of work.

At the close of such a period, it happens too often that the sober element face a heavy debt, a large portion of which would rightly be shared by the improvident class who have been nourished and supported by the others, but who now start work free of any recognized debt. To such an extent is this condition of affairs true in mining towns where saloons are permitted that most hard-working miners are beginning to realize that liquor in a mining town is an unqualified evil. But for the burden laid on them as a result, many would be willing to let every man follow his own course of living, pleading as an excuse, "Am I my brother's keeper?" Good judgment and sound common sense, however, lead these men to protest against the drink habit.

These observations are the result of my own experience in this neighborhood, which is a mining community, and I am proud to say allows no one to suffer regardless of whether he is worthy or unworthy of help—necessity is the deciding factor. There is no doubt that this experience can be duplicated in other fields of labor, since no community or industry has a monopoly of either vices or virtues. Let every man who has observed the evil of the drink habit do what he can to suppress it in his own community.

GEO. N. LANTZ.

New Straitsville, Ohio.

Letter No. 2—Having been directly concerned in coal mining, in one capacity or another, for the past 32 years, and for several years having served as mine foreman, I feel the great need of an active campaign against the liquor traffic in mining towns and camps.

I have observed with deep concern the degrading effects of drinking on miners enslaved by the habit. In many cases, the drinking is carried to excess, and Saturday night and Sunday are spent regularly in drinking and carousing. As a result the miner goes to work Monday morning totally unfit for his duties in the mine. Tuesday he is little better; but the last days of the week he bestirs himself and works like a demon in preparation for another carousal at the week-end, which is his regular habit.

The effects of a miner's drinking are not confined to himself alone. He is a source of danger in the mine, not knowing how to protect himself or to safeguard his fellows. My experience and observation have taught me that liquor is the direct cause of hundreds of mine accidents.

Although it is true that the saloon is excluded from some mining camps, in many cases this condition is offset by the work of the "boot-legger." He is a man who is licensed by the Federal Government, through its Internal Revenue Bureau, to sell liquor in any part of the country without molestation by the revenue collectors.

I have made a little investigation on my own account along this line and find that the Federal Government practically holds that on the payment of a small revenue tax the party making the payment is free to engage in the sale of liquor anywhere within the United States, so far as the Federal Government is concerned.

Having this license, the "boot-legger" generally finds it an easy matter to evade the state or county officers. But if, perchance, he is brought into court his sentence is light, and he escapes without a fine by serving from 15 to 30 days in jail. The Federal Government practically says to these men, "You must run your own chance with the state or county authorities, but you will not be molested by this government after paying the license fee required.

As I understand it, the National Administration, through Secretary of State Bryan and Democratic Leader Underwood, refused to indorse the proposed constitutional amendment that would do away with the liquor traffic throughout the country. The reason given for this refusal was that prohibition was a matter to be handled locally by the several states and counties. Nevertheless, without a protest from these "states'-rights" advocates, the Federal Government continues to license liquor selling, even where that selling would be a violation of a state or county law.

Permit me to ask, Is such action consistent in itself? It is well known that "boot-leggers" fear Uncle Sam, who brooks no trifling with his revenue regulations. They do not hesitate, however, to take chances with state and county authorities. To this extent, is not the Federal Government lending its aid to violators of state law? In some cases the court has ruled that internal revenue collectors could not be compelled to testify concerning the business of "boot-leggers" who had paid the internal revenue tax.

I want to ask, Is it not possible to enact a law that will wipe out this scandal? The cry of "Safety first" comes from the North, South, East and West, while its direct cause is licensed by the supreme government. It is my belief that three-fifths of all accidents and crime are the results of the manufacture and sale of liquor, which affects alike all industries of the country. Let us hear from many on this question that so vitally concerns the success and safety of all.

A Mine Foreman.

Roope, Tenn.

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Longwall in the Pittsburgh Seam

Letter No. 6—I want to say a few words in reply to Engineer's Letter No. 2, Coal Age, Mar. 6, p. 431, regarding the working of No. 8 seam in eastern Ohio on the longwall plan. Although the writer of the letter states that he has had "a varied experience in eastern Ohio and the Panhandle mines," etc., I should judge he had not profited by such experience. I can see no ground for his argument condemning the use of longwall in the No. 8 seam, since this method of mining has not been given a fair trial in the eastern Ohio field.

I am well acquainted with the nature of the overlying strata in that section of the coal field and understand fully the bearing that it has on the success of longwall working. My knowledge of these conditions gives me reason to believe that the No. 8 seam in eastern Ohio can be worked successfully on the longwall plan. I freely admit that the limestone, as stated by Engineer, "gradually sags or bends under the enormous weight until it comes to rest on the mine floor." While this effect produced in the strata demonstrates an enormous roof pressure, it does not prove that this pressure is necessarily exerted on the face of the coal.

When longwall work is properly conducted, it is well adapted to avoid the harmful effects of great roof pressure. This result, however, cannot be accomplished by "leaving sufficient pillars," as Engineer seems to suggest or by leaving blocks of coal. Such measures would throw the pressure on the face of the coal and on the entries and roads instead of allowing it to settle firmly on the floor, where it belongs. I want to suggest that where *all* pillars and blocks of coal are removed and sufficient packwalls are well built there need be no fear of the occurrence of an extensive squeeze or any excessive pressure being thrown on the face of the coal or on the entries.

Since reading the letter of Engineer, I have talked with many men in this district who have had from 30 to 60 years' experience in all systems of working coal, and these men have expressed the same opinion; namely, that the longwall system can be successfully applied to the working of the No. 8 seam in eastern Ohio if men are employed who understand that system of working practically and are able to put the system in operation either when opening a new mine or when starting longwall from room-and-pillar workings.

I am informed that the mines on the Norfolk & Western Ry. are working the longwall system, also that a Pennsylvania company has adopted that system at one of their mines. I have also had letters from several coal companies in West Virginia stating that they are going to adopt the longwall system in mines they are operating.

In closing, I want to draw attention to Engineer's statement that "invariably when a superintendent and mine foreman from Pennsylvania take charge of a mine, either in this district or the West Virginia Panhandle, they want to start to draw the pillars as they do in the same seam in the Pittsburgh district." I will say that the roof pressure would not stop these superintendents and foremen from drawing the pillars if a proper system of mining was adopted in those mines. It would then be far better that the pillars be taken out in order to allow the roof to settle firmly on the bottom.

I will say further that there is not a mine in this district that is getting out 85 per cent. of the coal, while in my opinion it is possible by the adoption of the longwall system to extract from 95 to 98 per cent. of all the coal in the seam. I might venture to assert that in some of these mines the coal extracted does not exceed from 45 to 60 per cent. of that in the seam at the present time and with the present system of mining.

G. R. Waddell.

Moundsville, W. Va.

Experiences in Rescue Work

The recent references to the Layland mine explosion that occurred Mar. 2, in the mine of the New River & Pocahontas Consolidated Coal Co., as described in Coal Age, Mar. 20, p. 508, recalls my own experiences in rescue work in mines of the Pocahontas region. I am led to refer briefly to these experiences in view of the remarks made by Chief Inspector of Mines R. A. S. Redmayne, in his report of the Cadeby Main Colliery explosion, which occurred in South Yorkshire, England, July 9, 1912.

As stated in Coal Age, Vol. 3, p. 953, Mr. Redmayne in this report condemns the lack of organization at mines, by reason of which men are permitted to enter the mine unauthorized, following an explosion. He is said to have advanced the opinion that "the management of a colliery is not justified in allowing persons to risk their lives in the recovery of dead bodies. There is always great risk of a second explosion when a fire is known to exist underground. It sometimes requires much moral courage to restrain oneself and to prohibit others from undertaking a risk of this nature."

No doubt these remarks were suggested by practical facts in Mr. Redmayne's own experience; but it is a hard proposition to deny volunteers the privilege of entering a mine immediately after an explosion for the purpose of rendering any possible aid to fathers or brothers who may be entombed in the mine workings.

In the past few years the question of rescue work in mines has received much careful attention. Many forms of rescue appliances and devices have been developed, and much useful information and instruction have been given throughout the coal-mining states by the federal Bureau of Mines, by means of instruction cars that travel from place to place in the various mining districts.

Much credit is due to the Bureau of Mines for the great work it has already accomplished along this line, and it is the earnest desire of all well-minded mining-men that this effective work shall continue. It is much to be regretted, however, that there are yet some operations that have not provided such rescue appliances, while they know that they may need these at any moment for the preservation of life and the security of property.

The mining laws of many of the coal-producing states require that the mine equipment shall include such apparatus as will enable the rescue of men from mine workings and the resuscitation of men overcome with gas, besides a proper supply of approved safety lamps, first-aid outfits, blankets, stretchers and ambulances, for the care of the injured. For example, the following sections relating to resuscitating apparatus and rescue crews are taken from the revised (1913) coal-mining laws of Colorado:

> Sec. 89. Every mine employing as many as 25 men underground shall be equipped with apparatus as follows: One resuscitating apparatus, a suitable supply of auxiliary apparatus, and "first-aid-to-the-injured" outfit, including stretchers with a woolen and waterproof blanket for each stretcher and a suitable supply of olive or linseed oil.
>
> Sec. 90. The owner of every mine employing as many as 100 men underground shall endeavor to have trained for rescue work as many as three crews of four men each, and the owner of every mine employing fewer than 100 men underground shall endeavor to have two such trained crews.

My own experiences in rescue work began Feb. 8, 1906, when a local explosion occurred in the Parral shaft, at Parral, W. Va., where I was engaged on a contract of rockwork for the White Oak Fuel Co. The explosion occurred in the evening, just before the night-shift descended the shaft. The water-bailers, as was their custom, had preceded them to bail the water from the working-places, in preparation for the work of the nightmen.

On hearing the report of the explosion, I ran to the shaft and found the cage hung up in the headgear. This was soon released, however, and the mine superintendent and myself descended the shaft slowly by a prearranged set of signals. Owing to the débris blown into the shaft, the cage could not touch bottom, but we succeeded in getting down to the entry and rescued one of the water-bailers who had been thrown down with his mule close to the shaft bottom. This man was taken to the surface and recovered from his injuries completely in a few months—the result of quick rescue work.

Another explosion occurred in the St. Paul district of the Pocahontas mine, at Pocahontas, W. Va., Oct. 3, of the same year, when 35 men lost their lives. A previous explosion that occurred in the same mine, Mar. 13, 1884, killed 112 men, including the general superintendent of the company, who was overcome by the afterdamp on entering the mine for the purpose of rescue.

At the time of the second explosion (1906) I was employed at an adjoining mine, and in answer to a call for volunteers, in company with others, I assisted in the rescue work, which was under the efficient direction of William Lockie, the general superintendent, and T. D. Dennan, a company inspector. Being practical mining-men, these officials quickly organized a rescue party, which was divided into three gangs. A few of the more experienced men were selected to explore the workings ahead of those who were engaged in building brattices and repairing stoppings, while others handled the material and carried out the bodies of the victims as they were found. The necessary tools, safety lamps and materials were soon collected and the rescuers entered the drift mouth, which was protected against intruders by ropes stretched across the entrance and a guard.

Although there were no helmets or other breathing apparatus available at that time and place, the work was pushed rapidly forward and many bodies recovered and the circulation of air restored in the mine. This work was carried as far as the top of the dip workings, when it was thought advisable to proceed no further, owing to the accumulation of afterdamp in that section of the mine. It was decided that a strong current of air would be required to remove the gas from that section so as to make safe the work of exploring. Much credit is due to the practical judgment of those in charge of the rescue work at that time.

The Lick Branch mine, near Switchback, W. Va., which was operated by the same company as the Pocahontas west mine, was visited by two explosions, resulting in heavy loss of life. The first of these occurred Dec. 29, 1908, and was followed a few days later, Jan. 12, 1909, by a second explosion. In the first instance 50 lives were lost, while the second resulted in the death of 67 more persons.

As before, I was one of those who volunteered in the rescue work and was at first employed to inspect the safety lamps before these went into the mine and later to assist in restoring the ventilation in the mine by building brattices as required. The work was well organized under District Mine Inspector William Phillips. The men worked in relays from 8 to 10 hr. each. Chief Mine Inspector J. W. Paul arrived a little later and greatly assisted the work of rescue by his practical knowledge and wide experience, with the result that many bodies were recovered and ventilation rapidly restored throughout the mine.

The second explosion occurred early in the morning, shortly after the miners had gone to work. The only man rescued in this case was Mine Foreman Bowers, who had just entered the mine and had proceeded but a few hundred feet from the drift-mouth when the explosion happened. He was blown some distance by the force of the explosion. His ribs were broken, and the man who was with him was killed. The bodies, in this case, were all recovered within three days. I assisted in the rescue work in both of these explosions, and was overcome with gas in the forenoon of the last day of the second explosion. At that time we were trying to enter some workings where it was supposed bodies would be found.

In the opinion of many practical mining-men, the decrease in the number of mine explosions in recent years is due to the increase of the knowledge of mining conditions and the causes of such explosions. Some believe that the increased use of permissible explosives has assisted in reducing the danger of explosion. However, there are many other factors of greater importance in this respect than the kind of explosives used. Among these may be mentioned the undue accumulation of dust and gas, changes in barometric pressure, sudden outbursts of gas in the mine workings, the use of mixed lights in gaseous mines, and the need of more efficient ventilation, including humidification of the mine air.

J. E. Ambrose.

——, N. M.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Calculation of the Theoretical Flame Temperature—The theoretical temperature of the flame of a burning gas is the highest possible temperature that results from its complete combustion, assuming (what is never the case in an open-burning flame) that only sufficient air is present for the complete combustion of the gas.

There is always an **excess of air** in the outer envelope or zone of a flame exposed to the air, and this excess of air beyond what is required for the combustion absorbs heat and lowers the temperature of the flame in the **outer zone.**

The temperature within or in the body of the flame more nearly approaches the **theoretical maximum,** which can be calculated. This maximum temperature is found by dividing the total **heat of combustion** above 32 deg. F., per pound of combustible, less the heat rendered latent in the water vapor produced, by the heat required to raise the temperature of the **products of combustion** one degree. The quotient obtained gives the rise of temperature above 32 deg. F., which must therefore be added to it in order to find the theoretical temperature of the flame.

Flame Temperature of Methane Burning in Air—The first portion of the process is similar to that explained in the calculation of the lower inflammable limit of methane and need not be repeated here. It was found that for every pound of methane burned there was produced **carbon dioxide,** 2¾ lb.; **water vapor,** 2¼ lb.; and **nitrogen,** 13.39 lb. So far the two operations are the same.

As before, one pound of methane, burning to carbon dioxide and water at 32 deg. F., develops 23,513 B.t.u. From this must be subtracted the heat required to convert 2¼ lb. of water at 32 deg. into steam at 212 deg., which is absorbed in the **formation of the water vapor;** thus,

$$23{,}513 - 2\tfrac{1}{4}\,(212 - 32 + 966) = 20{,}934.5 \text{ B.t.u.}$$

The result obtained is the **net heat available** for raising the temperature of the products of combustion, which constitute the larger portion of the body of the flame.

It is necessary now to calculate the heat required to **raise the temperature** of the respective weights of the products of combustion **one degree.** The weight of each of these products, as previously given, is multiplied by its specific heat for constant pressure and the sum of these products is the total heat required for each degree of rise in temperature.

	Sp. Heat	Weight	B.t.u.
Carbon dioxide,	0.2163 ×	2.75 =	0.5948
Water vapor,	0.4805 ×	2.25 =	1.0811
Nitrogen,	0.2438 ×	13.39 =	3.2645
Heat absorbed, per degree rise........			4.9404

Finally, the **rise of temperature** in the body of the flame that is possible, in this case, assuming that all of the heat developed is absorbed by the products of the combustion only, is as follows:

Rise of temperature, 20,934.5 ÷ 4.9404 = 4238 deg. F.

This rise of temperature, like the heat developed by the combustion, is estimated from 32 deg. F. The theoretical flame temperature is therefore 4238 + 32 = 4270 deg. F.

The Coal Age Pocket Book

Flame Temperature of Carbon Monoxide—The first step is to write the chemical equation expressing the reaction that takes place when carbon monoxide burns to carbon dioxide, ignoring for the present the nitrogen in the air; thus,

	$2\,CO$	$+\ O_2$	$= 2\,CO_2$
Molecular weights,	56	32	= 88
Relative weights,	1	4/7	= 11/7

Since oxygen forms 23 per cent. of normal air, by weight, and nitrogen 77 per cent., the ratio of nitrogen to oxygen is 77 : 23, and the relative weight of nitrogen involved is

$$\frac{4}{7} \times \frac{77}{23} = \frac{44}{23} = 1.91+ \text{ lb.}$$

Hence, for every pound of carbon monoxide burned, there is produced carbon dioxide, 11/7 lb.; and nitrogen, 1.91 lb.

The heat of combustion of carbon monoxide burning to carbon dioxide, as taken from a table giving the heat of combustion of various substances, is 4325 B.t.u. per lb. of gas burned. There being no water vapor formed in this reaction, the above is the actual heat available for raising the temperature of the products of the combustion, which form the body of the flame, disregarding radiation and conduction losses.

Now, calculating, as before, the heat required to raise the temperature of the respective weights of the products of this combustion **one degree,** by multiplying the weight of each product by its specific heat for constant pressure and finding the sum of those products, we have

	Sp. Heat	Weight	B.t.u.
Carbon dioxide,	0.2163 ×	11/7 =	0.3399
Nitrogen,	0.2438 ×	1.91 =	0.4657
Heat absorbed, per degree rise.........			0.8056

The resulting **rise of temperature** above 32 deg. F., in the body of the flame, which determines the theoretical flame temperature, is then 4325 ÷ 0.8056 = 5369 deg. F., and the corresponding temperature, 5369 + 32 = say 5400 deg. F.

Although the **presence of moisture** (water vapor, H_2O) is necessary to the ignition of carbon monoxide, it is not required to take this into account in making the above calculation, for the reason that the **heat of dissociation** is balanced by the **heat of recombination** in the molecule of water and no loss of heat is assumed to occur. It has been suggested that the water only serves to start the reaction by effecting the ionization of the elements.

The theoretical flame temperature as calculated above, however, both for methane and carbon monoxide, is considerably modified by the **humidity of the air** supporting the combustion.

Volume of Flame—It is frequently estimated roughly that the volume of a flaming gas is proportional to its absolute temperature. For example, assuming the original temperature of the gas as 0 deg. F., the theoretical flame volumes of methane and carbon monoxide are,

Methane,	460 + 4270 ÷ 460 =	say, 10 volumes.
Carbon monoxide,	460 + 5400 ÷ 460 =	say, 12¾ volumes.

Inquiries of General Interest

Gas Due to a Mine Squeeze

In our mine, recently, a squeeze occurred on the cross-entries, shutting off the air supply from those entries, which rapidly filled with gas as a result. The gas could be found within 6 ft. of the main-return airway, but did not seem to have any tendency to mix with the return current.

The peculiarity of this gas to which I especially want to draw attention was the effect it produced on the flame of a safety lamp. The lamp would burn all right, on the edges of the gas, close to the floor, but on being raised toward the roof the flame would be gradually dimmed and finally extinguished. I would like to ask if this gas is nitrogen and what are its properties? Is such gas often found in quantity, as we have experienced in this case?

FIREBOSS.

——, Penn.

In order to properly judge of the nature of the gaseous mixture in this case, it is necessary to consider the conditions existing at the point where the action of the gas was observed; namely, at the mouth of the return airway where the cross-entries join the main return.

Under the conditions described in this inquiry, it is reasonable to suppose that the temperature of the air confined in the cross-entries has risen and is higher than that of the air current passing on the main-return airway. This difference of temperature would cause a slight circulation at the mouth of the cross-entry, whereby the *cooler* air of the main current would set in at the bottom of the cross-entries, while the *warmer* air laden with the gas would issue slowly from these entries at the roof. This circulation is of course local, occurring only at this point and proceeding so gradually as to be imperceptible. The effect, however, is to carry the gas accumulated in the cross-entry upward toward the roof, where it naturally circulates owing to its higher temperature.

This gas observed at the roof is probably a mixture consisting mainly of the depleted air of the cross-entries (which is low in oxygen and high in nitrogen content) and containing also carbon dioxide and, possibly, more or less methane.

In this connection, it is well to note that the stagnant air of the cross-entries soon becomes more or less depleted of its oxygen, which is absorbed in large quantities by the freshly exposed surfaces of the coal at the working face. Also, the action of the squeeze has probably driven out considerable carbon dioxide from the rooms and abandoned and void places in these entries and the adjoining workings.

Therefore, in the absence of any analysis of this gas and further information that would determine its character, it is reasonable to suppose that the observed gas is a mixture of carbon dioxide, nitrogen and a percentage of oxygen that is below the normal. The mixture may or may not contain methane. The depleted air (nitrogen and oxygen) will have a specific gravity less than that of normal air, while the specific gravity of carbon dioxide is much greater and that of methane much less.

Owing to the presence of the carbon dioxide and excess of nitrogen, it would be difficult to observe any cap on the lamp, even if methane was present in considerable quantity. Such a mixture is known as "flashdamp," owing to the quick disappearance of the cap immediately after it is formed. The mixture is extinctive of flame, because of the presence of the extinctive gases, nitrogen and carbon dioxide, and a percentage of oxygen below the normal. Its position in the roof is largely, if not wholly, due to the higher temperature of the mixture and the action of the air setting in at the floor from the main entry, as previously described. This condition frequently occurs in coal mining.

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Broken or Missing Strands in a Hoisting Rope

Kindly answer the following questions in COAL AGE:

1. Is a six-strand wire rope in which one or two strands are missing five-sixths or four-sixths as strong as it was when it contained all the strands? Or, in other words, is it safe to assume that the strength of a wire rope decreases in direct proportion to the number of strands?

2. Again, can a strand be run into a rope to replace one that has come out and the rope be as strong as it was originally?

3. Is it good mining practice to use a wire rope with one or more strands missing?

T. H. WILLIAMS,
Fernie, B. C., Can. Inspector of Mines.

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1. When one or more strands of a wire rope are broken or removed the rope is unable to resist the strain to which it is subjected, with the same effectiveness, because the strands do not support each other equally as well as when all are present. For this reason, the strength of the rope decreases more rapidly than the ratio of the number of strands it contains, and any estimate based on the former assumption would be unsafe.

2. It is not possible to run a strand into a rope to replace one that has come out and obtain thereby the same strength as possessed by the original rope. This is especially true if the rope has been used for any length of time after the failure or removal of the strand or strands. It will generally be impossible to lay in a strand in a rope in place of one that has been removed so that the new strand will take its due proportion of the load. In most cases such a strand will have a tendency to work out of its place under a load when the rope is in use, owing to the crowding of the other strands.

3. In good mining practice, a rope with one or more strands broken or missing should not be used for hoisting in a shaft. In case of failure, the use of such a rope after its condition was known, if such fact was proven, would render a company liable for the results of the accident.

Examination Questions

Pennsylvania Bituminous Mine Foremen's Examination, April 6-8, 1914

Ques.—State the chief causes of accidents in bituminous mines, from falls of coal, slate, roof and sides.

Ans.—Accidents from falls of roof, slate and coal are due chiefly to the neglect on the part of the miner to promptly timber the roof beneath which he is working and to sprag the coal when undermining the same. The failure to carefully inspect the roof of his working-place before proceeding to load out the coal shot down the night before is a frequent cause of accidents of this nature.

At times a sudden fall of roof in a place or fall of coal at the side or face of a breast is due to the pressure of gas in the strata or the seam. This gas pressure often finds access to a crevice in the coal or to an interfoliated space in the roof strata and becomes distributed over a considerable area and is sufficient to break down the roof or the coal.

Ques.—State briefly the legal duties of a mine foreman and assistant mine foreman.

Ans.—Briefly stated, the mine foreman is required by law to devote his whole time to the charge of the mine when in operation; to keep a careful watch over the ventilating apparatus, airways, travelingways, timbering and drainage of the mine; to see that all stoppings are properly built and cut-throughs made in all room and entry pillars; to measure the air at least once every week at or near the main-intake and return airways and in the last crosscut of the inby room on each entry and the last crosscut in each pair of entries and to record these measurements in a book kept for that purpose; to remove all dangers observed or reported to him as promptly as possible; to see that a sufficient quantity of all needed supplies of timber, iron, brattice boards and cloth, nails, spikes and tools are kept constantly on hand and delivered to the workmen as required.

The mine foreman or his assistant must visit each working-place in the mine at least once every day while the men are at work and carefully inspect all pillar workings, haulage roads, airways and abandoned places in the mine. He must give all needed instruction to the miners in his charge, in respect to mining and blasting the coal and timbering their working-places. He must see that the mining law is fully obeyed. He must enter and sign with ink, in a book kept for that purpose, a report each day stating the condition of the mine and any dangers he may have found to exist therein. He must read carefully and countersign with ink the reports of the firebosses. Once each week he must report to the mine inspector any fatal or serious accident occurring in the mine and any violation of the mining law or mine regulations.

Assistant mine foremen are required by law to assist the mine foreman in complying with the mining act and in his absence to perform his duties.

Ques.—What are the necessary supplies to be kept on hand at the mines for safety, and what action would you take in case such supplies were not provided?

Ans.—To insure the safe operation of the mine, it is absolutely necessary to keep an ample supply of timber of all sizes required in the mine, also brattice boards and cloth, nails and tools. There should always be kept on hand a sufficient supply of approved safety lamps that can be used in case of an emergency. At all gaseous mines requiring the use of locked safety lamps, there should be an ample supply of such lamps of an approved type sufficient for all the workmen. There should be at every mine one or more "first aid" outfits, including one or more stretchers and woolen and rubber blankets. A suitable ambulance should also be provided for use when necessary.

Whenever any of these supplies are insufficient for the requirements of the mine, it is the duty of the mine foreman at once to notify the superintendent and to withdraw the men from the mine until the needed supplies are furnished and on hand, as required in Sec. 1 of Art. 3 of the bituminous law.

Ques.—What observations would you make on your daily examination of the working-places, and what special attention must be given to pillar work?

Ans.—When inspecting a working-place, the mine foreman must examine carefully the condition of the roof to see that there are no slips, fault-lines or other weak places to render it unsafe. He must observe all timbers on the road and at the face to see that they are properly set and in good condition. In like manner he must examine the face of the coal and see that it is properly spragged and safe. He should observe what coal has been shot down and note its condition, so as to enable him to give the miner any needed instructions in regard to loading or blasting the coal. He must note the presence of any gas in the place and see that the ventilating current is conducted in such a manner as to sweep the face. When drawing pillars special attention must be given to the roof to see that it is properly supported over the men. It is important to keep the work in line.

Ques.—What material would you use in the construction of stoppings on main entries, cross-entries and room cut-throughs in order to comply with the requirements of the law and maintain the air currents at the face of the workings?

Ans.—The law requires that new stoppings between the main-intake and return airways in *all* mines and new stoppings in cross-entries in mines generating explosive gas shall be built of masonry, concrete or other incombustible material. The same rule applies to rebuilding old stoppings. Timber stoppings may be built on the cross-entries in nongaseous mines. Temporary stoppings in rooms may also be constructed of timber or brattice cloth. All stoppings must be kept in good condition so as to keep the air current at the face of the workings.

Book Reviews

COAL CATECHISM. By William Jasper Nicolls. Pp. 235 + 14 index; 4⅜x6⅜ in. No ill. J. B. Lippincott Co., Philadelphia, Penn. Price $2, flexible leather.

Perhaps some people do not object to the catechism as a way of imparting information. That is a matter of taste, and a book is valuable or not according to the material it contains and the judgment used in its selection regardless of the manner of presentation chosen.

We think this book stands the test well, seeing that it is intended for "that great number of intelligent readers who have no technical training." It is in nearly every case accurate as it can be made without entering exhaustively into details. The "volatile matter" in coal, however, it says "consists of gases—viz., hydrogen, nitrogen and oxygen. The combustion of these gases is seen in the flame when the coal is burning." This embodies several errors, some of which are not due merely to excessive condensation. For there is a volatile matter given off below boiling point which is wholly incombustible, and that evolved material commonly known as "volatile matter" can by no means all be burned. Much is steam and carbon dioxide. The volatile matter is not a gas in the coal, but a solid, and the gases are not merely evolved, but formed under the action of heat. Possibly neither hydrogen, nitrogen nor oxygen is driven off as an uncombined gas, and if the nitrogen were it would be incombustible.

Does Anthracite Give More Heat than Bituminous Coal?

The writer of the book has a most difficult time comprehending the nature of volatile matter. In answer to question 229, he says, "The richer a coal is in fixed carbon the greater is its heating power." The next answer says, "Anthracites would class higher in value than bituminous coals, weight for weight, owing to the higher percentage of fixed carbon which they contain." In the next answer he gives the evaporative power of Pennsylvania anthracite at 15.56 lb. of water per pound of fuel, whereas he adds, in the next answer, that the power of the best Scotch coal is fixed at 7.74 lb. and that of the best English bituminous at 9.07 lb.

One could not well ask for a better evidence of the faith in carbon of William Jasper Nicolls. But he begins to hedge and admits in the next answer that these laboratory experiments "are not sustained in actual practice or commercially." Then follows a remarkable answer which summarily removes the work of Julius Thomsen at a bound and simplifies thermodynamics marvelously. "It has been proven," he says, "that the heat value of fuel is proportional to the quantity of oxygen which enters into the combination, whatever may be the nature of the combustible. As hydrogen and the gaseous products of its combination with carbon consume much larger proportions of oxygen than the same weight of solid carbon, the presence of these increases the heating power of the fuel."

What wonder then that the author asks, "By this rule which coal would class the higher in value?" And answers, "The heavy gas coals would class higher in value than the anthracites, weight for weight, owing to the higher percentages of gaseous matter and volatile substances which they contain." But again he assures us that his new theory does not work out any better than the old. He says, "We learn that a coal may be high or low in volatile matter or fixed carbon in its chemical analysis and give entirely different results in practice than such determinations would indicate."

After turning over the pages we arrive at question 548; and we have the first statement repeated, "Theoretically, anthracite would be as much better than the bituminous coal as it exceeds that fuel in fixed carbon." Amazing! This is tantamount to saying volatile matter is theoretically as little heat-giving as ash.

But having claimed so much theoretically, he surrenders his whole point, saying, "This" [the superiority of anthracite] "is not the case. Either from the difficulty of combustion or the inefficiency of the mechanical appliances at present in use for generating steam, the excess of carbon in anthracite is not utilized and, generally speaking, a ton of bituminous coal will generate as much, if not more, steam than an equal ton of anthracite."

Now the probabilities are that anthracite coal has been more efficiently used in the past than bituminous and that the reason why it does not give better results than some soft coal under a boiler is because it does not have an equal number of thermal units per pound of fuel.

We would not have taken so much space in exploiting the errors of this writer had not ideas like his been extremely common, having been heard on the street and found in books for years. The fact is, some bituminous coals—usually those which are low in volatile matter—give out more heat when completely burned than anthracite. This is true both theoretically and commercially.

Judging by the statement that anthracite will evaporate 15.56 lb. of water, the author's authorities evidently assumed that Pennsylvania anthracite would generate in a calorimeter 15,000 B.t.u. The pure coal substance would do as much if it could be obtained, but anthracite as found is not by any manner of means so calorific. Assuming, however, that it is, theoretically it would evaporate 15.56 lb. of water from and at 212 deg. Practically it would do no such thing.

Practical Tests of Relative Fuel Efficiency

Unfortunately the Technological Department of the U. S. Geological Survey did not test anthracite under its boiler at St. Louis, Mo. It did, however, test several bituminous coals and evaporated the equivalent of as much as 10.22 lb. of water from and at 212 deg. per lb. of actual fuel. Authorities are of the opinion that better results are obtained under the most favorable conditions.

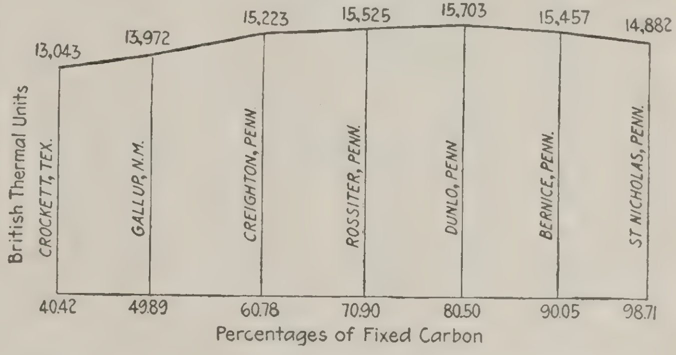

CHART ROUGHLY SHOWING RELATION BETWEEN THE HEATING POWER OF PURE COAL SUBSTANCE AND ITS FIXED CARBON PERCENTAGE

In fact in the Transactions of the American Society of Mechanical Engineers, Vol. IV, p. 267, it is stated that the equivalent of 11.53 lb. of water from and at 212 deg. has been evaporated per pound of Welsh bituminous coal, and even with Pittsburgh Third Pool lump the equivalent of 10.47 lb. has been thus evaporated. It is unfair, therefore, to make the following statement in answering question 232: "A pound of the best Scotch coal by the same experimental tests"—laboratory experiments are evidently meant—"evaporated only 7.74 lb. of water and of the best English bituminous only 9.07 lb." For these experiments could not be similar to those which showed Pennsylvania anthracite as having an evaporative capacity of 15.56 lb., and, moreover, they are experiments bettered in actual practice by many bituminous fuels. The best result we have been able to find with anthracite coal is 9.57 lb. per lb. of fuel.

How Theory Is Corroborative of the Above Tests

As a matter of fact carbon is not nearly as heating on combustion as hydrogen, the ratio being roughly 15 to 62. If, however, the hydrogen in the volatile matter of a fuel is so combined that it may be regarded as partly burned into hydroxide, as is the case in high-volatile coals, then it is of little or no account. The high-carbon coals such as the "low-volatile coal," so called, with less hydrogen of this kind, are the better for its absence. The even higher-carbon coal—anthracite—is also better for the loss of such ineffective hydrogen.

The best coal of all is one that has lost the partly burned hydrogen and the partly burned carbon and has its hydrogen in light chemical bonds, so that in its combustion all, or more than all, the heat is generated which would be furnished by the combustion of pure hydrogen alone. In fact, the best coal is the happy mean between a fairly pure carbon coal and one which is high in volatile matter. Still there are exceptions where the volatile matter though still large in amount is of exceptional heat-giving qualities. Such coals are the cannels whenever they are happily free from high percentages of ash.

Description of Chart

The chart on the preceding page has been prepared for this review to illustrate the fact that the best coal substance is a semibituminous fuel such as that from Dunlo, Penn. The coal substance from Bernice or St. Nicholas, both in Pennsylvania, though higher in fixed carbon, does not have an equal heat efficiency. That from Rossiter or Creighton, in the same state, containing in both cases less fixed carbon, is also less efficient as a heat producer than the coal substance from Dunlo.

By coal substance is meant an imaginary material made by eliminating the moisture and ash in the coal. The whole heat of the fuel is ascribed in the chart to this coal substance and the percentages of fixed carbon and bituminous matter are recalculated so as to add up to 100.

Some Other Criticisms

The other inaccuracies in the book we pass over rapidly. In question 59 we are asked to locate the largest coal basin, and the reply is, "It extends west from the Allegheny Mountains to the Missouri River, a distance of about 1500 miles, and south from the Lakes to the mouth of the Ohio River, about 600 miles." The word "basin" here doubtless means "original basin," but why the coal in West Virginia, Virginia, Tennessee and Alabama and other states is excluded despite continuity of deposit is indeed hard to see. Why include Illinois, Indiana, Michigan and Iowa if these others are to be omitted, for the central coal fields are no longer continuous with those in Pennsylvania?

In questions 152 and 153 the ratio of production between the Wyoming, Schuylkill and Lehigh regions is given as 50, 35 and 15. This proportion was never even approximately correct, but the nearest approach was perhaps in 1878, when it was roughly 49, 32 and 19. In 1913, it was 58, 29 and 13. In question 258 the vexed problem as to whether a bed of coal should be termed a vein or a seam is discussed. We are strictly neutral. We have never been able to see how the vein in a man's arm is less suggestive of a coal bed than the seam of the coat which more or less exactly follows the vein. A seam is a long, narrow, threadlike body just as is a vein. Why in a spirit of pharisaic literary purism make a pother about a difference which really has no existence?

In question 319 the writer describes the method of mining in a bituminous mine and carefully explains how a squib, iron needles and iron tamping tools are used and how coal dust is used for tamping. The purpose of such a book should be to describe good practice and not such methods as violate the law. Of course, squibs are not illegal though they are not advocated, but the use of iron needles, iron tamping tools and coal dust is forbidden in most states.

In answer to question 332 we are told that carbon monoxide has the faint fragrance of violets. It may be so; we would not like to give it a nasal test, seeing that less than 1 per cent. kills in a few seconds. We are told in answer to question 342 that about 3 per cent. of sulphureted hydrogen "is all that is necessary to cause death." An excellent authority, Lehmann, puts the percentage causing rapid death at 0.1 to 0.2 per cent., about $^{1}/_{20}$ of the figure just quoted.

In answer to question 348 we find that the average of fatalities among miners by gas explosions and otherwise is one miner for every 100,000 tons. The Bureau of Mines estimates that one life was lost last year for every 208,078 short tons produced. The loss of life has never approached the level of one man per 100,000 tons. In 1907, for instance, the year when mine fatalities reached their zenith, the rate was one man per 144,325 tons.

A foot-pound is, as stated in answer to question 523, "a unit of work." It is not a rate of doing work. It is erroneous to state, as in the text, that it is "the energy exerted in raising or lifting one pound in weight one foot high in one minute," for the time during which the work is achieved is not a point at issue.

In answering query 525 the unit of heat is the Fahrenheit degree; on the next page, without a statement to explain the difference, the Centigrade degree is taken. Thus the coal in one case generates 14,500 "heat units" and in the other only 7500 "heat units," and the author does not help the reader to a realization that the two coals are only 1000 B.t.u. different in value and that only the units of measurement are really different.

In the answer to question 626, the writer takes the old-fashioned view that coke should be bright and silvery. As a matter of fact, much of the best product of the byproduct oven cannot be so described, nevertheless it is equal to the best. Of course, the author favors coke as a fuel because it contains so much carbon. He overlooks the fact that the volatilization increases the ash percentage considerably to the detriment of the heating power and in some cases removes much valuable hydrogen.

We would not spend so much time checking these errors did we not know that this book has gone far afield, has been reviewed in foreign technical journals and has seen three editions. Nor would we even then give so much space to mere comment. The errors we have pointed out are common, and they may as well be met with this readable book as a text as be given place without such reference.

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THE MAN WITH A JOB. By Wightman D. Roberts, Huntington, W. Va. 16 pp.; 3¼x6 in. Price 10c. Stiff paper cover.

There is need for much literature such as is found in this little booklet. Only we wish Billy Sunday or some novelist had written it. If only Frédéric Bastiat were still alive, who wrote such wonderful little tracts of this sort for the French Government, or if Maria Edgeworth were still living, what might not be written on such a subject. But they are not, and this little book occupies the field all alone.

In the first chapter, the miner talks about the casting of all jobs into a "jack-pot" under a socialistic government. But, as these workers believe, however untruly, that any other job is better than coal mining the idea of exchanging it will not terrify them. Then he reviews the fact that all occupations have their drawbacks, usually much exaggerated, it is true, but all are far less delightful than the life seen in our visions.

Not Freedom, but Only a Change of Masters

In the second chapter the miner discovers that instead of being free under socialism he is only to change masters while his property is to be divided up among the deadbeats. He is struck by the fact that he has no future to work for and that life will be a deadly level. He says that if he doesn't like one company now, he can wander off to another. But in the socialistic days, if they come, he must grin and bear conditions as he finds them. There will be only one commonwealth, and if he is elected to a bad place in the mine, elected he will be without opportunity for change. He will be like a minority stockholder in a big corporation—unable to change conditions, for his vote won't count. He won't be able to get up and "beat it" to a place where conditions are better.

Then again, if any men decided to quit work entirely, what would be done to change their decision? If the government then took care of those men there would be no incentive for them to work. It will be a choice between "Let George (the man who is willing to work) do it" or else the application of force. Either the lazy will do as they please or government will have to make convicts of them. The lack of opportunity will take the ginger out of all of us.

After All, the Coal Is Not Going to Dig Itself

Of course we might rise to be bosses and managers, but the miner recalls that bossing is just what he has been denouncing for years. And as the miner thinks it over he is sure that the coal is not going to dig itself. The drudgery has yet to be done. In the last chapter the miner concludes that though he has not now all that he wants, the change is not likely to better him.

Liberal discounts are given for large numbers of these books. If a list of persons is furnished, copies will be sent direct to them from Huntington, W. Va.

This little book has received the most favorable comment from mine officials. J. J. Ross, general manager of the Logan Mining Co., writes us personally indorsing it and saying that his company has distributed many copies. All the members of the Kanawha Operators' Association expect to use it, and it has already been distributed by the Consolidation Coal Co., the Hutchinson Coal Co., the Carbon Coal Co., the West Virginia Colliery Co., the Republic Coal Co., the Slab Fork Coal Co., the Columbus Iron & Steel Co. and the West Virginia Pocahontas Coal Co.

⁂

ELECTRICITY IN COAL MINING. By David R. Shearer. pp. viii + 80 + 4 index. 6x9¼ in. 28 ill. McGraw-Hill Book Co., Inc., 239 West 39th St., New York City, 1914. Price $1.50, cloth boards.

This book treats on the application of electricity to signaling, haulage, coal-cutting, ventilation and pumping and is probably as complete as can be compressed into 80 pages with illustrations. Some elementary facts relative to electricity appear in the earlier chapters and information is given as to power equipment and repair shops. In the appendix are valuable tables and other useful data.

Coal and Coke News

Harrisburg, Penn.

Legislative investigation of the allegations that anthracite coal producers and retailers have been making extortionate charges for coal under the guise of the state enthracite tax was determined upon at a conference between Governor Brumbaugh, members of the Republican platform committee of the two houses and the chairmen of the appropriations committees on the state revenue situation.

The primary object of the conference was to secure an agreement on revenue-raising measures and it is believed that about $5,000,000 can be secured for highway improvement by enactment of proposed laws, among them being the anthracite tax bill, but which is in danger of being killed by the members of the nine anthracite counties, if a 50-50 division is not made.

Resolutions calling for the investigation will be presented at an early date. This investigation will go into the sales of coal producers and retailers, which according to reports received here from time to time have been made at prices far in excess of what would be justified by the state tax.

Attorney General Brown in telling about the conference said.

> The conference felt that a division of the anthracite tax, 60 per cent. to the state and 40 per cent. to the anthracite counties would be fair. The tax proposed in the pending bill is about 5 cents a ton. At this rate the gross amount of revenue would be about $4,500,000. The conference discussed the advisability of increasing the tax to about 7½ cents a ton (the bill reads 2½ per cent ad valorum), which would bring in $7,000,000 a year. The state would have to take out 1 per cent. of its share for collection.
>
> The conference decided that a state commission would be created to investigate the charges that anthracite coal prices have been raised exorbitantly because of the tax. This commission would also look into any future extortionate rates. It and the state would fight any attempt to increase the price per ton to a larger sum than the regular selling price of coal with the tax added. We would resort to the use of bulletins, sent broadcast over the state, and to first page advertisements in newspapers if necessary.

The governor and his attorney general will hold a conference with the representatives of anthracite districts during the latter part of the month. The governor is willing to grant 40 per cent. to the anthracite counties, and the state to pay all expenses incident to assessing, collecting and distributing the tax. The anthracite districts will receive 40 per cent. net. The Governor figures the counties producing anthracite will receive 11 per cent. of the 60 per cent. the state receives, and arrives at this through a study of the highway maps of the state. He is desirous that the Legislature act quickly on the bill and put it through. The members of the Senate and the House, contend that as the coal companies in selling surface rights "reserve everything but the wind" and there is no redress to the municipality or individual property owner for loss which may be occasioned by mining operations, the municipalities should receive 50 per cent. of the tax. Some members think the distribution should be made on the basis of production rather than population of the municipality.

Bituminous Miners and Compensation

A bill designed to bring the bituminous miners of the state under the provisions of the proposed workmen's compensation act has been presented in the Senate by Senator Martin, of Clearfield. The bill is somewhat similar to the one now before the Legislature, presented by Representative Dawson to bring the anthracite miners under the proposed law.

Under the present law mine foremen must be selected from among men who have been granted certificates by the state. Under state rulings coal companies are not responsible for the acts of mine foremen because the companies did not have the right of free selection of the men. Under the bill presented by Senator Martin the company may select foremen without regard as to whether they have certificates or not and mine employees are brought under the direct supervision of the operators.

Representatives of the United Mine Workers are confident that the Catlin bill to bring miners under the workmen's compensation act will pass the senate at an early date. Numerous conferences have taken place during the week between miners, operators and senators on the committee of mines and mining. Senator McNichol has stated that the Legislature will not adjourn on May 5 if the Catlin bill is not passed.

A bill to amend section 1 of article 8 of the Act of June 1911 applying to bituminous mines has been introduced by Representative Milliron, to give the mine inspectors power to compel the adoption of such safety and locking devices on cages used in lowering and hoisting persons as will prevent the accidental tipping of cages.

A bill which makes many changes in the miners' certificate act of 1897 has been introduced by Mr. West of the Mines and Mining Committee, the amendment (Section 5) reads as follows:

> That it shall be the duty of each board to meet once every month and not oftener, and said meetings shall be public and if necessary the meeting shall be continued to cover whatever portion may be required of a period of three days in succession and examine under oath all persons who shall desire to be employed as miners in their respective districts and the said board shall grant such persons as may be qualified, certificates of competency or qualification which shall entitle the holder thereof to be employed and to do the work of a miner as may be expressed in the said certificate and such certificate shall be good and sufficient evidence of registration and competency under this act and the holder thereof shall be entitled to be registered without an examination in any other of the anthracite districts upon payment of the fee herein provided.
>
> All persons applying for a certificate of competency entitling them to be employed as miners shall be not less than 21 years of age and shall have had at least two years' experience as a miner, miner's laborer or a man of general work in the coal mines of this country or of other countries and in no case shall the applicant be deemed competent unless he appear in person before the examining board to answer 12 questions in the English language pertaining to the requirements of a practical miner. He shall demonstrate that he understands the use of safety lamps, knows how to handle explosives and is competent to do the work of a miner without injuring his own life or the lives of others.
>
> Said boards shall keep an accurate record of the proceedings of all its meetings and in said record shall show a correct account of the examination of each applicant with the questions and their answers and at each of its meetings the board shall keep such record open for public inspection. Any miner's certificate granted under the provisions of the act or any prior acts shall not be transferable to any person or persons whatsoever and any transfer of the same shall be deemed a violation of this act. Certificates shall be issued only at meetings of said board and said certificates shall not be legal unless then and there signed by at least three members of said board.

Senator Lynch, of Lackawanna County, has introduced a bill to regulate the mining out and removing of coal under streets, alleys, public highways, etc., in the anthracite region.

The bill provides that any municipality in the anthracite region may create a Bureau of Mine Inspection and Surface Support, with a practical mining engineer in charge. The bureau is to have the right and power to enter and inspect, examine and make surveys in any mine at any time, and to take such persons as may be necessary for such examinations, surveys, etc. The bill provides that every operator shall within three months after the passage of an ordinance by any municipal corporation creating a Bureau to furnish the Bureau with an accurate map of the mine workings on a scale of 100 ft. to the inch, and place thereon the extensions made at least once every three months.

The proposed law prohibits any mining under streets, alleys, etc., to such an extent as to remove the necessary and adequate support of the surface against subsidence, without first having built sufficient, adequate and permanent artificial support in such place to maintain and preserve the stability of the surface. Before the coal is removed the operator will be compelled to give 30 days' notice to the bureau of its intention to so remove the coal under the streets, etc., the Bureau is given power to apply for injunction to stop mining under any street, but must give the operator written notice of its intentions, at least 24 hours before application is made.

A bill to increase the salaries of the mine inspectors of the state from $3000 to $4000 per annum has been introduced by Representative Evans.

Until the governor declares his purpose in withdrawing the Tenor appointments as commissioners to the Public Service Commission his intentions will not be known. But it is a good guess that he contemplates something out of the ordinary. If he were satisfied with the constitution of the commission or its personnel he could have left the appointments undisturbed. The senate has not yet confirmed them.

PENNSYLVANIA

Anthracite

Tamaqua—The Nesquehoning breaker of the Lehigh Coal & Navigation Co. is turning out 500 tons of coal each operating hour.

Beaver Brook—The Duggan stripping operations were tied up on Apr. 14, by a strike of 200 employees. They claim that the owner, Harry Duggan, of Hazleton, had refused to meet the committee that demanded the payment for two shifts worked in March.

Larksville—Many houses were damaged, water and gas mains were broken and damage to the extent of thousands of dollars was done by a cave-in in the Bennett and Cooper veins of No. 5 colliery of the Delaware & Hudson Co. on Apr. 15. The caved district takes in about two acres in which there are many deep holes and depressions. A number of homes were badly wrecked. The home of Thomas Temperine was broken in two by the cave-in and is a total wreck. The cave-in twisted and turned over buildings on their foundations and some of the structures are greatly tilted. Walls and partitions of the buildings have been damaged so badly that they can never be repaired. The bursting of the water mains caused the company to cut the supply, and all fires in the cave-in area were ordered quenched and all lights ordered extinguished.

Carbondale—Charles Enzian, of the Federal Bureau of Mines and City Engineer Saxe, of Carbondale, estimate that it will cost $90,000 for the proposed attempt to smother the mine fire that has been raging under the city for a number of years.

Bituminous

Jumbo—In a suit against the Pittsburgh Coal Co., Amelia Janofski, seeks $10,000 damages by reason of the death of her husband, killed in a mine of the defendant coal company. The accident occurred on June 9, 1914. Acting under instruction, it is averred, the husband was sent into a part of the mine to work that was dangerous. It is averred that prior to the day her husband was killed there had been various falls of roof which fact, it is claimed, was known to the defendant company. The husband of the plaintiff was caught by the fall of a large piece of rock and crushed to death. It is alleged that prior to the accident the mine foreman had promised to send a crossbar to prevent the roof from falling, but failed to do so.

Fredericktown—As the result of rioting, in which women were leaders, around the mines of Vesta No. 5 of the Vesta Coal Co., at the opening of the mine recently, after a long shutdown, 20 men, 13 women and 7 babies were lodged in the county jail. The trouble arose over the company's action in discharging John Dale, a check weighman and an employee whose dismissal is decided by the union. The company has agreed to take back the discharged weighman, and that eviction notices to seven miners' families whom the company had refused to allow in its employ should be withdrawn.

Meadowlands—The mine of the United Coal Co. recently began operations with large orders for lake shipments. During the past few months this mine has been operated three to four days per week with only about one-half the plant in active operation. The prospects are good for active work throughout the entire summer.

Pittsburgh—The caving of old mine workings recently caused two houses in Climax Street to settle so that the doors had to be forced open in order to extricate the occupants. At five o'clock in the morning the tenants of these houses were awakened by jarring and rumbling. They tried to escape, but the doors could not be opened. An investigation showed that the land had settled several feet, due to collapsing of old mine entries under the property.

Connellsville—The weekly production of Connellsville coke recently attained 292,000 tons with shipments aggregating 288,000 tons. It is thought that the 300,000-ton mark will be reached before May 1. There have been practically no idle ovens fired recently, but the running time of those in operation has increased.

WEST VIRGINIA

Mason—About 300 men working in the mines of the Hutchinson Coal Co. are on strike, as the result of a difference of opinion regarding the driving of entries. The company wanted several entries driven, and agreed to let any man who wished to do so work them, furnishing all the cars needed in order to facilitate the work. The men working in the mine proper objected to this, for the reason that they did not get as many cars as the men working the entries, and the strike resulted. Union officials are endeavoring to adjust the matter.

Huntington—Operators representing 75 per cent. of the coal-tonnage production of West Virginia were present at a meeting here on Apr. 12, at which the West Virginia Coal Association was organized, for the purpose of promoting the interests of the industry in the state in every way possible. A permanent organization will be perfected on Apr. 30, a constitution having already been formulated and sent out to various district associations for ratification. J. W. Dawson was temporary chairman, and A. H. Land secretary of the meeting.

Betterment of market conditions and plans to decrease fluctuations in price were discussed at a recent meeting of coal operators from the high volatile field. This meeting followed the adjournment of the session of the West Virginia Coal Association. Although state operators generally declare that bad working conditions are universal, the condition of the splint gas-coal market is said to be especially bad because of the keen competition and the unsteady condition of the market.

Roderfield—Three men were killed in a mine of the Davy-Pocahontas Coal Co. Apr. 17, when a pocket of gas was exploded by a shot. Only six of the 200 miners usually employed in the pit were in it at the time of the explosion.

Elverton—The Branch Coal Co. recently suffered the loss of its power house and a portion of a trestle by a fire which originated in the engine room. This loss it is thought will reach $25,000, but was fully covered by insurance. The company will begin immediately rebuilding and expects that work will be completed in 30 days.

Bluefield—A persistent rumor is current throughout this section that an effort will be made, or rather is already underway looking to the organization of the coal miners. It is said that parties other than the miners are promoting a movement to have the miners organize. It is believed that the present is a most inopportune time for such a movement. At no time in the field's history could the mine managers better afford to close up shop than at the present.

Fairmont—The Annabelle mine of the Four States Coal & Coke Co. recently began operations with a force of 650 men, after a shutdown of several months. It is stated by company officials that more miners are needed and that within the next few days 300 more men can be employed. During the past five months the miners at the Annabelle plant worked only 23 days. The opening of the Lake trade giving an outlet for shipments caused the resumption of operations.

Montgomery—March coal loadings were far below normal in the Kanawah and New River fields, and the month was a discouraging one for local operators. There was a gain of 30,000 tons over February in the New River district, but a loss in the Kanawha district of 30,000 tons. Compared with March, 1914, there was a loss of 157,000 tons in the two districts. It is believed that conditions through April will show improvements, as all mines in both districts have been working a little better thus far.

ALABAMA

Birmingham—The Committee named by the State Legislature to look into the matter of conditions at the camps employing convict labor, with the view of abolishing such labor in the mines, made a recent investigation of the conditions at all convict camps, and reported that existing conditions were not as bad as reported, that sanitation conditions were good; that the food was clean and wholesome, and that their investigation failed to find that convicts had been cruelly treated.

KENTUCKY

Whitesburg—Coal shipments from the McRoberts-Fleming coal field of Letcher County have increased greatly since the 10th of the month. The Lexington & Eastern is now carrying out from 125 to 150 cars per day—this to be increased to about 200 cars May 1.

A big party of coal operators, capitalists and others, including Congressman Slemp; W. S. Dudley, of Carlisle, Ky.; John E. Buckingham, of Paintsville; Johnson N. Camden, and others, have just completed an inspection trip over the Letcher-Perry coal fields especially along the North Fork extension of the Lexington & Eastern R.R. With the party were a number of West Virginia operators who it is said are projecting leases of certain of this land.

Hazard—The Lexington & Eastern announces that more coal was shipped over that road from the Perry County coal field the past week than in any previous week in the history of its development. There has been much improvement in market conditions owing, it is said, to the opening of the markets of the Lake region.

OHIO

Brilliant—The tipple of the Dexter Coal Co.'s mine was destroyed by an incendiary fire Apr. 14; this put 135 men out of work. It will take some time to rebuild the tipple, and whether or not it will be rebuilt at all is not known, as the mine has not been operated at a profit.

Bridgeport—It has been estimated by one of the officials in charge of the strike of eastern Ohio coal miners that over 25 miles of fences will have to be constructed in Belmont county by striking miners to surround their community gardens. These gardens have been started in many mining camps, and it is the intention to raise vegetables and field products during the coming summer. Large Chicago and Pittsburgh wholesale seed houses have promised to extend every assistance to the miners and their officials.

Gen. Jacob S. Coxey, best known as the head of "Coxey's Army," has secured an option on the mine of the Neister Coal Co. at Thrashing, Ohio, for 20 days, at a price said to be about $100,000. It is reported that Gen. Coxey intends to take up the option and operate the mine on a coöperative basis.

Gloucester—At a meeting of officers of the Sunday Creek Coal Co. and representatives of the miners' union held here recently, to discuss the matter of loading "dirty coal," it was declared by the union men that any man following this practice would have to stand on his own responsibility, as the union would not support him. One of the points made by the operators in opposing the mine-run law in Ohio was that under it men would load dirty coal, thus rendering the product unmarketable, but the union men took the position that this was an unwarrantable charge. Now that it has happened, as the operators assert, they look to the union to break up the practice. It is especially important to the operators that it be eliminated at this time, as only the best coal can be marketed.

Steubenville—Fire destroyed the tipple of the Dexter Coal Co. at Brilliant, Ohio, last week. The origin is believed to be incendiary.

Columbus—Only slight opposition developed in the Ohio Senate last week to the enactment of the Moore bill, giving coal companies the right of eminent domain. The bill gives coal companies the right to condemn a right-of-way through private property when necessary. The bill now goes to the House of Representatives for consideration.

Roseville—The Elk Coal Co. has settled its differences with the 140 men employed in its mine and the latter have gone back to work. The suit brought by the company against the union and its officials for $25,000, for breaking their contract and closing the mine by striking, will be dropped. The union charter of the men, which was revoked on account of their unauthorized strike, has been restored, and the miners' attachment suit for $4000 in wages has also been dismissed.

ILLINOIS

Edwardsville—An unusual action was taken Apr. 16 in the Madison County Circuit Court, when the court gave the defendant's witnesses the option of testifying the way the court suggested, or having the case thrown out. This was a damage action for $5000 against the Madison Coal Corporation. The defendant witnesses would not state to the court whether the corporation had elected to come under the provisions of the Illinois Compensation Act or not. They declined to identify a notice that they would come under that act, which they had posted on their bulletin. The court said it was a matter of common knowledge that the company had led the miners to believe they would come under that act, and when a suit came up they refused to admit that agreement. There is much dissatisfaction felt among the coal operators in the state over the action of the defendant, bringing into ill repute the operators in general, who support this measure.

Chicago—Readjustment of coal and coke rates proposed by the Western railroads in the Western advance rate case were recently argued in the Interstate Commerce Commission's investigations. Large coal operators of Illinois, Indiana, Ohio, Oklahoma and other Middle Western states opposed the proposed rate increases.

Matherville—Officials of the Coal Valley Mining Co. recently closed down the Matherville mine, laying off between 150 and 200 miners. Unsatisfactory demand for coal has been given as the cause for this shutdown.

Taylorville—The deal for the sale of the Christian County Coal Co.'s mines to the Peabody Coal Co. will be completed in a few days, it is believed. The purchase price is said to be between $200,000 and $225,000.

Farmington—The new No. 8 mine of the Alden Coal Co. has established a new rate of production which the officials are striving to keep up. The output was recently doubled as compared with a month previous.

Danville—Through a petition of the Chicago Continental Bank and Trust Co., trustees of the Bering Coal Co., which became bankrupt several years ago, the sale of the latter firm's property has been ordered because of the inability of the coal company to pay a mortgage and other debts aggregating over six million dollars. Walter C. Lindley, of Danville, has been appointed special master, and the sale will be held at the Federal Building in Danville on May 12.

MINNESOTA

Duluth—John E. Lindgren, John Bergman and August Johnson recently incorporated the Red River Valley Coal Co. for the purpose of exploring and developing coal lands near Crookston, on which it is claimed large deposits of coal, believed to be of higher grade than any yet found in this part of the country have been discovered. These gentlemen have under option about 2000 acres of land and have sunk several test pits. A drill is being placed in operation to thoroughly explore the coal deposits.

ARKANSAS

Fort Smith—According to the report prepared by W. S. Newcomb, of the Southwestern Interstate Coal Mine Operators Association, the Arkansas coal production in 1914 was 299,980 tons less than in 1913. The entire production during the year was 1,643,881 tons as compared with 1,943,861 tons in 1913. Labor difficulties and the increased use of oil for steam purposes are said to be the causes of this falling off in production.

FOREIGN NEWS

London, England—A critical situation has arisen among the coal miners. Representatives of the Welsh miners have unanimously decided in favor of tendering a fortnight's notice of a proposed strike to the mine owners in order to enforce their demands for a 20 per cent. increase in wages. The Mineral Federation of Great Britain will meet shortly to decide what action they will take to compel the mine owners to accede to their demand for a similar increase. That the result of the trouble will be anything like a national strike of the miners is considered improbable, but it may necessitate Government intervention in a drastic manner.

PERSONALS

C. M. Weld, mining engineer, formerly at 66 Broadway, New York, has removed his office to 60 Broadway.

P. F. Sweeney, a leading mine worker of Shenandoah, Penn., has been appointed a board member of District No. 9 of the United Mine Workers of America.

J. H. Picton was recently offered and has accepted the position of mine manager for the Higbee Coal Co. at Peoria. Mr. Picton will assume his new duties on May 1.

H. McDermott, for the past five years auditor of the Pratt Consolidated Coal Co., has resigned his position to enter other business. His successor has not yet been named.

Richard Peters, Jr., has resigned his position as sales agent of the Producers Coke Co., of Uniontown, Penn., to become assistant to the general manager of the W. J. Rainey Co. with headquarters at 52 Vanderbilt Ave., New York.

Clarence Boyle, Jr., formerly district sales manager of the Taylor Wharton Iron & Steel Co., Connell Bldg., Scranton, Penn., has become associated with Clarence Boyle, Inc., wholesale lumber dealers, 1211 Lumber Exchange Bldg., Chicago.

S. E. Van Horn, formerly assistant engineer of the Delaware & Hudson Co., has been promoted to chief engineer of the coal department of that company, with headquarters at Scranton. Mr. Van Horn has been with the engineering force of the Delaware & Hudson Co.'s coal department for the past 15 years, prior to which he spent a number of years in the engineering department of the Lehigh Valley Coal Co. at Wilkes-Barre.

L. F. Hamilton, in charge of the advertising and specialty department of the National Tube Co., has just returned from an extended trip to the West and Pacific coast in connection with the company's exhibit at the Panama-Pacific Exposition. The National Tube Co.'s exhibit is a part of the U. S. Steel Corporation's exhibit which is located in the Mines and Metallurgy Building and occupies 44,000 sq.ft., being the largest single exhibit at the Exposition.

OBITUARY

Dr. T. C. Shaffer, surgeon for the Berwind White Coal Co., of Windber, Penn., was almost instantly killed in an automobile accident near Tyrone, Penn., recently. He attempted to avoid another car on the road, as the result of which he lost control of the steering wheel, and turned turtle into a ditch.

John H. Dougherty, one of the pioneer residents of Altoona, Penn., died recently at the home of his son, Clarence, in St. Louis, Mo., where he had gone on a visit. Mr. Dougherty was for many years engaged in business but lately had been developing a 900-acre coal tract at Dougherty, Penn. He was a veteran of the Civil War.

John Bryden, who died at Esquimalt, Vancouver Island, British Columbia, on Mar. 27, was a pioneer coal-mine manager in that province. He was born in Ayrshire, Scotland, on Dec. 4, 1831, so at the time of his death was in his 84th year. In 1862 he left Scotland for Vancouver Island, going by paddle-steamer to America, and via the Isthmus of Panama and San Francisco to Esquimalt and Nanaimo. At the latter place he at once became joint manager with Mark Bate for the Vancouver Coal & Land Co., an English company that had acquired the coal mine opened at Nanaimo about 1851 by the Hudson's Bay Co., which operated it for about 10 years. In 1880 Mr. Bryden transferred his services to the Wellington Colliery Co., a Dunsmuir incorporation that was operating within a few miles of Nanaimo. In 1894 he retired from active mine-management, but continued his association with the coal-mining business interests of the Dunsmuirs until the sale of their collieries to the Canadian Collieries Co. (Dunsmuir) Ltd. in 1911.

INDUSTRIAL NEWS

Columbus, Ohio—Judge Rogers in Common Pleas court has ordered the sale of the property of the Starr-Hocking Coal Co., of which C. E. Haskins has been receiver for several months. The properties consist of coal mines in the Hocking Valley.

Huntington, W. Va.—The Allis-Chalmers Mfg. Co. through the Banks Supply Co. has received a large order from the Lincoln Coal Mining Corporation for a generating plant to be erected on Big Creek. The Lincoln Mining Corporation has just recently put its mines into operation.

Toledo, Ohio—The steamer "W. H. Donner" left Toledo on Apr. 16 bound for Milwaukee with 10,000 tons of coal, this being the first shipment to leave Toledo this season. The steamer "Agassiz" began loading immediately after the "Donner" but was not expected to sail for several days.

Birmingham, Ala.—The annual meeting of the stockholders of the Sayre Mining & Manufacturing Co., which was due to be held this month, has been postponed until some time in May. It is expected that a complete reorganization of the company will take place at the annual meeting.

Coaldale, Penn.—Because the Eastern Pennsylvania Street Ry. allows workmen in mining clothes to ride on the regular trolley cars, despite protests, 37 girls, employed in Tamaqua mills and factories, on Apr. 16 engaged an automobile bus to take them to and from work. They assert that many more will follow their example.

Pittsburgh, Penn.—The first shipments of lake coal will go from the Pittsburgh mines to the Northwest about the end of this month. Mines throughout the Pittsburgh district have in the recent past increased production fully 10 per cent. Part of this was due to preparatory shipments to the Lake docks and the remainder to a generally better coal consumption.

Buffalo, N. Y.—The War Department has denied the Delaware, Lackawanna & Western R.R. the use of the North Pier for the mooring of coal vessels. Unless the matter is adjusted the company will be unable to load cargoes for Upper Lake delivery this season. Last year several hundred vessels were loaded there and the company has had the use of the pier for the past 50 years.

St. Louis, Mo.—In the case of the Dealers Fuel Co. versus the Burlington R.R., judgment was rendered for the plaintiff for $152 and costs. This is a case wherein the plaintiff notified the defendant to stop coal in transit, and the defendant ignored the order and delivered the coal to a bankrupt. This decides the right of a shipper to stoppage in transit, regardless of his reason.

Huntington, W. Va.—In compliance with orders recently published in bulletins posted by the Chesapeake & Ohio R.R. repair shop, 1700 men, skilled and unskilled, recently started working 9 hr. per day and 5 hr. on Saturday. This is an increase from 35 to 50 hr. per week. It is believed that the Lake coal movement having started, business will be heavy throughout the summer.

Lorain, Ohio—West Virginia coal is to be shipped to this point for the Lake trade, according to plans being perfected by W. T. Lechlider, superintendent of the Cleveland division of the Baltimore & Ohio R.R. The coal will be stored here and shipped as the demand develops. The Lake movement began formally, with the loading of the first cargo. It is expected to be a good season.

Spokane, Wash.—The sum of five million dollars, invested in Canadian coal fields by the Count Alvo Alvenselben, of Seattle, will likely be irretrievably lost because the count was unfortunate enough to interest Kaiser Wilhelm in his mining enterprise. The Count, too, is German, and since the war broke out, he has confined his business to this side of the line. He is the dominant figure in the Issaqua and Superior coal districts of Washington.

Fairmont, W. Va.—The Federal Coal & Coke Co. has let the contract to F. J. Foye, of Brownsville, Penn., for sinking a shaft near the confluence of Finche's and Heck's Runs. This shaft will be 360 ft. deep and will be sunk for the purpose of giving the mines better ventilation and to secure additional means of escape. Work on the shaft will be started on or about May 1 and will be pushed to completion as rapidly as possible. The cost will be about $30,000.

Birmingham, Ala.—Petitions for reduction in coal rates from Birmingham to Anniston and Selma were recently filed before the State Railroad Commission by the Chambers of Commerce of Anniston and Selma. They desire a restoration of the old coal rates which were granted to certain manufacturing companies. The rates apply to Talladega, Gadsden and Sylacauga. The granting of these rates was one of the issues in the gubernatorial campaign recently held.

Grafton, W. Va.—Officials of the Baltimore & Ohio R.R. are of the opinion that all employees of that road will be back at work within a few days. Announcement has been made that an additional appropriation has been received for the Monongah Division engine shops at Grafton for the remainder of this month, and that as a result from 50 to 60 men will be put back to work in the local shops immediately. It is believed that the shipments of coal will increase regularly up until about the middle of June.

Columbus, Ohio—The contracts for building 28 miles on the new line of the Chesapeake & Ohio R.R. from Portsmouth to Columbus, have been tentatively awarded by M. J. Caples, vice-president in charge of construction. The final contracts will be awarded some time during the coming week. The 28 miles extend from Sciotoville to Waverly. The tentative contracts were awarded to W. W. Boxley & Co., of Roanoke, Va.; Winston & Co., of Richmond, Va., and New York; Rinehart & Dennis Co., of Charlotteville, Va., and the Robert Green Contracting Co., of Pittsburgh. Work will be begun within 30 days after the final contracts are awarded.

Bluefield, W. Va.—It is believed that never in the history of the Pocahontas coal fields has the industry revived so quickly as it has within the past few weeks, rising from the lowest ebb in years at the end of February to virtually normal conditions by the close of March, and promising to rise above the highest record for any one month in April. The opinion that the coal business of April will exceed normal if not establish a record for the month, is based on the fact that a number of foreign vessels are loading at the Norfolk & Western piers, while the railroad company is said to be working to its full capacity to supply them.

Charleston, W. Va.—The list of fatal accidents in the coal mines of West Virginia during the month of March shows a total of 130 fatalities. This, however, includes 112 victims of the explosion at Leyland mine on Mar. 2. From all other causes, only 18 deaths were reported, which would denote a considerable decrease in mine fatalities but for this unfortunate disaster. This report shows 112 deaths as due to explosion, 9 as resulting from falls of roof and coal, 3 from electrocution, 3 from mine car accident, 2 from explosives, and one from miscellaneous. Four deaths occurred above ground. Of the total number of men killed, 45 were Americans, and 85 foreigners. By counties, the fatalities were as follows: Fayette, 115; Logan, 3; Harrison, 2; Marion, 2; McDowell, 2; Mercer, 2; Raleigh, 2; and one death each in Mingo and Preston Counties.

Coal Trade Reviews

General Review

Orders plentiful in anthracite. Improved undertone in bituminous but the situation is still decidedly mixed. Heavy export movement. Better outlook in the Lake trade.

While anthracite orders are not as plentiful as at the beginning of the month, it is none the less evident that some of the companies are being pushed hard to meet the demand and some orders will be carried through into May. The easing in the money situation has undoubtedly released numerous unexpected orders in all directions. The barge lines to Down East points already have sufficient business on their books to carry them well over into next month. Lake shipping is just starting, having been delayed by unusually heavy ice fields at the Buffalo ports.

Bituminous agencies are expressing every confidence in the intrinsic soundness of the market, but there are so many conflicting tendencies that the situation is decidedly mixed. On the whole the market has steadied up noticeably while there is a decidedly better feeling as regards prices, and no material concessions are noted, though the outlook for any substantial advance continues as indefinite as ever. It is still evident that large steam consumers are taking coal very conservatively, holding shippers rigidly to monthly proportions. Even the agencies handling the high-grade coals are still pressed with excessive tonnage, and buyers have not relaxed any in their disposition to be critical as regards quality. With the disruption in British shipping, our export trade continues to expand in a most impressive manner, particularly to South American ports; an easing tendency in ocean freights is having a stimulating effect on this business.

A further reaction appears to have developed in the Pittsburgh district market. This is commonly ascribed to surplus production at the local mines, but close observers are inclined to lay the blame on other districts where aggressive efforts are being made to force the market. Lake shipping is nominally open, but there is such a large quantity of coal offering, and production is so heavily curtailed that little relief is possible from this source, particularly as there is practically no movement so far. Preparations of the United States Steel Corporation to ship down a large tonnage of ore is creating a more hopeful outlook, and some few boats are already being loaded for the Northwest, but there is considerable coal standing at all of the loading ports, and the movement cannot be of large proportions until late in the season at best. The situation as regards dealers' stocks is rather mixed in Ohio, though further south the disposition to stock up is noted. Steam consumers still maintain they will be able to buy all their requirements in the prompt market and continue holding off on contracts.

The Middle Western situation is generally flat, but there is none the less a notable disposition to maintain prices and curtail shipments down close to market requirements. Contracting is still generally delayed and some of the largest consumers are apparently convinced that this will be a year of low prices. The outlook is none too favorable for even an average volume of business, and interest so far is concentrated on an effort to get profitable prices.

BUSINESS OPINIONS

Banks still surfeited with loanable funds but the general outlook is notably optimistic. Well sustained and conservative progress in most lines.

Financial Chronicle—There is little definite change to be noted in the general money situation. Thus far slight, if any, improvement appears evident in mercantile or industrial circles in the requirements for funds to be used in ordinary routine channels of business activities. The banks still are surfeited with supplies of loanable funds. Last Saturday's bank statement (the actual figures, as distinct from the averages) showed a decrease of the nominal sum of $43,100 in the surplus above requirements, the surplus itself standing at $148,214,940, which compares with $18,732,950 a year ago, when the old form of statement was in operation.

Armour & Co. (Credit Dept.)—Conditions have improved very materially during the last ten days. An increasing number of furnaces are in blast. Many factories are increasing their output. The number of idle men continues to decrease. For the first time in many months the number of idle cars shows a decrease. The demand for export is strong. Weather conditions uniformly are favorable. Conservative optimism of a healthy type is present throughout the United States, and in al' lines of trade, without exception, an improvement has occurred.

Dun's—Progress in trade continues, and the improvement, as a whole, is of gratifying proportions, but there is nothing in the commercial situation resembling the remarkable revival of activity on the Stock Exchange. This speculative movement, while having a somewhat stimulating effect upon business sentiment, as perhaps discounting the future, has no counterpart in actual industrial and merchandising conditions as they exist today. The fact is that financial recovery from the effects of the war is much more rapid than in trade, although the advance in the latter is also considerable.

Bradstreet's—Passing of the intense pessimism so long ruling, coupled with actual improvement in many lines, is the dominant element in this week's report. Improvement is reflected in brighter skies, better country roads, easier collections, favorable crop news, enlarged distributive trade, increased industrial operations, continued whittling down of idleness and intensive activity in stock market operations.

Boston News Bureau—While general trade, outside of the war orders, does not improve so fast as one would like to see, it is believed that the tide is turning and that the pace toward betterment will be quicker as the season advances. General business cannot be confined to a few special lines long. It will broaden naturally. Fundamental conditions are gaining strength all the time. However the situation abroad may shape up in the immediate future, our products will be wanted by Europe for a long time to come, and we are bound to gain foreign credit or gold. All we need to do is to keep strictly to our neutrality to hold our present commanding position.

American Wool and Cotton Reporter—The bulk of the business is on foreign wools, but largely owing to the scarcity of the domestic supply. The woolen goods market is awaiting developments. Wool fabrics are now selling for spring and summer wear, whereas they are seldom used except in cold weather. Orders for uniform fabrics have kept the mills busy.

Iron Age—The Pennsylvania R.R.'s announcement that it is about to buy or build 16,500 cars and 194 locomotives and the tentative placing in this country of further large sections of the Canadian Car & Foundry Co.'s $80,000,000 shrapnel contract have been the main contributions of the week to the news of better business. There is also the expectation that the Pennsylvania rail order will soon be distributed, adding 150,000 tons or more to the 20,000 tons already placed.

ATLANTIC SEABOARD

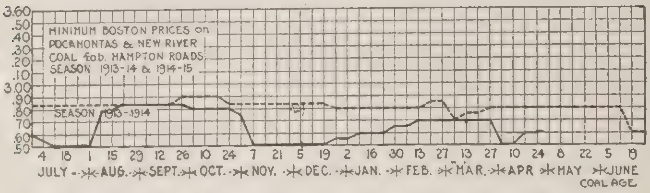
BOSTON

Better feeling noted with regard to prices on Pocahontas and New River but tonnage outlook not improved. Georges Creek shares in the general dullness. Pennsylvania grades being considered in new directions. Anthracite demand improves.

Bituminous—Pocahontas and New River continue fairly firm, considering the general situation. While there is more or less vacillation as to prices for future delivery, no material concessions are heard and apparently recent efforts to curtail production have been somewhat effective. There is a noticeably better feeling among the sales agencies with regard to prices although the prospects for any improvement in the near future are as hopeless as ever. There is little doing in the way of closing contracts. Buyers who are still waiting are likely now to defer purchases until June at least. Receipts here are well in excess of the demand and "market cargoes" are going hard. The mills this season are taking coal very conservatively; even those with ample storage are holding their contractors down to "monthly proportions." Several mill buyers who last year made contracts early are now buying only as needs require and are disposed to follow out that policy for months to come.

To show how New England buyers view the market, the recent action of the City of Boston authorities is a case in point. Bids were received Apr. 7 for supplying 41,000 tons to the harbor institutions, but they were rejected, and the city has now readvertised. There is no great amount of faith here in present prices holding through May and June.

The Georges Creek shippers are pressed with coal at all points, and there seems no improvement in demand. Their barges and steamers are moving on schedule, however, and if at times cargoes here are absorbed slowly, yet consignment is found and without any appreciable effect on the market.



The Pennsylvania coals are mulling along on small tonnages. A number of contracts have lately been closed, and in some few cases where West Virginia coals have usually been preferred in the past. The shippers are correspondingly encouraged over their prospects. All-rail trade is spasmodic, with prices averaging 5@10c. less on quantity orders than prevailed a year ago. One of the largest consumers in Boston is trying out different grades from Pennsylvania in the effort to make comparisons with Pocahontas and New River. Cambrias and Somersets that can show a uniform grade are receiving greater consideration here than usual.

Water Freights are unchanged. There are plenty of bottoms offering for what spot business there is and rates are easy at 80c., Hampton Roads to Boston.

Anthracite—The demand is noticeably better than early in the month. The weather has helped out the retailers, particularly to the Eastward, and orders that were not expected until later in the season have been coming in rather freely the past week. The prospect is that the shipping companies will carry over business into May that was unlooked for. Some of the shippers have had to disappoint Eastern consignees on the volume of April coal they could send forward.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.40@2.85	2.92@3.02	
New York*	2.40@2.95	2.70@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.60@2.75
Boston†	....	....	....	3.55@3.73
Providence†	....	....	....	3.55@3.73

* F.o.b. †On cars.

NEW YORK

Domestic grades of anthracite moving freely. Stove coal in strong demand. Bituminous slightly stronger. More contracts closed.

Bituminous—There appears to be a slightly healthier tone than prevailed a week ago and this in spite of the fact that mining has continued on a large scale. There is very little demurrage coal at the terminals, shipments being made to the piers only on orders as they are secured. The coming fall promises better conditions in the bituminous field especially if the international conflict is cleared up. The fear of labor troubles next year is another factor which calls forth the thought that a stimultaed market will become physically perceptible within the next few months.

With the loss of the enormous bunkerage business of the German lines some little consolation is obtained through the additional tonnage acquired from the increased neutral shipping. The harbor continues busy and these ships require much fuel although the total is far less than the 800,000 to 1,000,000 tons which were formerly taken each year by the great vessels of the German companies.

Some additional contracts have been closed up during the week although there are still some who delay. The figures are practically the same as those which prevailed a year ago. Quotations are: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.05@3.10; Georges Creek, $3.15.

Anthracite—There has been a free movement of the various domestic sizes of anthracite during the past week although not the rushing demand which usually prevails in April. While there are orders for a large tonnage on the books of the retailers, some of this business is being pushed back a little and the dealers, in turn, are not taking the coal so fast as was anticipated a fortnight ago. The line trade keeps active with heavy shipments, and a large tonnage will be accounted for before the warm weather sets in. Now that Lake navigation is open there will soon be an urgent demand for Western shipment. A few minor contracts have been awarded within the past ten days at good prices which aggregate quite a tonnage.

In the local market stove coal is in strong demand. Chestnut is also moving more freely than before, while egg seems to be plentiful and orders are lighter. Pea coal and the smaller steam sizes are probably easier than a week ago owing to the steady continuance of mining and No. 2 buckwheat, which was short in the better grades, may now be loaded promptly. The wholesale trade is in a very satisfactory state, all things considered, and there is no doubt that there will be an increased impetus from now to the end of the month.

The anthracite market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.60	$4.60	$4.55	$4.55
Egg	4.85	4.85	4.80	4.80
Stove	4.85	4.85	4.80	4.80
Chestnut	5.10	5.10	5.05	5.05
Pea	3.55	3.35@3.55	3.50	3.15@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.30@2.40	2.00@2.25	2.10@2.35
Barley	1.80	1.60@1.80	1.75	1.40@1.75

PHILADELPHIA

Market in anthracite shows no diminution in demand for domestic sizes. Steam sizes in easy supply, and output probably in excess of current requirements. No change in bituminous situation.

Anthracite—For the balance of the month the outlook indicates good business on the domestic sizes of anthracite. The demand still centers on egg, and while the requisitions for this size are hardly likely to warrant premium coal, at the same time, it is understood that both the companies and individuals are hard pushed for this particular size. Broken coal has shown a marked improvement the past week. Stove is in about the same condition as egg, although there does not seem to be such a sharp demand. Chestnut is still being absorbed and there is a brisk market for pea, but with production at the maximum, it is doubtful if the trade is taking all of it. Buckwheat and rice are already showing indications of the usual spring slump, occasioned by the closing down of furnaces for heating the large buildings. It is also understood that some of these sizes are going into stock.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.25	$4.25@4.35
Egg	4.50	4.50
Stove	4.50	4.50
Chestnut	4.75	4.65@4.75

Bituminous—The situation in bituminous remains unchanged. Speculation as to the future has ceased, and the operators are concentrating their efforts on securing all the business they can at current prices. The demand is confined to contracts, and but little new business is offering. A revival of commercial activity seems to be slowly materializing, but the effect as yet on the bituminous trade is hardly noticeable. Prices for medium grades are still $1 to $1.05 with the better coals offering at 35 to 45c. higher.

BALTIMORE

Trade in the best condition for a long time. Demand improves and prices stiffen. Gas coals remain weak. New anthracite schedule in effect.

The present week opened with soft-coal trade in the best condition for weeks. There are reports of a better demand on both contract and spot business and contract prices have stiffened from five to ten cents a ton over the cuts on last year's prices as effective for several weeks previous; certain classes of spot coal are also advancing. The bituminous mining regions also report spot prices about five to ten cents better, although there is still no great demand for fuel. Producing interests are convinced that better times are at hand, and are holding more firmly to their product.

West Virginia gas coals have not responded to the upward tendency so far, but it is felt that there will be improvement shortly. Three-quarter gas is still selling around 75 and 80c. at the mines, while low-grade steam coals of West Virginia are bringing 80 to 85c.

Export movement continues heavy by reason of the fact that southern Europe and South America are cut off from the better grades of Welsh coal. The month of April seems likely to establish a new record for foreign movement from this port.

HAMPTON ROADS

Export shipments moving in large quantities. Prices firm and demand improving.

Large export cargoes have been loaded during the week. The coastwise movement has been principally to the New England ports the largest percentage going to Boston. The largest cargo of the week was taken by the U. S. Naval collier "Neptune" which loaded 10,515 tons of cargo and 1480 tons of bunker coal. The export coal has all been New River and Pocahontas run-of-mine, as usual, but there has been some nut and slack shipments to the New England market. From the number of cargoes going foreign it will be seen that the demand is increasing; while a majority of the ports are regular customers of Hampton Roads coals, others only purchase here when there is difficulty in getting the European product.

Steamers and schooners loading at Hampton Roads with export cargoes, week of Apr. 9 to 16 inclusive were as follows:

Norfolk

Vessel	Tons	Destination
Batinin Accame	6100	Catania
Ed. R. Smith	762	Horta, Azores
Lewiston	1123	Maranhan
Orkild	3231	Havana
Trodenskjold	5600	Canal Zone
Camillo May Page	1049	Punta del Gorta
Genova	5632	Genoa
Ada	2675	Santiago
Atlantide	7051	Elba
Geo. M. Embiricos	5746	Piraeus
Emily I. White	512	Santo Domingo
Ejvaston	6008	Montevideo
Breynton	6344	Buenos Aires
Three Marys	1569	Bermuda
Josef Frederik	2000	St. Thomas
Pacific	6946	La Plata
Doris	4768	Cagliano
Tottenham	4500	St. Lucia
Itasca	1033	Bermuda

Newport News

Vessel	Tons	Destination
Frankby	5800	Taranto
Berwinimoor	7100	Taranto
Stephen	2875	Para
Llanberei	5000	Rio
Competitor	5200	Rio
Melbon Smith	950	Rio
Eva B. Douglas	1645	San Juan

Note—Steamers are indicated by **bold face type**, all others being schooners.

OCEAN FREIGHTS

Market slightly easier and rates lower.

The freight market is slightly easier than a week ago, owing more to the decreased demand than to the increased supply of tonnage. Although a number of steamers were chartered for export coal during this period, the freight rates were but slightly lower than previous quotations.

To	Rate	To	Rate
Havana	$2.25@2.50	Guantanamo	$3.00@3.25
Cardenas or Sagua	2.75@3.00	Demerara	5.50@6.00
Cienfuegos	2.75@3.00	Bermuda	3.50@3.75
Port au Spain, Trinidad	3.75@4.00	Vera Cruz	**3.50**
St. Lucia	3.50@3.75	Tampico	**3.50**
St. Thomas	**3.25**	Rio	**9.60**
Barbados	3.75@4.00	Montevideo	**9.36**
Kingston	3.00@3.25	Buenos Aires or La Plata	**9.36**
Curacao	3.75@4.00	Mediterranean*	10.20@10.80
Santiago	3.00@3.25	Valparaiso†	8.40@9.60

Note—Rates noted in **bold face type** are only approximate.

* To a direct port not east of the West coast of Italy, Spain excluded.

† With 800 tons per day discharge.

W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Paralos	Greek	Baltimore	Buenos Aires	2022	$9.36
Grigorios Anghelatos	Greek	Baltimore	W. Coast Italy	2339	11.04
Orion	Greek	Baltimore	Naples	2081	10.80
Phineas W. Sprague		Norfolk	Azores	709	
James Rothwell		Philadelphia	Biddeford	473	
Jane Radcliffe	British	Baltimore	River Plate	2642	9.36
Fernfield	British	Baltimore	Leghorn	2025	10.54
Robert H. McCurdy		Baltimore	Puerto Cabello	602	4.00
Bertrand	British	Atlantic R.	River Plate	2282	9.24
Competitor	British	Atlantic R.	River Plate	2216	9.12
Rio Janeiro					9.60
William H. Sumner		Norfolk	Maranham	489	6.00
Sedgwick		Norfolk	Maranham		
James William	British	Norfolk	Paramaribo	440	
Ninetta M. Porcella		Norfolk	Bermuda	466	3.25
Bessie Whiting		Philadelphia	Charleston	531	
City of Augusta		Philadelphia	Camden, Me.	514	1.00
Rauma	Norwegian	Baltimore	River Plate	1951	9.36
Cardiff	British	Baltimore	River Plate	1786	
Rosario		Baltimore	River Plate		9.60
Hopemoor	British	Baltimore	Savona	2375	10.80
St. Theodore	British	Baltimore	Genoa	3175	
Anglier	British	Baltimore	Leghorn	2148	
Antonio	British	Baltimore	Marseilles	1663	
Teviotdale	British	Baltimore	W. Coast, Italy	2538	
Fratelli Bianchi	Italian	Baltimore	W. Coast Italy	2237	
Talisman	Norwegian	Baltimore	Havana	1178	
Henry Lippitt		Norfolk	Maranham	790	$6.00
Warren Adams		Norfolk	Maranham	587	
James W. Elwell		Philadelphia	Para	1081	6.00
George D. Edmands		Baltimore	Cienfuegos	438	
Crescent	Cuban	Philadelphia	Eastport	400	1.50
Mobila	Cuban	Philadelphia	Havana	1363	

LAKE MARKETS

PITTSBURGH

Market more demoralized. Free coal at $1 for mine-run. Lake prospects poor. Mines operating 50%.

The coal market seems to have lost still more ground in the past week, and prices are lower than ever on free coal and possibly also on contract. While surplus production is given as one cause for the demoralized situation as to prices, Pittsburgh district operators are disposed to place most of the blame on other sections, making reference in particular to "wild cat" operations in West Virginia. There is a surplus of free coal in the Pittsburgh district but if there was any absorbing power in competitive markets the quantity would probably not appear large. Production, of course, might then be considerably increased. The Pittsburgh shippers certainly show a disposition to produce all the coal that can possibly be sold without actual loss.

Lake navigation is nominally open but practically there is hardly any coal moving and it does not seem likely there will be much of a movement before July. Manufacturing demand has increased slightly, but the domestic trade is down now to summer proportions and on the whole coal requirements are probably less than six weeks ago. Mines are operating at an average of about 50%, but many are idle or running only two days a week.

We quote contracts nominally on the basis of $1.15 for mine-run, but it is exceptional to obtain that figure even on contracts running to Apr. 1 next. Three-quarter coal for the Lake trade is now being sold occasionally and the price is only moderately well sustained at $1.15 to consumers and $1.10 to dealers. We reduce quotations on free coal, but still leave them at higher levels than have obtained on many recent sales: Slack, 75@80c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Industrial improvement is under way to a limited extent. Prices continue low and unsettled. Anthracite trade falling behind last year. Lake shipments delayed by ice.

Bituminous—The bituminous market is not making much headway and prices are unsettled, though no additional weakness has developed. Industrial business seems to be mending slowly, but it is still running substantially below normal. Some large war orders for steel have lately been placed with western New York plants and activity is promised for a number of months to come. Bituminous operators are now making Lake shipments in some instances and these may help strengthen the market, but there is a large quantity of coal offering at lower prices than would seem to afford a fair profit. Slack coal holds about steady.

Anthracite—The companies are not getting as many anthracite orders as at the beginning of the month, and it is predicted that the demand will not continue active as long as usual. Dealers are holding off in many localities and will either contract later in the month or wait until May. A fair proportion of them will take their chances of getting coal as needed after the coal-burning season starts in the fall.

The Lake shipments of anthracite have been held up by an unusually extensive field of ice. It is expected that the first shipments will be made during the present week.

TOLEDO

Navigation opened at Toledo. Considerable coal in the local yards.

Domestic coal is showing some stiffness in both demand and price. Steam coal is still slow. Generally speaking, however, conditions are about the same. Navigation was formerly opened on last Friday. The first vessel to leave Toledo was the "W. H. Donner," owned by the M. A. Hanna & Co.; it carried 10,000 tons of coal for Milwaukee. The "Agassiz" is now loading with 11,000 tons for the same port. It is reported that the Hocking Valley railroad has about 3000 cars of coal in the Toledo and Walbridge yards and Supt. Palmer states that about 150 cars of coal are being received daily.

COLUMBUS

Trade quiet in every department. Lake shipping slow in opening and steam business is also quiet.

Little demand is noted in domestic trade as the season is practically over. Dealers' stocks are somewhat larger than usual in some sections, while in other localities they are rather short. The tone of the trade is still good and future prospects appear to be brighter in the face of improved industrial conditions.

Steam business is still slow although something has been done toward renewing contracts. Quite a few of the steam consumers are expecting rather cheap fuel during the summer and are loath to contract at this time although some have signed up and the outlook is not so bad as formerly. Railroads are taking a considerable tonnage now. Some lines of manufacturing appear to be improving slowly and this means an increased demand for steam grades.

Lake trade shows a little activity. Some few boats will be loaded during the coming week for shipment at the opening of navigation but on the whole operators are holding off until later in the season. The large tonnage carried over on the docks of the Northwest is the principal cause for the slowness in opening. Chartering of vessels is not at all active. Lake prices will probably remain the same as last year.

Production in Ohio fields has been rather small during the week. In the Hocking Valley it is estimated that but 25% of the average has been produced. This is also true of Massillon, Cambridge, Crooksville and Jackson districts. In the Pomeroy Bend field the output has been about 45% of normal. Many mines have been closed entirely in all fields.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.70	0.75	0.65
Coarse slack	0.60	0.65	0.55

CLEVELAND

The trade is absorbing a larger tonnage, but the market is slightly lower than a week ago. Consignment coal a depressing feature.

Slack is selling at $1.65 to $1.70 on track here as compared with $1.70 to $1.75 a week ago. These are Monday prices and are likely to change toward the end of the week. The fine coal on track was mostly Middle district and Pennsylvania grades brought in over the Pan Handle. There was also some West Virginia No. 8 and Fairmont nut on track Monday, which sold for $1.80 to $1.85. Spot three-quarter coal brought $1.80 to $1.90. The lower price was paid for West Virginia No. 8 and the higher for Bergholz and high grade Middle district coals. Mine-run sold at $1.80 and a little 1¼-in. lump sold for $1.95 to $2. A good deal of coal was carried over Monday night.

Business is much better than at the opening of the year when the improvement started. There has been no let up in the increased business and while it is not up to what would be termed normal for a good year, it is becoming more general and is no longer confined to a few large companies.

Lake Trade—The Lake business does not show much life. The boats that are downbound will be on the market for coal the last of the current week or early next week and a number of them will have trouble getting coal cargoes. C. Reiss Coal Co. officials were in the city the week of Apr. 11 and arranged for the floating of 2,500,000 tons of coal to Sheboygan, Wis., Green Bay, Wis., Escanaba, Mich., and Duluth, Minn. The rate will be 30c., the same as last year. Most of the business is done on long-term contracts.

The outlook for Lake coal is better. Iron ore selling had not started last Monday, but the United States Steel Corporation is preparing to ship a large tonnage of ore, and the independent inquiry for ore is growing. Optimism is quite general.

Quotations on coal for shipment are:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	......	......	......	......
Lump, ¾ in.	......	2.20@2.25	2.00	$1.90@1.95	$1.90@2.00
Egg	3.10	......	......	......	......
Mine run	2.65@2.70	2.10	1.90	1.85@1.90	1.75@1.90
Slack	......	1.70@1.75	1.70@1.75	1.75@1.80	......

CINCINNATI

Improving industrial conditions have strengthened the nut and slack market. Beginning of the Lake movement has encouraged domestic production slightly.

While there has been no tangible change in the local situation during the past week, there is undoubtedly an improved feeling among manufacturers, as is evidenced by the continued strength of the screenings market. It is probable that the general industrial situation in this vicinity is better than for many months, making the prospects very good for summer business on the steam side of the market. If it develops that there is a normal market for the prepared grades the trade will have a first-class season. There is still some uncertainty on this score, however, as it seems to be extremely difficult to get accurate figures on the amount of domestic coal left over, either in this immediate section or at the Lake ports.

COKE

CONNELLSVILLE

Undertone continues to strengthen, with slightly more activity. Production and shipments make new record for this movement.

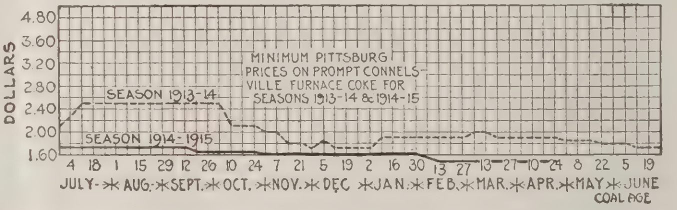
While there is not much activity, there is slightly more inquiry, and the whole tone of the coke market continues to strengthen in greater ratio than would be indicated by the new demand. Coke operators evidently have their eye on the steel trade, observing possibilities of further improvement and greater absorption of coke, even if it is only coke produced by the consumers. Such increased operations mean greater employment of labor, and there is not enough labor in the region, and probably not enough obtainable, to operate the district at capacity. It is said that a couple more merchant furnaces coming into the market and absorbing merchant coke would start prices definitely on the upgrade, and $3 coke is regarded as by no means an impossibility within a few months.

Prompt furnace coke continues to show a firm tone, and well above $1.55 has been paid for good brands. There is a little tentative inquiry for furnace. We quote: Prompt furnace, $1.55@1.60; contract furnace, to July 1, $1.60@1.65; contract furnace, Jan. 1, $1.75; prompt foundry, $2@2.35; contract foundry, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 10 at 292,215 tons, an increase of 10,964 tons, and shipments at 287,829 tons, an increase of 9815 tons. Both production and shipments made new records on this movement.

Buffalo, N. Y.—The market shows little activity and prices remain about the same as for some weeks. Dealers report a notable hesitancy among consumers to enter into contracts. Prices remain unchanged at $4.25 for the best 72-hr. Connellsville foundry and $3.30 for stock coke.

Chicago—The coke market is fairly steady but it is reported that some consignment shipments have been sold this week at a sacrifice. There is an improved demand for furnace and foundry coke, but so far the domestic sizes have not shown the liveliness anticipated. Quotations are as follows: Byproduct, $4.45@4.65; Connellsville, $4.50@4.75; Wise County 72-hr. (select), $4.50; gas coke, $3.75@4; furnace, $4.45@4.65.



SOUTHERN

LOUISVILLE

Dealers coming into the market. Large shipment of river coal started from Pittsburgh.

Retail dealers are showing considerable disposition to begin stocking for next season's trade. Straight mine-run is now selling around $1, due in part to the fact that there is little movement of the block coals. Six-inch mine-run is on much the same basis. Block coals are offered at from $1.40 to $1.55, round at from $1.15 to $1.25 and nut and slack of the better grades, is up to 65 and 85c., due to the fact that it is scarce. All prices are f.o.b. mines.

Dispatch in this direction of fourteen barges of coal from Pittsburgh has been announced, the first shipment of the kind in many weeks, due to the low river stages. There is a very large quantity of coal in the Pittsburgh pools, according to reports here.

BIRMINGHAM

Steam fuels slightly improved. Lump coal very quiet.

The market on steam coal shows some improvement over last week, the demand being slightly stronger for the better grades, though conditions are far from normal, mines running only about two or three days per week. Lump coal shows no improvement, the demand being very light, and operators are making only what tonnage they are actually shipping. Prices are at least 50c. per ton lower than usual on lump coal.

MIDDLE WESTERN

CHICAGO

Light demand for Indiana coals though prices are well sustained. Franklin and Williamson County operators holding together firmly. Anthracite movement light.

The demand for steam coal from the Indiana mines is of little consequence, and it is reported less is moving at this time than a year ago. On the whole, Indiana operators are maintaining prices satisfactorily, even though the demand is light. No. 4 lump has sold at $1.35 and domestic sizes at around $1.40, with few shipments of the latter. Screenings show the same strength as last week.

Movement of coal from the Springfield district is quiet, but more contracting is being done by the operators there than elsewhere, particularly with the railroads. Contracts awarded so far are reported to be at the same figure as last year.

In Franklin and Williamson Counties the mines are averaging about three days per week. Coarse coals are in little demand but the Operators Association is maintaining stable prices.

Hockings are in the doldrums, and there is no business to be reported. The operators show no disposition to ship any free coal into this territory.

In smokeless coals there is little buying by retailers, but prices for direct shipment from the mines seem to be better maintained than heretofore. No free coal is reported on the market.

Anthracite trade is quiet and the movement so far well below last year. It is felt that the closing week of April will see a rush of orders to take final advantage of April storage prices.

Prevailing quotations are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.35	$1.35	$1.35@1.50	$1.30@1.50	$1.35@1.50
4-in. lump..	....	....	1.35@1.45	....	....
Steam lump	....	....	1.25@1.35	1.20@1.30	....
2½-in. lump.	1.20@1.30	1.20@1.30	1.25@1.35	....	....
1¼-in. lump.	1.25	1.25	1.25@1.40	....	....
Mine-run...	1.10	1.00@1.05	1.00@1.20	1.00@1.10	....
Egg........	1.25@1.35	1.30@1.35	1.30@1.45	1.20@1.30	....
No. 1 washed	1.25	....	1.65	....	1.35@1.50
No. 2 washed	1.25	....	1.75	....	1.35@1.50
6x3-in. egg	....	....	....	....	1.50
Nut.......	....	1.15@1.25	1.25@1.40	1.15@1.20	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut	1.25@1.35	....	....	....	....
Screenings..	0.85@0.90	0.80	0.80@0.95	0.75@0.80	0.90

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump....	$1.25@1.35	$1.30@1.40	$1.50@1.60	1.50@1.60	$1.40@1.60
1¼-in. lump.	1.15@1.25	1.25@1.35	....	....	....
Mine-run...	1.00@1.10	....	1.15@1.25	1.15@1.25	1.25
Egg.....	1.20@1.35	1.00@1.10	1.50@1.60	1.50@1.60	....
Nut.......	....	....	1.30@1.40	....	....
Screenings..	0.75@0.85				....

Knox and Greene County 5-in. lump, $1.25@1.35; 3-in. lump, $1.10@1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.05. Screenings 80 to 90c.

ST. LOUIS

Domestic movement practically ceased and steam demand also flat. Outlook generally unfavorable.

There is very little activity in the local markets, with the possible exception that there is an effort to get better prices when there is no market. It is remarkable that with practically no domestic coal moving, there is not the demand for steam coal that had been anticipated. The result is that the market is in bad shape.

There is a little tonnage of Carterville and Franklin County coal moving into the country, but very little locally. The Standard market is at a standstill, excepting for the movement of railroad coal. A small tonnage of anthracite is moving in, but other than that there is very little doing.

Conditions are not at all favorable for even the average volume of business at this time of the year. Effective Apr. 12, a new scale of prices from the Standard fields went into effect, but the result will not be known until the surplus tonnage on hand has been consumed.

KANSAS CITY

Retail business about over for the season and wholesale very quiet.

The retail business here has come to a close and the wholesale trade continues without any change and with very little movement. Prices remain the same and show no indication of a change. Very little coal is being taken from the mines in Missouri and Kansas and thousands of miners are out of employment.

PRODUCTION AND TRANSPORTATION STATISTICS

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports of the United States for February, 1914-15, and for the eight months ending February, 1913-14-15, in long tons:

	Eight Months			February	
Imports from:	1913	1914	1915	1914	1915
United Kingdom	7,355	8,460	27,270	3,547	6,158
Canada........	954,363	654,641	742,500	75,570	102,814
Japan..........	42,217	81,476	64,201	7,170	5,914
Australia and Tasmania....	107,017	172,127	124,131	30,843	3,912
Other countries	3,257	2,010	1,447	43	124
Total.......	1,114,209	918,714	959,549	117,173	118,922
Exports:					
Anthracite					
Canada........	3,170,607	2,445,231	2,286,289	203,130	176,966
Brazil..........	....	....	6	....	....
Uruguay.......	....	84	....	....	....
Other countries.	53,997	45,360	39,821	3,683	1,274
Total.......	3,224,604	2,490,675	2,326,116	206,813	178,240
Bituminous					
Canada........	7,559,065	8,956,986	6,307,734	440,712	302,594
Panama........	307,759	257,704	170,797	16,650	26,578
Mexico.........	206,908	205,144	271,054	22,171	18,916
Cuba..........	805,162	787,134	670,974	101,375	75,646
West Indies.....	402,705	380,457	277,397	43,186	24,007
Argentina......	....	76,410	184,393	23,609	32,974
Brazil..........	....	185,687	230,188	15,166	28,705
Uruguay.......	....	22,039	30,494	5,181	....
Other countries.	642,367	773,377	1,126,755	98,259	75,468
Total.......	9,923,966	11,644,938	9,269,786	766,309	584,888
Bunker coal....	4,794,942	5,110,588	4,452,363	335,529	502,449

NORFOLK & WESTERN

Destination of shipments over this road for March of this year, the three months of this year and last year were as follows, in short tons:

	March		Three Months	
Coal	1914	1915	1914	1915
Tidewater, foreign.......	158,247	190,818	428,672	387,443
Tidewater, coastwise.....	342,530	310,353	991,863	835,922
Domestic..............	1,611,341	1,403,581	4,323,872	4,189,346
Coke				
Tidewater, foreign.......	......	327	15	1,837
Domestic..............	103,070	70,797	317,669	208,087
Total..........	2,215,188	1,975,876	6,062,091	5,622,635

FOREIGN MARKETS

GREAT BRITAIN

Domestic coals easier, but steam fuels still short. Prices continue to advance. Wage question more acute.

Apr. 9.—Business in the coal trade has been under the influence of the holidays during the greater part of the week, and although the miners as a rule loyally responded to the call of the Government to return to work as early as possible, the suspension of operations has naturally resulted in some further temporary restriction of the output and the supply available. There are no important changes in the position to note, however, the outstanding features being an easier tone in the house coal market and a very strong demand for practically every other class of fuel, accompanied by prices which show no sign of declining.—"The Iron and Coal Trade Review."

Apr. 9—There is great pressure for all descriptions, and coals are exceedingly scarce for this month's shipment. Quotations are approximately as follows:

Best Welsh steam......	Nominal	Best Monmouthshires...	$8.28@8.40
Best seconds...........	Nominal	Seconds..............	7.80@8.04
Seconds...............	$8.88@9.12	Best Cardiff smalls....	5.16@5.28
Best dry coals..........	8.88@9.12	Cargo smalls..	4.32@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Outward chartering is very quiet owing to the continued stemming difficulties. Tonnage does not offer freely. Rates are rather unstable but are approximately as follows:

Gibraltar.........	$3.84	Naples	$4.80	Las Palmas.	$3.60
Marseilles.........	5.02	Venic	9.60	St. Vincent.......	4.32
Algiers...........	3.86	Alexandria.......	6.60	Rio Janeiro.	6.72
Genoa............	4.80	Port Said........	6.48	Monte Video...	5.88
				River Plate..	6.12

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let section on page 12.

+Indicates contracts regarding which official information has been received.

Recast

This section gives a synopsis of items previously announced that will come up for consideration during the ensuing week, together with the number of the page on which the former notice appeared; also additional or supplemental information, such as bids, etc., on other old contracts.

+No. 312—Chicago, Ill.—The City of Chicago is readvertising for bids on a portion of this contract (pp. 488, 666) for coal as follows: 1800 tons of screenings per month for delivery on cars at the 39th St. Pumping Station, 400 tons of screenings per month to be delivered in bins at the Lawrence Ave. Pumping Station. Bids must be accompanied by a certified check for $600 on the 39th St. business and for $200 on the Lawrence Ave. business. Bids will be received until noon, Apr. 29. Address Clk. John McGillen, Room 700, Karpen Bldg., 910 South Michigan Ave., Chicago, Ill.

No. 396—National Soldiers' Home, Virginia—The bids on this contract (p. 567) were opened on Apr. 16, but were so close and have required such extensive calculations of analysis, etc., that the name of the successful bidder has not yet been given out. Address Treas. S. E. Skinner, National Soldiers' Home, Virginia.

+No. 437—Boston, Mass.—The bids on this contract (p. 627), which provides for furnishing 2000 tons of anthracite and 1300 tons of bituminous coal to the local Post Office and Sub-Treasury Building, were: Anthracite screenings, Coleman Bros., $3.30; Wellington-Wild Coal Co., $3.36; Metropolitan Coal Co., $3.60; bituminous mine-run, Metropolitan Coal Co., $4.42; Staples Coal Co., $4.44. All quotations are per gross ton. Address Custodian William F. Murray, United States Post Office and Sub-Treasury, Boston, Mass.

+No. 454—Cleveland, Ohio—We are informed that this contract (p. 627), which provides for furnishing the Municipal Electric Light Department with 35,000 to 40,000 tons of Youghiogheny coal, was made for 18 months. Address Supt. of Service and Distribution C. G. Beckwith, Municipal Electric Light Department, Cleveland, Ohio.

No. 461—Boston, Mass.—The City of Boston has readvertised for bids on this contract (p. 627), which provides for furnishing 41,300 tons of bituminous coal to the institutions in Boston Harbor. All stipulations, specifications, etc., apply as previously announced with the exception that bids will be opened on Apr. 27. Address Supt. of Supplies D. Frank Doherty, Room 808, City Hall Annex, Boston, Mass.

+No. 489—Staples, Minn.—One bid has been submitted on this contract (p. 665) by the Dover Lumber Co., which offers to furnish Youghiogheny screenings at $2.65 per ton. Bids will be received until May 3. Address Supt. John Effinger, Municipal Electric Light Plant, Staples, Minn.

+No. 496—Malden, Mass.—In addition to the previous requirements noted on this contract (pp. 665, 707) we are advised that 700 tons of bituminous coal will also be required for delivery at the High School in the same manner as the anthracite. Address Clk. of Com. John L. Gilman, City Hall Bldg., Malden, Mass.

+No. 505—Louisville, Ky.—This contract (p. 665), which provides for the fuel requirements of the Finzer Tobacco Co., should read 225 tons of nut and slack coal per month instead of per year, as previously noted. Address Purchasing Agent, Finzer Tobacco Co., 4019 Finzer Ave., Louisville, Ky.

No. 506—Chicago, Ill.—We are informed that the tonnage involved in this contract amounts to 10,000 tons instead of 20,000 tons, as previously noted (p. 665). The purchaser has in the past been using southern Illinois screenings on this business. Address Purchasing Agent, Barrett Mfg. Co., 10 South La Salle St., Chicago, Ill.

No. 510—Chicago, Ill.—This contract (p. 665), which provides for furnishing approximately two cars per day to Darling & Co. at this place, has always been filled with southern Illinois 1½-in. screenings in the past. Address Purchasing Agent, Darling & Co., 4201 South Ashland Ave., Chicago, Ill.

+No. 511—Dayton, Ohio—Bids on this contract (p. 665), which provides for furnishing the National Military Home with coal during the next year, will not be opened until June 30 instead of May 1, as previously announced. Address Treas. W. H. Ortt, National Military Home, Dayton, Ohio.

No. 512—Chicago, Ill.—This contract (p. 666), which provides for furnishing approximately one car of Illinois screenings per day to the Barber Asphalt Paving Co., will come up for consideration shortly. Address Purchasing Agent, Barber Asphalt Paving Co., 7 South Dearborn St., Chicago, Ill.

No. 518—Chicago, Ill.—This contract (p. 666), which provides for furnishing approximately 30 cars of coal to the Bowman Dairy Co., is usually filled with 1½-in. southern Illinois screenings. Address Purchasing Agent, Bowman Dairy Co., 158 West Ontario St., Chicago, Ill.

+No. 522—Lorain, Ohio—The Board of Education has decided to readvertise for bids on this contract (p. 666), which provides for furnishing coal for the school year 1915-16. The new bids will be solicited on a heat-unit basis, and will be opened on May 12. Address Clk. E. Bruell, Board of Education, Lorain, Ohio.

+No. 527—San Francisco, Calif.—Bids on this contract (pp. 666, 708), which provides for furnishing coal to 28 Western army posts, will be received until 11 a.m., Apr. 30. Address H. S. Wallace, care Quartermaster Corps, "Chronicle" Bldg., San Francisco, Calif.

+No. 531—Frankfort, Conn.—Awards on this contract, which involves about 19,000 tons of coal for the State Prison Department, were scheduled to come up for action on Apr. 26. Address State Prison Commission, Frankfort, Ky.

+No. 540—Knoxville, Tenn.—Bids will be received on or before Apr. 24 for furnishing the Southern Ry. Co. with a large quantity of Alabama mine-run coal (p. 708). Address Fuel Agt. E. G. Goodwin, Southern Ry. Co., Knoxville, Tenn.

+No. 546—St. Joseph County, Ind.—The Board of Commissioners will receive sealed proposals until Apr. 26 for 600 tons of Pocahontas or New River smokeless coal, mine-run, 60% to be lump coal, to be delivered at the county jail (p. 708). Address Auditor Clarence Sedgwick, South Bend, Ind.

+No. 557—Brockton, Mass.—The quantities on this contract (p. 709) have been announced, and are as follows in gross tons: 528 tons of Lehigh egg, 600 tons of Lehigh stove, 1800 tons of Lehigh broken, 300 tons of Shamokin stove, 4700 tons of bituminous steam coal. Bids were received until 3 p.m., Apr. 20, and were submitted on a f.o.b. basis at specified yards at Brockton and Halifax, Mass. Address Highway Commission, City Hall, Brockton, Mass.

+No. 564—New Orleans, La.—Sealed proposals will be received for furnishing the United States Plant at South Pass, La., for its annual requirement of coal, until 11 a.m., May 3 (p. 708). Address Maj. Edward H. Schultz, Corps of Engineers, United States Engineer Office, Room 325, Custom House, New Orleans, La.

+No. 567—Brookline, Mass.—Sealed proposals will be received by the local city government until 3:50 p.m., Apr. 26, for furnishing approximately 2963 tons of anthracite coal and 2000 tons of bituminous (p. 709). Address Secy. of Board Edward A. McEttrick, Town Hall, Brookline, Mass.

+No. 568—Albany, N. Y.—Bids on this contract (p. 709), which provides for furnishing about 10,000 tons of anthracite and 3000 tons of bituminous coal for use at the Capitol Buildings were as follows:

Bidder	Anthra.[1]	Slack[2]	Grate[3]	Stove[4]
Willard M. Phillips	$3.68	$3.75	$5.54	$6.12
J. T. D. Blackburn	2.97	3.00	5.34	5.80
C. M. Stuart Coal Co.	2.97	3.12	...	...
R. B. Rock	3.20	3.40	5.00	5.75
E. W. Howell Co.	2.97	3.04	4.98	5.78
Montgomery Coal Co.	2.95	2.97	4.90	5.50
W. G. Morton	...	...	5.09	5.54

[1] 10,000 tons No. 1 buckwheat. [2] 2500 tons. [3] 600 tons. [4] 50 tons of stove or chestnut.

Address Supt. William H. Storrs, Capitol Bldg., Albany, N. Y.

New Business

No. 569—Louisville, Ky.—The Grocers Ice & Cold Storage Co., which consumes an average of 10 to 12 cars of nut and slack during the summer months, has no contract at present but would consider applications for furnishing coal on contract. Address Purchasing Agent, Grocers Ice & Cold Storage Co., 603 East Main St., Louisville, Ky.

No. 570—Louisville, Ky.—The American Elevator & Machine Co., which consumes about 300 tons of coal annually, is testing various grades to find one best suited to their purposes. Mine-run and nut and slack are being consumed at present. Address Pres. M. Poschinger, 520 East Main St., Louisville, Ky.

No. 571—Louisville, Ky.—The American Baking Co., one of the largest local consumers of coal, will arrange for a supply, probably a year's contract, some time next month. Pres. Budge, American Baking Co., South Tenth St., Louisville Ky.

+No. 572—New York, N. Y.—The United States Army will receive bids until 10 a.m., May 12, for furnishing approximately 5200 tons of bituminous and 900 tons of broken egg, stove and nut coal mixed, for deliveries at various points in New York and adjoining stations. Complete details can be had on application. Address Col. A. L. Smith, Depot Quartermaster, Army Building, Whitehall St., New York City.

+No. 573—Kokomo, Ind.—The local Board of Education will receive bids until 4 p.m., May 4, for furnishing approximately 800 tons of coal to the local school building during the ensuing year. Bidders are requested to submit quotations on both 2- and 3-in. screenings, Hocking Valley, Indiana No. 4, Virginia Splint and Pocahontas coal. The bids must all be accompanied by satisfactory bonds, and should cover cost of delivery to the various buildings. Address Secy. A. B. Armstrong, Board of School Trustees, Kokomo, Ind.

+No. 574—Cincinnati, Ohio—The Board of Education at this place will receive sealed proposals until noon, May 10, for supplying the various public schools with coal approximately as follows: 8000 tons of smokeless mine-run, 1600 tons of nut and slack coal, 2500 tons of lump, 50 tons of Piedmont smithing. All bids must be accompanied by a bond for 30% of the amount of the bid. Specifications are on file at the office of the chief engineer of the Board at 511 West Court St., Cincinnati. Address Business Mgr. C. W. Handman, Board of Education, Cincinnati, Ohio.

+No. 575—Middletown, Conn.—Sealed proposals will be received by the Connecticut Hospital for the Insane until 10 a.m., Apr. 26, for furnishing about 8000 tons of bituminous coal and 700 tons of anthracite. Complete details as to point of delivery, quality, etc., can be obtained on application. Address Asst. Supt. Dr. William E. Fisher, Connecticut Hospital for the Insane, Middletown, Conn.

No. 576—Chicago, Ill.—The Royal Enameling & Manufacturing Co. is in the market for mine-run coal under a contract to meet its steam requirements, involving about 7000 tons per annum. It has been consuming Knox County, Indiana, coal in the past. Address Pres. J. H. Fall, Jr., Royal Enameling & Manufacturing Co., 326 West Madison St., Chicago, Ill.

No. 577—Davenport, Iowa—The Davenport Water Co. expects to make a contract very shortly for its annual supply of coal; about 2000 tons of southern Illinois screenings are required. Address Davenport Water Co., Davenport, Iowa.

No. 578—Davenport, Iowa—The Independent Baking Co., which is just starting a new plant here, has not yet let any contract for its coal requirements. It has been using Harrisburg screenings and Harrisburg No. 1 nut for producer purposes. Address Secy. W. H. Wiese, Independent Baking Co., Davenport, Iowa.

No. 579—Mishawaka, Ind.—The Dodge Manufacturing Co. will be in the market about June 1 for its annual fuel requirements, aggregating about 9000 tons of mine-run coal. It has been using a West Virginia grade. Address Pur. Agt. F. P. Howlett, Dodge Manufacturing Co., Mishawaka, Ind.

No. 580—Union, N. J.—The local Board of Education will receive bids until 8 p.m., Apr. 28, for 100 tons of pea, 200 tons of nut and 300 tons of stove coal. Bidders should quote prices per net ton of 2000 lb. including cost of delivery and storage. Address Secy. Fred Cortal, Board of Education, Union, N. J.

+No. 581—York, Penn.—The School Board will receive bids until noon, Apr. 26, for furnishing approximately 1000 tons of anthracite and 1500 tons of bituminous coal to the local schools. Stove, egg, chestnut and buckwheat anthracite will be required, and Greensburg, Yatesboro and Scootac screened lump, Punxsutawney No. 3 screened and Dilltown smokeless mine-run bituminous coal also. Prices quoted should include cost of delivery to the various buildings. Address Secy. A. J. Updegraff, 229 West Third St., York, Penn.

+No. 582—Allentown, Penn.—Sealed proposals will be received by the city government until 9:30 a.m., Apr. 27, for furnishing coal as follows: City Garbage Crematory, 240 gross tons of mine-run gas coal; City Fire Engine Houses, 217 gross tons stove coal, 20 gross tons of chestnut and 20 tons of pea coal; Central Fire and Police Station, 30 gross tons of stove and the same of egg coal. All bids must be accompanied by certified checks and further information may be obtained by addressing the superintendent of the various departments noted. The bids will be received by Mayor Charles W. Rinn, 39 North Seventh St., Allentown, Penn.

+No. 583—Andover, Mass.—The local Board of Education is in the market for its annual requirements of coal and will receive bids until Apr. 30, 1915. Complete details can be had on application. Address Superintendent of Public Schools, Andover, Mass.

+No. 584—Ann Arbor, Mich.—The Purchasing Committee for the county at this place received bids until Apr. 22 for furnishing 125 tons of Lehigh Valley or Scranton anthracite grate, 75 tons of Lehigh Valley egg and 20 tons of the same, deliveries to be completed before Jan. 1, 1916. Address County Clk. George W. Beckwith, Ann Arbor, Mich.

+No. 585—Washington, D. C.—The United States Government will receive bids through the General Supply Committee until 2 p.m., May 6, for furnishing coal to the Executive Department and independent Government establishments in Washington during the fiscal year beginning July 1, as follows: BITUMINOUS (mine-run)—13,000 tons for the Bureau of Engraving and Printing, 2000 tons for the Treasury Building, 3200 tons for the Freedmen's Hospital, 7000 tons for the General Land Office, 20,000 tons for the Hospital for Insane, 5000 tons for the Agricultural Building, 3500 tons (2-in. bar screen; crushed, nut and slack) for the New Museum Building, 7300 tons for the United States Soldiers' Home, 2200 tons for the State, War and Navy Department Building, 7500 tons (crushed, nut and slack) for the Government Printing Office, approximately 4100 tons for delivery at various points in amounts not exceeding 700 tons. ANTHRACITE—3000 tons of buckwheat No. 1 for the Bureau of Standards, 2400 of the same for the State, War and Navy Department Building, 7500 tons of pea for the Government Printing Office, 6000 tons of pea for the Post Office Building, approximately 1600 tons for miscellaneous deliveries; 9010 tons of egg, stove, nut and furnace coal for delivery in small lots to the various buildings of the following departments: Treasury Department, War Department, Department of Justice, Navy Department, Department of Interior, Department of Agriculture, Department of Commerce, Office Public Buildings and Grounds, miscellaenous. Address Acting Secy. of the Treasury Byron R. Newton, General Supply Committee, Washington, D. C.

+No. 586—Utica, N. Y.—The Board of Contract and Supply at this place opened bids on Apr. 2 for coal to supply the Department of Public Works, Public Safety and the Department of Charity and the Parks, the bidders being the Utica Coal Co., Sang & Reussig, Emil George, Clark-Davis Co. and Henry F. Miller. Address Clerk of the Board of Contract and Supply, City Hall, Utica, N. Y.

+No. 587—Cohoes, N. Y.—The Board of Education at this place will contract in May or June for its annual requirements of coal, aggregating about 400 tons. Egg coal is used mostly, but some stove is also required. The cost for the coal on the expiring contract was about $6.25 per ton. The call for bids is advertised and the business let on a competitive basis. Address Board of Education, City Hall, Cohoes, N. Y.

+No. 588—Everett, Mass.—The Board of Education at this place will be in the market some time during May or June for its annual requirements of coal, aggregating 1800 to 2000 tons. The ash content must not exceed 14% and the price per ton in 1914 was $6.24. The call for bids is advertised. Address Committee on Fuel Supply, Board of Education, Everett, Mass.

+No. 589—West Hoboken, N. J.—The Board of Education of this place will receive bids until 8:30 p.m., May 27, for supplying the various schools with 1000 tons of stove and egg coal. Address Secy. Alexis Benoist, Board of Education, Hoboken, N. J.

+No. 590—Philadelphia, Penn.—Sealed proposals will be received until 1 p.m., May 18, for furnishing the Frankford Arsenal with coal as follows: 11,000 gross tons of best grade Clearfield, Berwind-White Scalp Level or other coal of equal value, deliveries to be at the rate of 300 tons per week during the winter and 200 tons per week during the summer; 90 tons of the best Lehigh stove coal; 100 tons of Connellsville coke, stove size. Bids will be received only from responsible dealers and quotations should be made delivered f.o.b. Frankford Arsenal, except on anthracite coal, which is to be delivered in bins on the arsenal grounds where required. Payment will be made on the price quoted with correction for variations in the heating value and ash. Complete details and specifications can be had on application. Address Commanding Officer, Frankford Arsenal, Philadelphia, Penn.

+No. 591—Troy, Ohio—The Public Service of this city will receive bids until noon, Apr. 27, for furnishing coal to the Water Works, Electric Plant and City Hall for the fiscal year beginning May 1, 1915. Mine-run coal and different grades of nut and slack are required, and bids should include cost of delivery in bins as required, but the cost of hauling from railroad cars should be quoted separately. All bids must be accompanied by a certified check for $100, and the successful bidder will be required to furnish a bond for $2000. Address Dir. of Pub. Service Henry J. Beck, City Hall, Troy, Ohio.

+No. 592—Nashville, Tenn.—The local Board of Education will be in the market during May or June for its annual requirements of coal, amounting to about 40,000 bu. of lump and 20,000 to 40,000 bu. of pea and slack. The current contract is being filled with Kentucky vein No. 9 coal at $2.10 per ton for lump and $1.60 per ton for pea and slack. The call for bids is advertised. Address Board of Education, Nashville, Tenn.

+No. 593—Boston, Mass.—The Supply Department of the City Government will receive bids until Apr. 29 for furnishing coal to the public buildings as follows: 7400 tons of broken, 7200 tons of egg, 3620 tons of stove, 900 tons of screenings and 9150 tons of bituminous. Bids will also be received at the same time for 350 tons of stove for delivery at Long Island, 150 tons of egg and stove each at Deer Island, 50 tons of stove and 150 tons of egg at Rainsford Island. Address Supt. D. Frank Doherty, 808 City Hall Annex, Boston, Mass.

No. 594—Mattoon, Ill.—The Central Illinois Public Service Co., whose general offices are at this place, is in the market for a contract covering its requirements, aggregating about 4000 tons, for delivery at about 20 different plants in Illinois; 1¼-in. and 3-in. screenings and mine-run coal are required. Address Pur. Agt. D. R. Truax, Central Illinois Public Service Co., Mattoon, Ill.

+No. 595—Hartford, Conn.—Bids were received until noon, Apr. 13, for furnishing the State Capitol with coal as follows: 700 tons of Lehigh egg (of not less than 12,900 B.t.u.) and 600 tons of Lehigh pea (of not less than 12,300 B.t.u.). Address Comptroller Morris C. Webster, State Capitol, Hartford, Conn.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

No. 221—Columbus, Ohio—This contract (p. 446), which provides for furnishing the local Post Office with 700 tons of bituminous coal, has been awarded to the **Taylor-Williams Coal Co.** The contract provides for West Virginia mine-run coal at $2.24 per gross ton. Address Custodian S. A. Kinnear, United States Post Office, Columbus, Ohio.

+No. 262—St. Louis, Mo.—This contract (pp. 447, 664), which provides for furnishing and delivering 360 tons of bituminous coal to the Federal Building has been awarded to the **Boehmer Coal Co.**, at $2.36 per ton for 2-in. lump coal. Address Custodian Fountain Lorthwell, Federal Bldg., St. Louis, Mo.

+No. 290—East Orange, N. J.—This contract (p. 487) which provides for furnishing the local Board of Education with about 1800 gross tons of anthracite coal has been awarded as follows: **East Orange Coal & Supply Co.**, 1500 tons for delivery April to June; **David W. Ball Co.**, 300 tons for deliveries after August. Address Secy. Warren A. Clapp, Board of Education, East Orange, N. J.

+No. 340—Rochester, N. Y.—Awards on this contract (p. 528), which provides for the fuel requirements at the local public schools, were:

F. P. Weaver Coal Co.—Spring deliveries, anthracite egg and stove, $5.44; nut, $5.67. Winter deliveries, anthracite egg and stove, $5.82; nut, $6.05.

Jenkins & Macy Co.—Morris mine-run, $3.10; Morris lump, $3.30; Eureka Scalp Level, $3.40; semianthracite screenings, $2.35.

Yates Coal Co.—Indiana County, $3.10; Cambria County, $3.25; bituminous nut slack, $2.85.

D. M. Filkins & Son—Three-quarter lump, $3.25; anthracite buckwheat, July 1 to Oct. 1, $3.20; same, Oct. 1 to end of contract, $3.30.

Address Secy. J. S. Mullan, Board of Education, Municipal Bldg., Rochester, N. Y.

+No. 345—Salem, Ohio—This contract (p. 528), which provides for supplying coal to the local city water-works, has been awarded to **Reece Bros.** at $1.85 per ton of mine-run, delivered. The next lowest bidder was the Keystone Coal Co., of Cleveland, at $1.90 on cars at Salem. Adress Dir. of Pub. Service I. N. Russell, Salem, Ohio.

No. 346—Chicago, Ill.—This contract (p. 528), which provides for furnishing Sears, Roebuck & Co. with approximately 50,000 tons of steam coal, has been awarded to the **Ender Coal & Coke Co.**, of Chicago. The contract provides for 2-in. screenings, and it is understood that the coal will be shipped from the Livingston mine of the Rutledge & Taylor Coal Co. in Madison County, Ill. Address Pur. Agt. J. H. Westrish, Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill.

No. 353—Greenville, Mo.—This contract (p. 566), which provides for furnishing the Ozark Valley Ry. Co. with about 200 tons per month of 2-in. lump coal, has been awarded to the **West Virginia Coal Co.**, of St. Louis, at $1.25 per ton at the mines. Address Purchasing Agent, Ozark Valley Ry. Co., Greenville, Mo.

+No. 354—Janesville, Wis.—The Janesville Machine Co. advises that this contract (p. 566), which provides for about 2500 tons of coal, has been closed. No details are available. Address Pur. Agt. C. O. Eddy, Janesville Machine Co., Janesville, Wis.

+No. 357—Pottsville, Penn.—This contract (p. 566), which provides for furnishing 400 tons of stove coal and 3000 tons of buckwheat coal, has been awarded to **Edw. H. Borda**, Schuylkill Haven, Penn., at $1.83 for buckwheat and $4.48 for stove. The only other bid submitted was from Charles Heissler, buckwheat, $1.85, and stove, $4.40. Address County Controller J. E. Kantner, Pottsville, Penn.

+No. 369—Bridgeport, Conn.—This contract (p. 567), which provides for furnishing about 16,000 tons of bituminous coal, has been awarded to **Archibald McNeil & Sons Co.** at $3.95 per ton. Address Mgr. C. A. Paul, United Illuminating Co., Bridgeport, Conn.

+No. 377—Jersey City, N. J.—This contract (p. 567), which provides for furnishing the Municipal Building with coal until Mar. 31, 1916, has been awarded to **James Coyle.** The average price on the six grades involved was $5.80 per ton. Address City Clk. Michael I. Fagen, City Hall, Jersey City, N. J.

+No. 393—New York, N. Y.—This contract (p. 567), which provides for furnishing the Hastings Pavement Co. with from 6000 to 9000 gross tons of bituminous coal, has been awarded to the **A. W. Hillebrand Co.** The contract was awarded on a specification basis. Address Secy. C. P. Pultz, Hastings Pavement Co., 25 Broad St., New York, N. Y.

+No. 400—Eagle Grove, Iowa—The Citizens Light, Heat & Power Co. at this place advises that it has contracted for its requirements to Apr. 1, 1916 (p. 567). Address Secy. J. A. Innes, Citizens Light, Heat & Power Co., Eagle Grove, Iowa.

+No. 403—Bayonne, N. J.—This contract (p. 567), which provides for furnishing the local Board of Education with about 2500 tons of anthracite coal, was awarded to the **Consumers Coal & Ice Co.** at the following figures: Pea, $4.18; egg and stove, $5.80; chestnut, $6. Address Secy. of Bd. W. J. Tomlin, 26th St. and Ave. C, Bayonne, N. J.

+No. 433—Reading, Penn.—This contract (p. 626) which provides for furnishing about 2500 tons of pea, egg and stove coal has been awarded to **Elmer E. Moore & Bros.** on the following basis: Egg, $5.38; stove, $5.63; pea, $3.68. Fehn & O'Rourke bid $5.40 for egg; $5.65 for stove; $3.99 for pea. J. W. Holmes & Co. bid $5.60 for egg; $5.80 for stove, and $4 for pea coal. Address Secy. F. Roland, Jr., Board of School Directors, Reading, Penn.

+No. 455—Clinton, Mass.—This contract (p. 627), which provides for furnishing the requirements for the local School Department during the ensuing year, has been awarded to **Connery Bros.**, at $7.65 a ton for egg coal, and $7.45 a ton for broken. Address Frederick E. Clerk, Clinton School Committee, Clinton, Mass.

+No. 466—Reading, Penn.—Awards on this contract (p. 628) which provides for furnishing 400 tons of pea coal and 50 tons of stove coal to the Berks County Prison, were: **J. W. Holmes & Co.**, 400 tons of pea at $3.98; **H. J. Heck**, 50 tons of stove at $5.60. Other bids on this business were: J. W. Holmes & Co., 50 tons of stove at $5.74; H. J. Heck, 400 tons of pea at $4; Loy & Liebold, 400 tons of pea, $4, and 50 tons of stove, $5.65. Address County Controller D. K. Hoch, County Controller's Office, Reading, Penn.

+No. 467—Somerset, Penn.—This contract, which provides for furnishing the local water-works with coal during the next year, has been awarded to the **Economy Coal Co.**, at 6c. per bushel for mine-run coal. Address Supt. C. E. Pile, Town Council, Somerset, Penn.

STATE GEOLOGICAL SURVEYS

COAL AGE

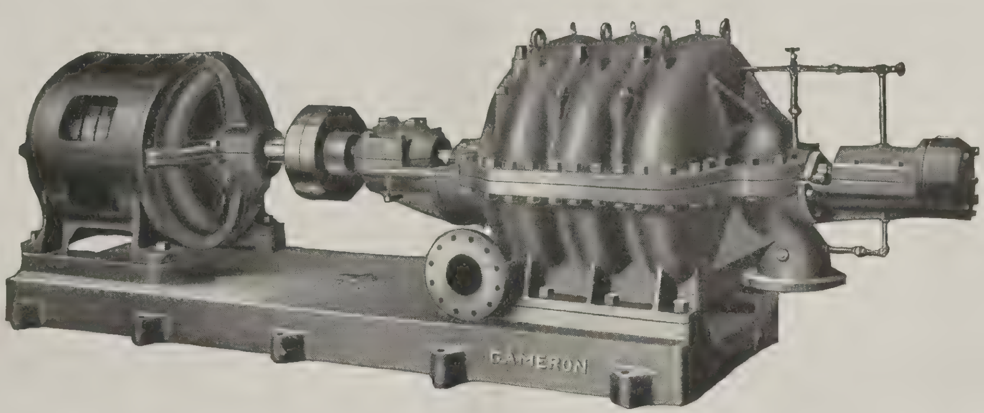
Volume 7, No. 18
Issued Every Saturday
Hill Publishing Company

NEW YORK, MAY 1, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

The Slogan of The Cameron—"Character: The Grandest Thing."

For High Efficiency Against High Heads



CAMERON CENTRIFUGALS

Five hundred feet down in the mine where there is a steadily increasing volume of water to pump out—there pump efficiency shows to the strongest advantage. In such situations CAMERON CENTRIFUGALS have proved their superiority.

The pump illustrated above is a 6″ four-stage centrifugal, delivering 1000 gallons a minute against 500 ft. head. The space occupied is only 3′ 6″ wide, 3′ 10″ high and 13 ft. long. In spite of the severe conditions it is giving very high efficiency.

Like the whole CAMERON CENTRIFUGAL Line, this pump embodies the latest and most correct principles of pump design. Simple in construction, compact and strong. One of its many operating economies is the easy accessibility to the working parts by merely removing the upper half of the split casing. This is a great advantage in the dark, cramped quarters down below. With these advantages there is combined the Cameron Quality of material and workmanship.

CAMERON CENTRIFUGALS are built in a great variety of types and sizes for low, medium and high heads. They may be direct-connected to an electric motor, or any available motive power. Our Engineering Dept. will gladly figure on your requirements without obligation.

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A. S. Cameron Steam Pump Works

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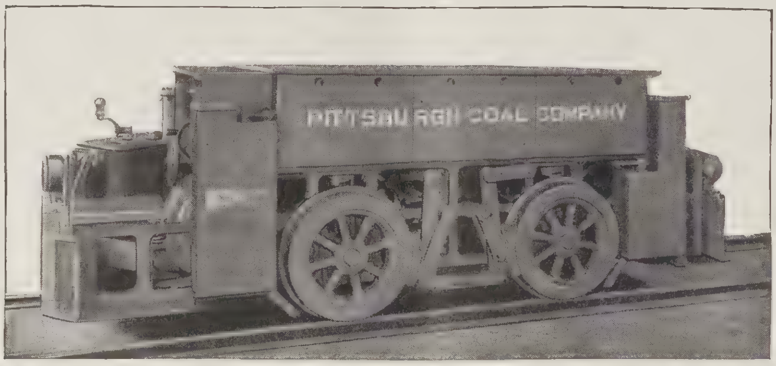
Why It Costs Less

to gather coal with

The Barsteel Storage Battery Mine Locomotive



It handles more cars on one charge—

Pulls less current from the battery—because it has

1. Five-point series-parallel control—Only two resistance points.
2. Low voltage battery motors—with highest efficiency.
3. Maximum drawbar pull—with minimum current.
4. No dead weight in frames.

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1. Outside-hung motors—*accessible without removing battery.*
2. Open side frames—*Inside parts accessible without removing battery.*
3. Most rugged batteries made—*long life—minimum repairs.*
4. Spring-suspension of entire frame—*prevents jarring of battery.*
5. Best brake rigging—3 point suspension—Double brake shoe hangers—M. C. B. detachable Brake Shoes—Turnbuckle adjustment to keep full pressure on Brakes.
6. Barsteel frames—*Unbreakable.*

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Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 11,200
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS
ON YOUR BUSINESS AND OURS

By the Business Manager

Six Letters from Indiana

D. B. MEDILL, General Superintendent of the J. K. Dering Coal Co., at Clinton, Ind., writes:

"I have been a subscriber to Coal Age for some time and am very much pleased with the paper. The advertising pages I consider well worth the attention of every active mining man and I personally follow them with interest."

* * *

H. M. STEWART, General Superintendent of the Grant Coal Mining Co., at Terre Haute, Ind., writes:

"I have been a reader of Coal Age for the past several years, and as Mine Manager and Purchasing Agent have been able to purchase various kinds of mine machinery and equipment through the advertisements in Coal Age. I consider it the best mining journal published."

* * *

EDWARD G. EPPLE, General Superintendent of the Queen Coal and Mining Co., at Jasonville, Ind., writes:

"During the past year I have purchased equipment from several concerns which were suggested to me by Coal Age advertisements. I may add that I consider your advertisements of as much value to me as your editorial work, and experience as an active Superintendent and Purchasing Agent has taught me the reliability of your advertisers."

C. W. SCHIMMELPFENNIG, Consulting Engineer of the Sunlight Coal Co., at Boonville, Ind., writes:

"We maintain our subscription to Coal Age principally because you provide us with a concise weekly list of mine equipment. It is necessary for us to keep in close touch with new equipment and we have found your paper the most suitable for that purpose."

* * *

J. H. NEEDHAMMER, Superintendent of Mine No. 2, Jackson Hill Coal Co., at Sullivan, Ind., writes:

"Your advertising pages have kept me in close touch with the new equipment, and I have frequently recommended the purchase of supplies and equipment advertised in Coal Age. Past experience has taught me the reliability of Coal Age advertisers, and when I recommend the purchase of supplies advertised in your paper, I do so without misgiving, and am willing to assume responsibility for the order."

* * *

GEORGE EPPERSON, President of the Valley Coal Co., at Terre Haute, Ind., writes:

"Coal Age has given me many valuable suggestions, which I have been able to make practical use of, and the advertising columns, which I follow with great interest, continually suggest new equipment which will benefit our mines."

Engineering Talks to Operators

Selecting the Plant Equipment

THERE may be several ways home, but there is only one *shortest* way. There may be several ways to do a thing, but there is only one *best* way. This evident truth applies to nothing more directly and more vitally than to the business of mining coal.

It is possible to spend $100,000 in opening and equipping a mine to produce 1000 tons a day; or it is possible to invest double this amount without adding materially to the daily output capacity. The entire difference has to do with the wisdom exercised in the purchase of the plant equipment, it being understood that physical conditions in the two cases are the same.

This is the age of the specialist, which fact applies to everyone in every industry, from office boy to president. A man can hardly expect to master all the intricacies of finance, or to understand in minute detail the commercial phases of a great business, and yet be entirely familiar with the practical operation of a plant, the successful working of which depends wholly on engineering skill.

Innumerable failures in coal mining have resulted from defective initial plans. Oftentimes men who are able executives and efficient in their own line of endeavor have met with great trouble through their failure to recognize that the engineering and the executive, or business side of mining, are totally different. Success can only come from a full recognition that expert advice, based on long experience in the operating end, is essential to safety and efficiency in coal production.

There is but one sane method to follow in purchasing mine equipment, and that is to prepare careful plans and specifications to cover the exact article, or articles wanted. And this is but half the job; the other half is to see that the equipment furnished is precisely what was ordered. Far from being displeased, the manufacturer of mining equipment will be glad to have definite facts, or data, to use in building the machine that is wanted. The mine manager who simply sends out a letter, stating in a general way his requirements and then asking for plans and estimates, is following a line of action that is unworthy and unsatisfactory.

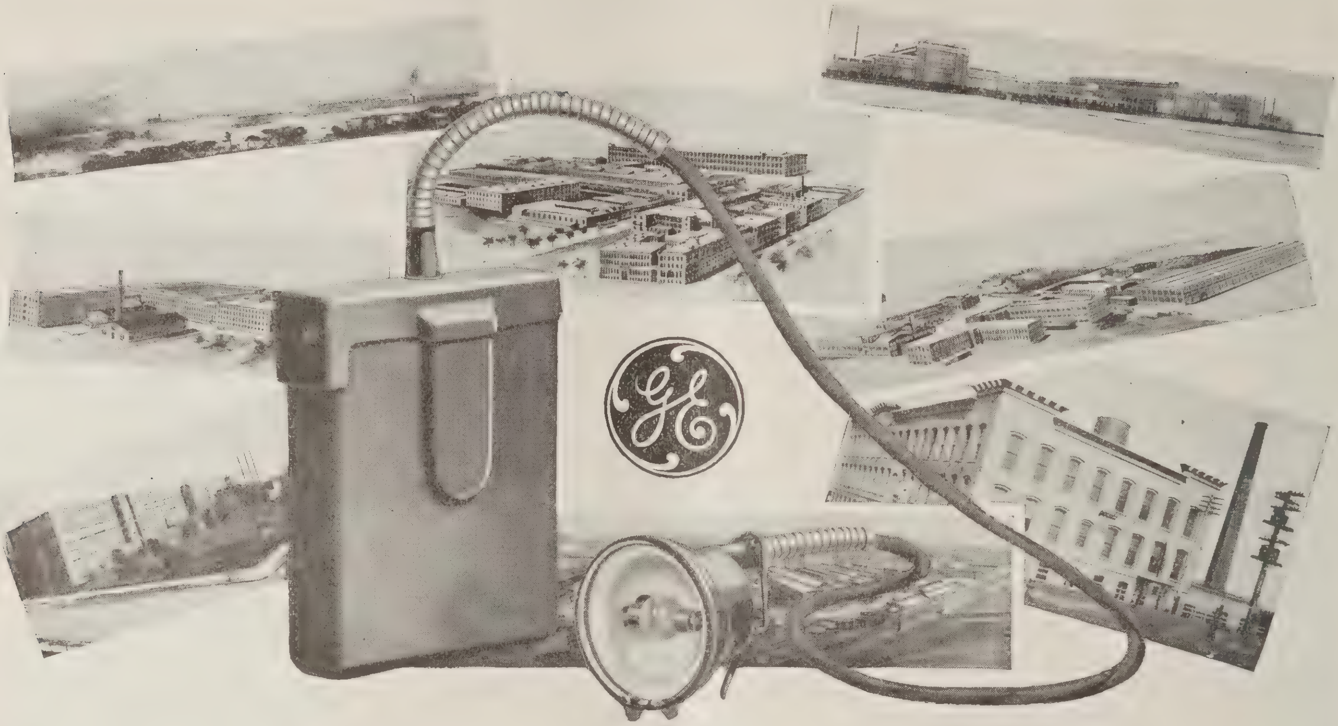
The average business man knows more about commercial law than he does about electricity, yet he would not consider consummating any deal or contract of any importance without the services of a lawyer. The average mine operator knows more about civil engineering than he does about electrical engineering, yet he employs a civil or mining engineer to make plans and maps of his mine.

One certain result following the submission of indefinite equipment requirements to a manufacturer is the call of a salesman; in fact, if several machinery people have been communicated with, the outcome will be a number of salesmen each presenting to the mining company strong reasons for the purchase of their particular machine. When a large percentage of the bids received are from high grade manufacturers it often becomes a difficult matter for the mining company to reach a decision which ultimately leads to the best economy. In many cases an apparently prudent decision proves to be the direct converse when the machine is placed in operation, whereupon the mining company is dissatisfied and the manufacturer severely criticised.

The one solution of the entire matter is effective cooperation between the mining company through properly employed engineering skill, and the equipment manufacturers. The latter are prepared in most cases to build exactly what is wanted, if the would-be purchaser will state exactly and in detail just what is desired.

We would be pleased to discuss your prospective plans and extensions in detail.

Oliver Building **Randolph Means Co** Pittsburgh Pa
Consulting Electrical Engineers



The G-E Miners' Lamp is backed by the G-E Organization

The G-E organization of engineers, skilled workmen and commercial executives is vitally interested in each and every product put out by the General Electric Company. Every piece of apparatus, every device, however large or small, must measure up to G-E standards or it cannot win the approval of the organization and without that approval it cannot be put upon the market.

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Chicago, Ill.
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COAL AGE

Vol. 7 NEW YORK, MAY 1, 1915 No. 18

Humanity and Good Fellowship

As a usual thing there is a considerable difference in the point of view of the man at the face and the mine superintendent. The latter's conception of mining details should be much clearer than the coal digger's.

However, the most successful mine executives are those who do not refuse to listen to their employees' suggestions.

"The company pays ME *(!) to run this mine, and I don't want any of you fellows to butt in."*

We know of a superintendent (now digging coal) who, when any of his men suggested some real improvement, would invariably reply: "The company pays ME (!) to run this mine, and I don't want any of you fellows to butt in."

However, when a new idea from one of the men did get to him, he would apply the suggestion to the operation of his mine, and when the manager next came around he would point to the improvement and ask—"What do you think of my new plan?"

So successfully did he work this game that he held his position with the company for several years, but "murder will out," and eventually the general manager got wise to his tactics and a new superintendent was put in charge. It is needless to say that few of the miners expressed regret.

We know another superintendent—his name is Jim. He encourages his men to suggest any improvement that they think will benefit the working of the mine. He is considerate and always ready to listen when Tom, Dick or Harry tells how little Bob is getting along at school.

If the men at the mine have a grievance, they can always count on Jim's willingness to listen to their story.

As a result of his just and generous administration, a bond of sympathy and friendship grew up between Jim and his miners, so that recently when he was promoted to general manager all the men serving under him got together and presented to him a handsome token of their deep appreciation.

The superintendent that does not possess a kindred feeling toward his fellow-mortals will never be permanently successful. When any man in a position of authority becomes an autocrat, he has failed to realize or at least to observe the old truth, "There is so much good in the worst of us." He has failed to grasp the spirit of co-operation as applied to production.

Let us get rid of our aloofness and settle down on the bed-rock of common-fellowship. Let us eliminate coldness, and in its stead feel that we all belong to one great society.

Why attempt to "go it alone" when a hundred hands are ready to help if only the opportunity is afforded them.

Suggested by William Crooks, Ensley, Ala.

Ideas and Suggestions

Will the Worm Turn?

By R. Z. Virgin*

During the past few years mine superintendents have been seriously studying the construction and makeup of mine cars. Among other things this question is often asked by the man whose money is invested or expected to be invested: How does it occur that cars in olden times cost less than one-half the present cost and were about one-half as light, and the mine produced about the same amount of coal?

I believe the investor has the right to ask such a question. A few years ago the average car built for 2-ton capacity weighed about 1800 lb. and cost about $20.

There are numerous firms of car builders each striving to outdo the other and each expecting his cars to run easier, longer, faster and to stand up better than any other company's product. So each firm takes out certain patents, and every time a patent is granted the coal companies are charged "so much" per car extra for these "improvements" until such prices are asked for cars and car irons that mining-men are studying the construction of the cars made in former days.

The standard mine-car wheel used to weigh about 90 lb.; now it weighs 140 lb. To this latter weight must be added channel bars weighing 35 lb. each and extra boxings or bearings weighing a total of 40 lb. Two straps used to be sufficient on the end gate; now it takes four straps, and double ones at that; and in addition a plate of iron $\frac{3}{16}$ in. thick is added to the door, the makers say "to strengthen it."

Irons all over the car have doubled in thickness and width, until the once 1800-lb. car now weighs (with the improvements) from 2800 to 3500 lb., and the cost of such rolling stock has increased at the rate of almost 100 per cent. Is there a good reason for it? They haven't reduced the costs of hauling nor bettered the product.

Is the Increased Cost Warranted?

No corporation or individual is in business for pleasure; so what warrants this additional outlay of money and also dead weight carried?

Large cars, with modern improvements, are large investments; the improvements require high-priced labor to make repairs, also high supervision costs. Will they save their cost and show a profit after their upkeep and the interest on the investment are considered?

I have in mind a colliery having 450 cars, each carrying 700 lb. of "improvements," which is 315,000 lb. in all. Each car makes two round trips per day, which causes the company to haul 315,000 × 2 = 630,000 lb. of "improvements" 5 miles per day. Figuring 300 days per year, the coal company is carrying a load of 189,000,000 lb. of "improvements" per year. It is not the first cost that counts, but the continual outlay for power, etc., to keep these "improvements" moving.

The price of coal has gone down; the price of mine cars has gone up. At the mine already referred to, when the wire cable breaks the cars run down an incline and are wrecked, being almost a total loss. If the most expensive cars would survive just two such accidents, they would be equal to the light cars; if they would stand three such accidents, they would be superior; but they all have been a total loss after the first wreck.

Heavy dead-weight cars require heavy locomotives to haul them. This in turn requires heavy rails, and then heavier ties, and then larger spikes. Furthermore the heavier cars and larger ties require higher and wider haulways, and the roof must be blasted, causing an increased outlay for yardage costs. Is the game worth the candle?

Are Such Heavy Installations Justified?

During the past few years cars have become so large that companies are placing capacities, light weights and numbers with the firm's name on the sides, and they are now holding 4 tons, or 8000 lb., together with a car weight of 3500 lb., making 11,500 lb. in all. Totaled up this gives a gross load of about 7 tons. Can you imagine what size rails and ties it will take in the rooms and pillars to accommodate these cars? Can you imagine men in rooms handling rails 35 to 45 lb. per yard? Can you imagine this size rail going around the room necks into each room? I very much doubt the wisdom of such an installation.

During this steady increase of weight in the cars, did the coal loader share in the benefits, if there were any? Did he get any more pay for pushing the cars? We boast of not having a mule in the mine. Is it a credit to the firm? This latter thought has not been given the consideration it ought to have, and the worm may soon turn.

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An Explosion Overcast

By Ralph W. Mayer*

The Roslyn-Cascade Co., William McKay, manager, uses at its No. 2 mine, of which James Ash is mine foreman, a light, substantial and inexpensive overcast, which can be quickly replaced if it should happen to be blown out.

The stoppings or walls across the air-course and parallel to the entry are built of concrete or 8x8-in. timbers, squared as high as the roof of the entry. They are set in hitches cut into the ribs and sealed with cement grout. If timbers are used, they are fastened together with drift-bolts and banked up with waste to strengthen the walls. On top of these walls light steel rails are laid, one end on each wall and reaching across the entry. Three or four feet apart is as close as it is necessary to lay the rails, having one on each side of the overcast to support the walls that reach from the overcast floor to the side or top of the excavation made for the passage of the air.

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*Superintendent West Virginia-Pittsburg Coal Co., Colliers, W. Va.

*Roslyn, Wash.

These rails have two fishplates bolted to each end, which are given a half twist and bent at a right-angle, so that they reach down over the side of the wall or stopping, to which they are fastened with spikes or small drift-bolts, holding them securely in position.

Across these rails and parallel with the entry are laid sheets of 1/8-in. iron or steel, having the same length as the width of the overcast. These sheets are given a lap of three or four inches on their edges and are fastened together with bolts placed a foot or so apart, but are not fastened to the steel rails at all. An explosion would simply raise them off the rails, leaving the rails and stoppings or walls of the overcast uninjured, and the overcast could easily be repaired.

The side walls of the overcast over the entry can be built either of concrete or wood on top of the sheet steel, or a couple of extra rails can be laid across the entry on the sides of the overcast and used to build the walls on, leaving the sheet steel free. A rope grease or some rust preventive is spread over the steel on the floor of the overcast to prevent its rusting.

A 2-in. plank is laid over the overcast above one of the rails to walk upon and to keep the sheets of steel from being sprung. A couple of fishplates bent at right-angles are spiked to each end of the plank and to the side of the wall upon which the rails rest, so that the plank is always in position.

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The Coal Mine Clerk

By Neill Hutchings*

Several thousand clerks are engaged in doing the clerical work for the coal-mining companies of America.

Most of them have been told that clerks cannot be classified as to work and fitness like men in the operating end of the business. They say the work of a clerk is of an intangible nature and difficult to measure; also that these men are nonproducers. The fellows who work as mine captains, foremen, superintendents, etc., are in the producing end. They can smash records. The clerk can't, they say.

Without doubt there are thousands of clerks, storekeepers, timekeepers, shippers, weighers, bookkeepers and so on who believe they haven't got a chance to break records. Only too often the clerk lets himself believe his only chance for promotion is for the man ahead of him to die or move on. His pay is not what he wishes it was. In many cases this is due to the fact that he allows himself to believe he can't help it.

Because somebody told him that classifying clerks was an impossible thing, he was so deluded as to believe it. When Mme. Schumann-Heink, the great singer, started her career, a noted musician told her to quit trying to sing and go back to sewing. She would not listen to such advice nor believe that she could not sing. Now she can sing anywhere on earth and name her own figure.

Clerical Force Is a Factor in Success of a Business

The clerical force of the accounting organization of any coal concern is as great a single factor in the success of the business as the operating department. As for the individual clerk, he can break records and do things worth while just as well as any man in the company from president down. The trouble with some men is, they want to measure anything they do with whatever things a bigger man may do and are unable to see that *doing things* is what counts rather than the magnitude of what is done.

It used to be true in some concerns that a clerk was looked upon as a "person," while the man who was an official of whatever title in the operating end was looked upon as a "personality." We know better now. We have long ago learned that power and worth are the measure of "personality." A clerk may be a personality just as easily as any other man. If he wants to achieve personality, here are three rules for him to follow:

First, he must get away from tradition and believe he can perform things as well as any other man. Break a record by smashing tradition.

Second, remember that time is his greatest asset and quit wasting it. Then concentrate and make up his mind to do more on his job and do it better than anyone else ever did. No concern can overlook such a clerk as he will be if he does this.

Third, he must really want to be more than a clerk. Then as soon as he knows what he wants to be in his business, he must take some of the time he now wastes and use half an hour or an hour each day to study his work, enrich his mind and obtain the accurate knowledge necessary to success.

If he will give only 30 minutes a day to the study of some splendid idea as against wasting that much of his time, he cannot miss achieving success for himself and his concern.

The clerk who would succeed must invest as many moments and hours as he can in learning to be worth more to his concern. He must quit thinking that either himself or his ability is unclassified. It is just as true of the clerk as of any man in the concern from president down that he is paid what he is worth.

Good clerks are not common. Unfortunately for companies who need them, they are rare. For him, it is fortunate that this is true; that is, if he really wants to prove his worth. He has as much chance as any other man alive today.

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*Birmingham, Ala.

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Commissary Management

In order to counteract the losses due to carelessness, dishonesty and incompetence, it is always advisable to make inventories of commissary stocks on the basis of selling price. After making an inventory of this kind, mark with the selling price all stock purchased thereafter. At the end of any merchandising period, preferably not over four or six months, take another inventory, also at selling price. The amount thus inventoried should be deducted from the total of the former inventory, to which has been added the total price for goods purchased in the interim. This should agree with the book record of gross sales after making due allowance for unavoidable inaccuracy in weights and measures. The value of the goods spoiled during the period and the difference in the price of goods which are marked down should be added to this allowance.

The first year this plan was put in operation at a commissary store in the Middle West the increased profit on sales was 6 per cent., in the second year 10 per cent. and in the third to the fifth year from 9 to 11 per cent.

The Air-Lift Pump for Coal Mines

By S. W. Symons*

SYNOPSIS—The principle of operation of the air lift has in the past been carefully shrouded in considerable mystery. The formulas used in calculating the amount of air required as well as its pressure per gallon of water pumped under known conditions of lift and submergence are here given.

The air-lift pump has found its chief field in municipal and private water-supply, and there are many large coal mines using it for such purposes. It has not been used extensively for shaft unwatering and mine drainage, although it is better adapted to such work under certain conditions than any other method of pumping.

Of the many air-lift plants in operation, some are working at a better economy than would be possible with other methods of pumping. As the matter of cost of operation is one that can be determined only after knowing all the working conditions of a given case, economy is often by no means the governing consideration; sometimes reliability and simplicity are of even greater importance, and it is in such cases that the air-lift method excels.

For shaft unwatering, the ease and cheapness of installation, absence of moving parts under water, ability to handle acidulous and foul water and the high rate of discharge from a given size of pipe are obvious advantages peculiar to the air lift.

For mine-drainage work, the great simplicity of the system, the fact that any number of pumps can be operated from one compressor plant and the absence of complicated mechanism in restricted situations underground are its chief recommendations.

A special case of mine drainage where the air lift can be used to great advantage is when water is struck at a low level a long distance from the main pump or shaft—sometimes a matter of a mile or more. Instead of laying long and expensive pipe lines, it is often both cheaper and more satisfactory to install an air lift by putting in a bore-hole from the surface to pass through the workings at or near the low point. With a properly designed air-lift pump it is easy to see that the efficiency of such an arrangement would be considerably greater than the forcing of the water through several hundred feet of pipe to the shaft. Fig. 1 shows the arrangement clearly.

Just such a case was that of the Clinton Coal Co., of Clinton, Ind., described briefly in the Jan. 17, 1914, issue of Coal Age. In this instance water had broken into the mine about 4000 ft. from the shaft at a spot 160 ft. from the surface. It was not until after two lines of 3-in. pipe had been laid and proved inadequate that resort was had to the air lift. The lift was kept in operation 24 hr. a day for four months before the water was sufficiently reduced to resume mining, and it is of course still in operation a small part of the time.

When it is not feasible to carry the bore-hole below the level of the workings (which is necessary with the usual type of air lift in order to provide "submergence"), a pump can be installed in the manner described in Coal Age of Apr. 4, 1914. This is known as the Jones system of compressed-air pumping and consists of a direct-acting pump operated by compressed air working in conjunction with an air lift. The direct-acting pump discharges both air and water into a closed tank, from which the exhaust air expels the water through an ordinary air-lift pump. The function of the direct-acting pump is to put a "head" on the water equivalent to that obtained by the submergence which would be necessary for a standard air-lift pump.

Before enumerating the features which appeal to the practical mine operator it might be well to outline the general principle of the air lift.

Operating Principle of thp Air Lift

Thirteen years ago Dr. Julius G. Pohlé first proposed, in a commercial way, that the most scientific method of inducing water inside a pipe to rise higher than the water outside the same pipe was to reduce the weight, or specific gravity, of the column of water within the pipe, when the greater relative weight of the water outside would act to force the lighter column upward. The simplest method of lightening the column of water in the pipe is to mix air with it. This mixing of air and water is what the so-called air lift does, and it is practically all that it does, while gravity does the rest.

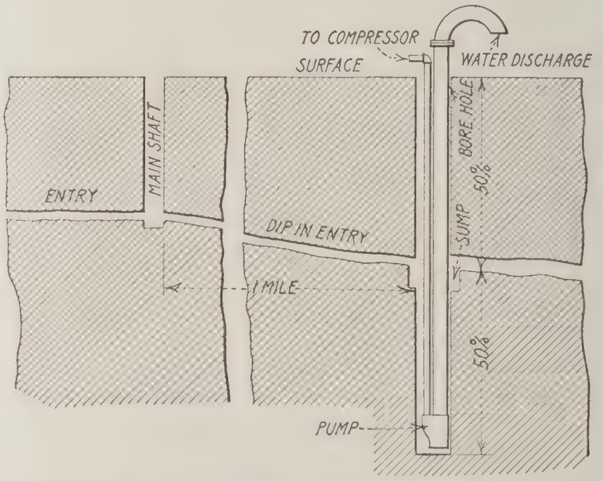

Fig. 1. Showing How Mine Workings May Be Drained by Air Lift

Notwithstanding the length of time during which the air-lift system has been in commercial use and the thousands of plants in successful operation, it is still considered more or less fashionable to make a mystery of its operation. This condition has been fostered to a great extent by the number of variable factors entering into the proposition, making it difficult to derive practical working formulas; also by the fact that manufacturers making a specialty of selling and installing these systems have obtained their data and experience at considerable expense and have consequently been unwilling to divulge to the public the tables used when making calculations. The result is that less is known by engineers in general about the proper design and requirements for an air-lift pump than in almost any other branch of engineering practice.

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*Ingersoll-Rand Co., New York.

The original theory of the air lift was that air and water entered the pipe alternately, forming layers or pistons of air in the pipe, which forced corresponding pistons of water upward. Though there was undoubtedly some action of this sort in the older air lifts, this theory, from an efficiency standpoint, has long since been exploded.

Figs. 2 and 3 show what was the most common method of piping wells up to a few years ago. It will be seen that the air is introduced into the rising main through a large opening, so as to encourage the formation of "pistons" as already explained.

Compressed air in the air-lift pump does not push or force the column of water upward after the first discharge. When air is forced down the well to a proper point and allowed to escape into the rising main, the effect after the first emission of water from the pipe, which comes out *en masse,* is to aërate and reduce the specific gravity of the contents, which are moved upward by the buoyancy and expansion of the air bubbles, aided by the greater weight of the solid column of water surrounding the eduction pipe. Contrary to the formerly accepted opinion, the formation of large bubbles of air has been found to be detrimental to the working of the pump, as they tend to drive through the water without doing their share of useful work. The slip of the bubbles constitutes the chief loss of energy in the air lift, varying as the square root of the volume of the bubble.

It is therefore advisable to reduce the size of the bubbles as far as possible, and to this end foot-pieces are now designed to divide the air into fine streams.

Figs. 4 and 5 show two styles of modern air-lift pumps of the "Imperial" type (they are no longer called "foot-pieces"). It will be seen from Fig. 4, showing the "annular" type, that the pump is designed to take advantage of the full cross-sectional area of the well and thus give a maximum flow for a given size of well or bore-hole. The pump proper, which is usually about 8 ft. long, is provided with several rows of holes some distance apart, which are uncovered successively when the pump is started up and remain more or less uncovered according to the relative pressure and volume of the air.

Fig. 5 shows the central air-pipe system and illustrates clearly the method of piping the well. In this type the mixing chamber is considerably larger in diameter than the eduction pipe, so that the air and water are mixed at relatively low velocity and discharged at a higher velocity. The air pipe ends in a long trap to catch any scale or dirt that may be carried through the system. An added refinement, which tends toward a higher efficiency, is the air discharge, from which the cool air is generally piped back to the compressor.

DATA NECESSARY FOR CALCULATION

Although it is impossible to construct a formula which will cover all cases, the rule following will enable any engineer to calculate the requirements for any given instance, if certain data covering the case are known. Referring to Fig. 6—

Static head is the distance from the surface of the ground to the standing-water level in the well when not pumping.

Drop is the distance the water recedes when the well is delivering a certain quantity of water.

Elevation is the distance above the surface at which it is desired to deliver the water.

Lift consists of the static head plus the drop plus the elevation.

Submergence is the depth that the air pipe is submerged below the pumping level of the water in the well. There are two classes of submergence—starting submergence, which is temporary, and running submergence, which is the important factor in any pumping proposition. The latter is usually expressed in terms of the total length of the water column from the point where air is introduced to the point of discharge. Thus 50 per cent. submergence means that the total lift, or head, and the submergence are equal. The necessary percentage of submergence varies in accordance with the lift; low lifts require proportionately more submergence than high lifts. As the lift increases the necessary submergence decreases.

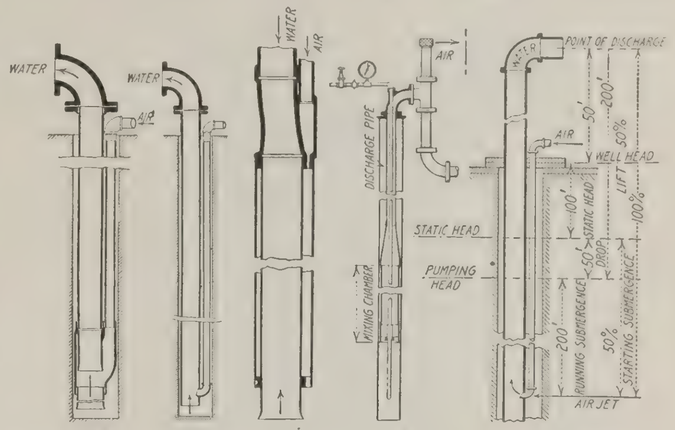

FIG.2 FIG.3 FIG.4 FIG.5 FIG.6

FIGS. 2 TO 6. VARIOUS TYPES OF AIR LIFTS AND TERMS USED IN CALCULATIONS

The range of these percentages is found within the following limitations:

For a lift of 20 ft.—66 per cent.

For a lift of 500 ft.—41 per cent.

When the total lift and running submergence are known the following formula can be used to calculate the approximate amount of free air required, and from this the compressor capacity can be figured after making due allowance for the usual losses:

Where

Va = Free air required to raise 1 gal. of water;
h = Total lift in feet;
H = Running submergence in feet;
C = Constant in table below.

$$Va = 0.8\left(\frac{h}{C\,log\,\dfrac{H+34}{34}}\right)$$

TABLE FOR VALUE OF "C" WITH PROPER SUBMERGENCE

Lift in feet (h)	Constant
10 ft. to 60 ft. inclusive	245
61 ft. to 200 ft. inclusive	233
201 ft. to 500 ft. inclusive	216
501 ft. to 650 ft. inclusive	185
651 ft. to 750 ft. inclusive	156

The necessary pressure can be calculated from the following:

Starting pressure = depth of pump (or foot-piece) in well less the static head × 0.434.

Working pressure = depth of pump (or foot-piece) in well less the pumping heard × 0.434. Friction in pipe = 2 lb. back-pressure in pump.

Since the actual pumping level in a well or a mine is seldom known in advance of a test, it is customary to assume certain conditions of lift, quantity and submergence, as experience dictates, and design the air- and water-piping accordingly.

It is essential that both the air- and water-pipes be properly proportioned because the velocity of flow is a weighty factor, and it is here that experience plays a most important part. If too large a pipe is used the air finds its way through it without doing work. If too small a pipe is employed there will be excessive friction and inefficient expansion of the air bubbles.

LATEST DEVELOPMENTS IN AIR-LIFT PRACTICE

Engineers specializing on air-lift work have learned much in the last few years. The proportioning of lift to submergence, thorough breaking up of the air, correct sizes of pipes, long sweeping bends and tees and umbrella discharge pieces to allow the water to flow along natural lines with the minimum of friction are all conducive to higher efficiency, better economy and a greater yield from a given source of supply. Along with these minor improvements have come two which are of real importance: One is known as the "booster," and the other, which is of particular interest to mine operators, is the "compound" air lift.

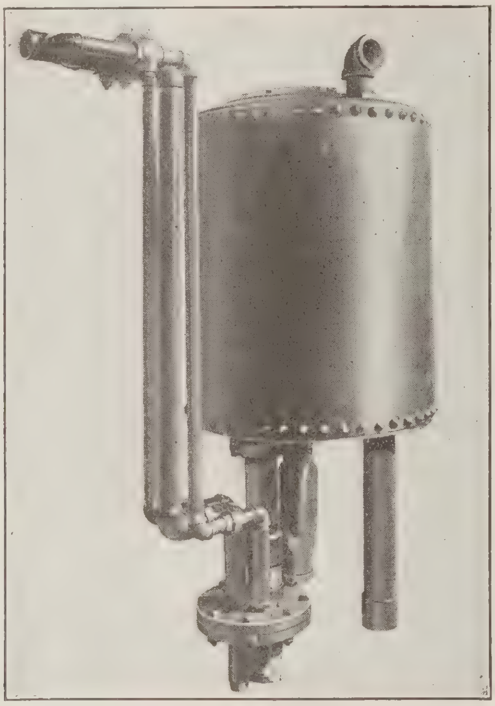

FIG. 7. THE BOOSTER TO DISCHARGE WATER HORIZONTALLY

The booster, Fig. 7, is intended primarily for forcing the water, after it has left the regular air lift, through a horizontal or sloping length of pipe to its final destination. The air lift is economical only when lifting the water in a vertical direction, and if it is to be conveyed some distance horizontally from the source of supply it is necessary to either lift it high enough to allow it to flow to its final destination by gravity or to install some supplementary means, such as the booster, to convey it after it is discharged by the air-lift pump.

The booster simply consists of a closed tank into which the air lift discharges. The air and water separate in this tank, there being sufficient pressure on the air to force the water from the bottom of the tank to its destination. The air escapes constantly from the top of the tank through a restricted opening which maintains the necessary pressure to eject the water. The air discharged is usually piped back to the compressor. The device is extremely simple and forms practically a part of the air-lift pump.

The compound air lift is a recent application of this system to mine drainage. Here a series of short lifts requiring low air pressure are installed in the shaft. Each lift is arranged to discharge into a tank from which the next lift takes its supply. The lifts are low, 11 ft. being considered the most advantageous, since it requires the very low air pressure of 5 lb., which pressure can readily be obtained from centrifugal compressors operated by exhaust steam turbines.

Since there is usually a vast quantity of exhaust steam going to waste around the average coal mine, this form of pump should prove both economical and efficient. Also, since the whole system is designed for only a 5-lb. pressure the piping, etc., can be correspondingly light and cheap; wood-stave pipes can readily be used. The exhaust air from the system should be of considerable aid to ventilation as it would maintain a strong current of air up through the shaft. In the event of a flood the compressor would simply have to be started up and the units above water level would commence discharging, those below coming into action as the water receded. This system has scarcely passed the experimental stage, but offers great possibilities.

In mines equipped with compressed air an air-lift pump can generally be used to advantage. In mines where no air is at hand the air lift has to stand its chance against other methods of pumping, and only a full knowledge of conditions and good engineering can decide between the two.

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German Coal in Sweden

Owing to the scarcity of coal in Sweden, says Consul General Ernest L. Harris in *Commerce Reports,* and the great difficulty of getting it at present from England or the United States, Sweden is turning its attention to Germany. It is proposed to import the cheaper quality of coal from Silesia to mix with other coal and coke. A few days ago the Swedish State Rys. purchased 72,000 tons of German coke for delivery at Malmo at a cost of 32 marks ($7.62) per ton. Thus far the total annual imports of German coal into Sweden have amounted to about 200,000 tons.

It may be safely predicted that German coal, as a result of present conditions, will find an increasing market in Sweden. This is especially applicable to German coke, which has the advantage of selling at a lower price and can be imported cheaper than coke from England. The close of the war will find both Germany and the United States competing with England for the coal market of Sweden.

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D. A. Thomas does not think the British Coal Mines Act of 1911 has really diminished the danger of underground working. During the last 50 years, there has been an enormous reduction in the rate of fatal accidents and in the death-rate of those engaged in coal mines, but it has not been shown that since this Act came into operation, there has been any decrease. Consumers of coal have been put to the cost of many millions of money, but apparently it has not led to the saving of a single life.

Centrifugal Pumps in Coal Mines

By W. A. Becker*

SYNOPSIS—The basic principle underlying the design and operation of volute and multistage pumps is here explained, as well as many constructional features which experience has shown to be important.

Since the acceptance of the centrifugal pump by mechanical and mining engineers as an efficient and reliable machine for pumping conditions in general, there has been developed in many minds the idea that wherever a reciprocating pump is used a centrifugal pump could be made to replace it. This is of course out of the question. The successful pumping of any heavy, viscous fluid, for instance, can only be accomplished by the use of the slow-moving reciprocating pump.

The question often arises, also, whether the centrifugal pump is applicable for use in coal mines, where the water is usually quite acidulous, containing considerable corrosive ingredients detrimental to cast iron coming in direct contact with it; also, whether the handling of large quantities of water against extremely high heads, as frequently met with in coal mines, could be successfully accomplished by the use of a centrifugal pump. In addition to this mine water often contains much grit and sand, especially where it is necessary to return to the surface the water which has been used in flushing silt, culm and coal dirt into the mine for surface support. This service is quite severe even for a piston or a plunger pump, the sand and grit being extremely sharp, cutting the plungers, pistons and valves and necessitating frequent and costly repairs.

Velocity Is Converted to Pressure

In discussing this subject it becomes necessary first to consider the principle and next the construction and adaptability of centrifugal pumps. The first and most important principle in the design of a centrifugal pump is that of producing the required energy in the form of velocity and then changing this to a pressure head, this to be accomplished with as little shock or disturbance of the water as possible, as shock tends to lower the efficiency considerably.

Fig. 1 shows a sectional view through an impeller in a plane at right angles to the shaft axis. The water enters the impeller at the inner circle A, having an area such that the water has a velocity of from 10 to 12 ft. per second in a line parallel to the axis of the shaft. The impeller vanes usually start on a line with the inlet opening circle or diameter to the impeller shown as D_1. Here the water is picked up by the rapidly revolving vanes and is carried at right-angles to its former direction of flow toward the outer rim of the impeller.

Because of the small angle a which the vane makes with the tangent of the entrance circle D_1, the water enters the vanes with but little increase in speed and with practically no shock or disturbance whatsoever. From this point the velocity of the water is rapidly increased, until it leaves the outer rim of the impeller at circumference D_2, where its maximum velocity is reached.

In order to produce this high exit velocity without causing disintegration of the body of water, the impeller width is gradually decreased on the curve of a parabola from the entrance, which has an area slightly greater than that of the suction, to the width at the rim, which has a total area corresponding to the required velocity of the discharge at this point. Thus the desired result is accomplished with practically no disturbance or shock.

The radial velocity of the water passing through the impeller and designated as V_r on Fig. 1 represents the actual flow of the water, as this velocity together with the width of the impeller at circumference D_2 fixes the capacity. The determination of this V_r, or radial velocity, as well as the required diameter of the impeller when the pump is to operate at a given speed against a given head, delivering a given quantity of water, is more or less complicated, and details will not be gone into here.

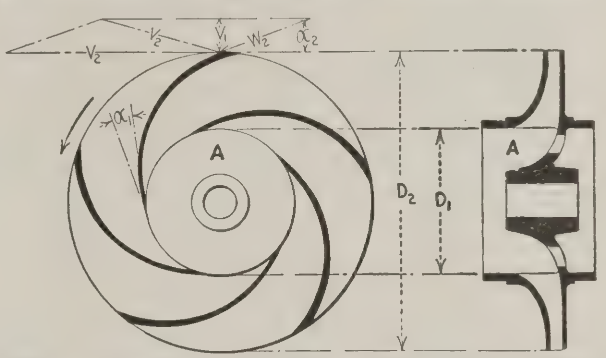

FIG. 1. THE IMPELLER OF A CENTRIFUGAL PUMP

However, the idea we wish to convey is that the velocity of the water leaving the outer rim of the impeller must represent sufficient energy so that when changed into pressure it would be equivalent to the given head against which we desire to force the given quantity of water. The width of the impeller will under these conditions control the quantity of water passing through it.

Volute and Multistage Pumps

The two most important types of centrifugal pumps are the volute, which may be either single or double suction, with open or inclosed type of impeller, and the multistage or turbine pump, always made with inclosed impellers, either single or double suction.

In the volute pump, the water upon leaving the impeller at the circumference D_2 enters a chamber in the pump casing surrounding it, known as the volute. This chamber is so designed as to have a gradually increasing circular cross-section similar to that of an Archimedean spiral. The cross-sectional area of this chamber (or volute, as it will henceforth be called) is of sufficient size to accommodate all the water from the impeller and allow it to flow through this passage at a considerably lower velocity than that at the rim of the impeller, thereby reducing the energy represented by the velocity at the rim of the impeller to a pressure head in the volute.

The gradually increasing cross-sectional area of the volute allows the water to slow down to about 12 to 15 ft.

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*Cameron Steam Pump Works, 11 Broadway, New York.

per second at the discharge of the pump. Beyond this point the velocity is still further reduced by installing a discharge pipe having larger diameter than the discharge opening of the pump. The main reason for thus increasing the cross-section of the discharge is to avoid the excessive frictional resistance in the discharge pipe caused by high velocity, this resistance or loss varying approximately directly as the square of the velocity in any given length of pipe.

In multistage or turbine pumps of the single-suction inclosed-impeller types the individual impellers are designed so as to give practically the same results as the impellers described in connection with volute pumps. Multistage pumps, however, are supplied with two or more impellers, each succeeding impeller raising the pressure of the water an additional 100 per cent. above that attained at the discharge of the first impeller. In this manner almost any pressure within reason can be produced by simply adding a sufficient number of stages.

The water upon leaving the first impeller must be returned to the entrance of the second; hence the elimination of the volute in this case.

The method of efficiently transforming the kinetic energy of the water at the rim of the impeller into pressure, as well as changing its course from a rotary to a radial direction before it is caused to flow back to the entrance of the second impeller, has always been a subject open to discussion or argument by designers and manufacturers.

The Diffusion Vane

One method, employed by the A. S. Cameron Steam Pump Works and several other concerns, is the introduction of a stationary diffusion vane ring around the outside of the impeller. This ring is designed so as to perform the above-mentioned function—to convert the kinetic energy of the water at the time it leaves the impeller into pressure by the time it reaches the outer rim of the diffusion ring. The vanes in this ring are designed to suit the diameter and form of the impeller. Their ends, where the water enters, are tapered to a sharp point and are set at such an angle as to receive the water in a straight line as it leaves the impeller parallel to the absolute velocity V_2, as shown on the diagram, Fig. 1.

This V_2 is considered to be the actual direction of the flow as the water leaves the impeller and is determined from the relative velocity W_2, which is tangent to the curve of the impeller vane at the rim, the circumferential velocity U_2 tangent to the rim of the impeller, and the radial velocity V_r.

The water passageways between the diffusion vanes are designed to have a gradually increasing cross-sectional area, and in addition the outlet is formed so as to divert the flow of the water to a radial direction. From this point the water enters a large chamber, at a low velocity, but at an increased pressure. Here its direction is reversed by the walls of the casing, and it is caused to flow through another stationary compartment known as the channel ring, which is really only a flat, smooth surface supplied with radial vanes to guide the water and cause it to enter the second impeller in the same direction and manner as it entered the first, but under a pressure equivalent to that produced by the previous impeller.

Most diffusion vane pumps are supplied with a diffuser in each stage. In the Cameron pump, however, the impeller of the last stage discharges directly into a volute, which is generally considered the most efficient method of converting the kinetic energy of the water into pressure. The only reason that it is not used on each stage of the pump is that the direction of flow is radically different on the last stage from the others.

Some multistage pumps have no diffusion vanes whatsoever. Here the water discharge from the impeller at high velocity naturally strikes the walls of the casings with considerable force where it makes the abrupt turn of 180 deg. to enter the second impeller, and when grit or sand are present this has a tendency to wear the casing and gradually weaken it.

The water also has a rotary motion, causing a centrifugal force, which must be overcome when the water is forced back through the channel ring. This causes loss. This latter type of construction, however, has its advantages over the diffusion vane type in that it has fewer parts, is simpler in construction and cheaper. The disadvantages of the diffusion vane type are that the vanes must be designed for each particular working condition, they require much machine work, and consequently are more expensive to build.

Grit Wears Away the Casing

When a pump is handling water containing sand or grit the points of the vanes (if the casting is made of iron or ordinary bronze) will gradually wear away, which will result in disturbances in the water at this point, thereby causing losses. In order to prevent this erosion the diffuser in each case is made of extra hard government phosphor bronze, which experience has proved to be capable of withstanding quite successfully the effect of a certain amount of grit and sand at high velocity.

In the double-suction impeller type of multistage pump, so designed as to secure a nearly perfect hydraulic balance, the waterways must be so proportioned as to give a tortuous passageway to the water at fairly high velocities. This often defeats the real purpose of this type of design. There are, however, quite a few successful double-suction turbine pumps on the market. They have been used quite extensively as boiler-feed pumps in connection with steam turbine drive, as this type of impeller with its small inlet diameter can be made correspondingly smaller in its outside diameter, and therefore adapts itself to rotative speeds from 15 to 20 per cent. higher than the maximum speeds for a single-suction regular type impeller pump.

To make a multistage pump having more than three or four stages, the shaft must be large in order to be of sufficient size to prevent undue deflection, and in such cases where the heads against which it is desired to pump would require five or more stages, it is always advisable to consider using two multistage pumps in series. While this construction requires more room, as well as having possibly a higher initial cost, the efficiency of the entire unit remains more nearly constant over a given period of time. Furthermore there is less expense for repairs.

A thrust bearing is almost always supplied on multistage pumps in order to take care of the unbalanced end-thrust, as well as to keep the impellers and diffusion vanes in proper axial alignment. It is also quite frequently supplied on double-suction volute pumps working against heads upward of 100 ft. or on high speeds, so as to prevent axial drifting of the shaft back and forth due to slight pressures building up alternately on each side of the impellers.

The Marine Thrust Bearing

The most common form of thrust bearing used in connection with centrifugal pumps is the marine type, so called from being used in taking up the thrust on ship propellers. This bearing consists of a series of carefully cut collars on the end of the pump shaft, forming the outboard bearing. It is sometimes made up of a series of hardened and ground steel thrust collars fitted over the end of the shaft, which is turned down to receive them and all held in place by means of one long feather key. These collars are equally spaced by the use of small steel thimble separators.

Of the two methods mentioned for making this thrust bearing the latter is preferable, as in case one of these collars breaks or if through improper attention the bearing should burn out it would be necessary only to replace the collars, whereas if they were cut directly on the shaft itself it would mean a new shaft.

The casing surrounding the marine thrust bearing is usually supplied with a water-cooling jacket, the cold water carrying away the heat generated by the thrust collars. This water jacket is connected by small piping to the discharge side of the pump and exhausts through another small pipe into the suction of the pump.

This type of bearing will give trouble if the shaft should be sprung out of alignment, if each collar is not continuously supplied with clean oil or if the shaft is so light as to allow vibration. With reasonable attention, however, and with present uptodate machine-shop methods for turning out a first-class job, this type of bearing has, with a limited number of exceptions, proven itself quite successful.

Another method of counteracting thrust is through the use of a hydraulic balancing device. This is made in different forms, but all operate on the same principle. It consists of a disk mounted on and rotating with the shaft and placed inside the casing immediately after the last impeller of a multistage pump. The disk is made of ample diameter to allow sufficient area for the pressure of the water leaking by the bushing rings behind the last impeller to act upon and counteract the thrust in the opposite direction.

This balancing device operates quite successfully on pumps where the discharge head always remains constant, but in cases where this pressure is liable to change at any time, or if the pump is started up without priming, the disk is liable to touch the casing. The result is that at the exceedingly high surface velocity employed the two parts are liable to "freeze fast" in a few seconds and wreck the pump. This is one of the most serious objections to the hydraulic disk balancing device.

A Casing Split Horizontally Is Advantageous

The horizontally split casing on volute and multistage pumps facilitates repairs or examination of any part of the interior. In this type the suction and discharge nozzles are cast integral with the lower half of the casing and need not be disturbed when removing the top half.

In discussing the adaptability of the centrifugal pump to meet various conditions, we will consider the different types of this machine and the conditions under which they can be used successfully.

First, the open impeller pump, which is extremely simple in construction. It has no bushing or wearing rings to seal the impeller against slippage, but the casing is made to fit close to the impeller with very little clearance. For this reason this type of pump is not good for much higher heads than 70 ft., as beyond this the pressure becomes so great as to cause water to slip by the impeller back to the suction. The simplicity of design and the absence of wearing parts in contact with the water make it an ideal pump for handling water containing much sand or grit or even for fluids that are more than ordinarily sluggish, as there is little chance for the pump to clog. This type is least efficient of any of the centrifugal pumps, but is best adapted for rough usage and the handling of dirty, gritty water or even sewage, providing the head does not exceed the 70 ft. as before mentioned.

Second, the inclosed impeller volute pump, double-suction type, which is more refined in its construction and also more expensive than the open impeller type. This pump is usually built for heads as high as 200 ft., and sometimes as high as 230 ft. per single impeller. These extremely high heads, however, require high speeds, unless the impellers are made exceptionally large. In this case, however, it is ofttimes found that the standard casings as built by American manufacturers are too small to allow the use of a very large impeller for high heads or ordinary low speeds. This is due possibly to standardization for manufacturing purposes.

These pumps are quite adaptable for coal mines in handling either pure, acidulous or gritty water. When handling pure water the impeller can be made of cast iron. The shaft sleeves and impeller bushings or wearing rings are always made of bronze. When handling acidulous water the impeller should be of bronze, while if the water is extremely acidulous the entire casing, and in fact all parts coming in contact with the liquid, should be made of acid-resisting bronze. When these precautions are taken, this type of pump will handle acidulous water quite as successfully as fresh water. When the liquid is gritty the impellers should be made of hard phosphor bronze in order to prevent wear. The efficiency of this type of pump ranges from 65 per cent. on the 3-in. size to 75 per cent. or even 80 per cent. on larger sizes, say 10-in. to 12-in. and over.

Third, the multistage or turbine pump, which operates on much the same principle as does the inclosed-impeller volute pump. Each impeller in a multistage pump can be made to operate against a 200-ft. or even a 230-ft. head; and a multistage pump with four impellers, each designed to operate against, say, a 200-ft. head at a given constant speed, will discharge against a total head of 4 × 200 ft., or 800 ft.

This type of pump will operate successfully when handling either fresh or acidulous water, providing the material of which the impellers, diffusion vanes and casings are made is capable of withstanding the corrosive action of the water being handled.

Centrifugal Pump Is Adapted to Coal-Mine Service

The centrifugal pump, because of its simplicity, durability and reliability, has proven itself to be almost ideal for use in coal mines. It requires but little head room and floor space; it can be direct-connected to an electric motor, and it is practically immune from the effects of coal dust on the bearings, which are all totally inclosed.

This latter is in marked contrast with electrically driven reciprocating pumps.

There are only two bearings on the pump and two on the motor, and all are of the ring-oiling type with large oil reservoirs, which require filling about once a week. There is practically no packing trouble in comparison to reciprocating pumps, as the only movement of the shaft on a centrifugal pump is rotary and not axial.

It is always well to remember in selecting a centrifugal pump for coal-mine service, which service is usually severe, that the cheapest type or the cheapest pump is not always the best investment, as the very best of machine work is required in order to turn out a properly aligned and efficient centrifugal pump.

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Extracts from a Superintendent's Diary

There are days when I enjoy every minute of the time spent at my office—today has been such a day.

At 6 : 30 my office-boy called me on my residence phone to tell me that a pit committee was waiting to see me at the office. I hurried over, knowing that the committee had made the early start that they might finish their business with me in time to enable them to go to work. This meant that they did not want to lie around all day and charge their time up to the miners, which they have a perfect right to do.

Within ten minutes after my arrival we came to an understanding, and the committee went on its way smiling. I had a kindly feeling for the committeemen because of the consideration they manifested for the miners they represent; they had a kindly feeling for me, realizing that I had come to the office nearly an hour before office hours. How easy it is to come to an understanding when there is good-feeling and esteem between adversaries.

Just after the committee left, my office-boy sidled in and asked for a half-day holiday. He wished to attend a ball game, but he didn't say so.

"Why were you here so early this morning, Tom?" I asked.

His countenance fell; he had figured that I would grant the holiday as a reward for his having been at work so early, but the expression on my face made him fear that I had discovered that his early arrival had been accidental and owing entirely to a crazy clock that wouldn't keep time.

His disappointment was so keen, however, that I weakened and granted his request. His victory following apparent defeat made us both smile.

About 10:30 our general manager called me by long-distance telephone to tell me that our sales manager had just closed a contract for enough coal to insure us five days' operation per week in place of the four that we have been running. Incidentally he remarked that we got this new contract in the face of keen competition, largely because our coal has the reputation of being more carefully prepared at the mines than other coal from our district. For several years I have realized that our coal is the best-prepared coal in our district, because I have kept close tab on all of my neighbors, but never before has our general manager admitted as much. I smiled at him; what a pity he couldn't see the smile!

About 3 o'clock Mr. Styles, the assistant state mine inspector in charge of the mines of our district, came into my office, having finished his quarterly inspection of our mines.

"Mr. Thompson," he said, "if all of the mine foremen in the state would carry out the instructions that we inspectors feel called upon to make, in the same spirit that your foremen do, the inspector's job would be one of the most pleasant imaginable. But you'd be surprised if you could see the treatment most of the foremen give us. Every criticism that we make is resented, and if we make a suggestion that reflects in the least upon their management, they get busy to see if they can't find something in our past history that might assist them to discredit us. We realize that the superintendents are responsible for a good deal of this feeling, because if they didn't encourage their foremen the foremen would soon change their tactics."

Flattery perhaps, but it started me home from the office grinning from ear to ear.

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English Trade Difficulties

The war has brought about a noticeable increase in cost of production in the colliery industry of both Bristol and the Forest of Dean district, says Consul J. S. Armstrong, Jr., in *Commerce Reports;* and in spite of the high prices now obtained, which range from 30s. ($7.30) to 32s. ($7.79) per ton, there has been a considerable reduction in profits. There has been a shortage of labor at the collieries owing to enlistment, and a consequent reduction in output to the extent of 33 to 50 per cent.

At the annual meeting of one of the leading colliery companies of this district (Bristol) the following statement was made:

> During August and September the British Admiralty was making abnormal demands upon the collieries, and this tended to disorganize the ordinary trade. Later, when the naval requirements abated, there was some delay in the resumption of ordinary trade occasioned by difficulties to be confronted by consumers in obtaining transportation facilities.

Other important factors in the increased cost of coal have been higher freight charges and the shortage of pitwood.

The report of the committee appointed by the British Government Board of Trade to inquire into the causes of the present rise in the retail price of coal was published recently. The recommendations are:

> Exports to neutral countries should be restricted.
>
> Steps should at once be taken to consider, in consultation with the public bodies concerned, the question of the accumulation by such bodies of reserves of coal in or near London for the use of small consumers during next winter.
>
> The rates of freight on interned steamers should be further reduced.
>
> Suitable enemy ships condemned by the prize court should be taken over by the government and used for coal transport.
>
> If prices do not shortly return to a reasonable level, the government should consider a scheme for assuming control of the output of collieries during the continuance of the war.

The committee in its report, which it explains is concentrated mainly upon London, states that recently large quantities of inferior coal which in ordinary times would find no market in London have been supplied to the consumer, under one designation or another, at very profitable prices.

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For every ton of coal raised from one of the anthracite mines, the operators of that field are obliged to pump to the surface about 11 tons of water. It is estimated that in the anthracite mines, there are 900 pumps in use at the present time. The capacity of these pumps is approximately 1,000,000 gal. a minute.

A New Sinking Pump

By Alden W. Baldwin*

SYNOPSIS—The ordinary type of sinking pump is suspended in the shaft by a cable and must be raised whenever a shot is to be fired. This new pump works in a borehole beside the shaft, the power head being placed on the surface out of harm's way.

The earliest point where water may hinder development in coal mines is in shaft sinking. In some cases the strata penetrated are so formed that the water may seep away and the shaft be thus self-draining. If this is not the case some mechanical means must be provided for delivering the water at a point sufficiently removed from the shaft opening, so that it cannot interfere with operation. For this purpose the sinking pump, or "sinker," was especially designed and built to meet the severe conditions encountered in this service.

Sinking pumps may be either steam or electrically driven, the steam pump being the earlier type and the one which is more extensively used, even at present. Successful steam pumps long antedated the electric-driven machines. Furthermore, they would stand much harder usage than the earlier models of motor-driven pumps.

There has not been (until comparatively recently) a wide application of electricity to mining work. During the past few years, however, progressive pump manufacturers have developed successful motor-driven sinkers, which are now recognized as more satisfactory in many instances than steam sinking pumps.

From the nature of the work to be performed, the pump must be so supported that it can be easily raised and lowered in the shaft. It must always be kept within suction reach of the water when at work and must usually be raised a considerable distance above its normal working position when shots are to be fired. These requirements make it desirable that the sinker be not too great in weight or size for hoisting by cables and for easy handling.

All sinking pumps must be substantially built, so that they may operate for long periods without danger of failure, and this, too, with a minimum of attention. They must be provided with sufficient covers or inclosing shields so that flying débris, in case a shot is fired or a tool carelessly allowed to fall into the shaft, will not be likely to cause damage. In these respects the steam pump, with its compact design, appears to have the advantage, but properly designed electric machines have repeatedly proved their worth when tested under the severest service conditions.

It is difficult to give figures when comparing the relative economy of the two principal types of sinking pumps. It is not necessarily the efficiency of a machine that determines the value of either type under given working conditions. Of the two types, the electric sinking pump is doubtless the more efficient.

Ordinary Sinkers Have Many Disadvantages

It is evident to all practical mining men that at its best neither form of sinking equipment mentioned is what is really desired. Hauling the pump up in the shaft out of harm's way every time a shot is to be fired delays operation. This delay is only partly obviated if the pump is allowed to remain near the bottom, behind a rough shelter of timber. Furthermore, a pump that cannot be harmed by submerging for a considerable time would prove a great advantage in situations where flooding is liable to occur. Recently, a pump for use in shaft sinking has been introduced which combines the high efficiency of the ordinary triplex plunger machine with the ability to overcome the conditions mentioned above. This pump is entirely new in principle as applied to mining work, but the application of machines somewhat similar in design has already proven successful in a number of instances.

The pump referred to is the Glendora triple-plunger deep-well pump, designed to lift water from considerable depths by means of a working barrel placed in the water near the bottom of a borehole. This barrel, or cylinder, contains three plungers, operated by long rods driven by a power head at the surface of the ground. The borehole in which the pump operates may be placed adjacent to, but just outside of, the side of the shaft that is being sunk. The barrel may be placed down as far as it is intended to carry the shaft, or it may be found preferable to move it down occasionally as the sinking progresses.

Accumulated water in the shaft may be admitted to the borehole at intervals by punching through the intervening strata so that the water can drain off, it being then forced from the bottom of the borehole through the column-pipe to the top. In some instances it has been found unnecessary to make these drains connecting with the pumping equipment, the strata being such that drainage of the shaft takes place through fissures in the rock. Other developments have been handled by putting down two borings—one, as described above, close to the outside of the shaft and another in the shaft itself. In this way the water in the shaft drains through the hole in the floor and is delivered to the pump through underlying strata sufficiently porous to allow the passage of water from one hole to the other. Care must of course be taken to keep unobstructed the hole in the shaft.

The Pump Head Is Gear-Driven

The power head of the Glendora pump has a gear-driven crankshaft supported in bearings on a heavy frame; also five connecting-rods transmitting motion to three crossheads which move up and down in guides in the frame casting.

Although there are five crankspins and five connecting-rods, the pins are not spaced equally around the crank circle. The center crankpin makes an angle of 120 deg. relative to the two which are nearest it on either side, these two being on a common center line with each other. They, in turn, are at an angle of 120 deg. with the two pins nearest the end of the crankshaft, which also have a common center line. The outside connecting-rods move up and down together, as do also the second pair of connecting-rods.

The working barrel contains three plungers, one above the other, operated by means of long rods which transmit

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*No. 720 Hampden St., Holyoke, Mass.

the driving power from the pump head at the surface. These rods comprise a central solid rod inside of a tube, or pipe, which is itself inside of a second tube. The end of the solid rod is attached to the lowest plunger, its upper end being actuated by the center crankpin at the power head. The lower end of the intermediate rod, or the one within which the solid rod works, is attached to the middle of the three plungers and is driven up and down by the two cranks next to the center crank. The upper plunger is driven by the outside one of the three rods, the upper end of which is attached to the lower crosshead. It is driven by the outside pair of cranks.

Each plunger has a heavy bronze valve seating upon its top: Each valve seats firmly upon the up stroke, unless the plunger above or the one below it is lifting or forcing water through this plunger. Thus, as each plunger reaches that portion of its stroke in which it is moving at a greater speed than the other ascending plunger, its valve will seat gently and assume the load of the water column. As the speed of this plunger gradually decreases another is attaining maximum speed, and this in turn assumes the load when its valve closes, thus allowing it to lift water through the plunger below it by means of suction or force water through the one above.

Each plunger carries the load of the water column for only a portion of its up stroke, or while moving at or near its maximum speed. Thus, the water in the column-pipe is kept moving continuously and smoothly at the highest allowable velocity. This is in decided contrast with the operation of the common single- or double-acting working valve usually employed and results not only in high efficiency, but also great reliability, the rods and power head being relieved from the shocks which are inevitable in pumps requiring the overcoming of the inertia of the water column at the beginning of every stroke.

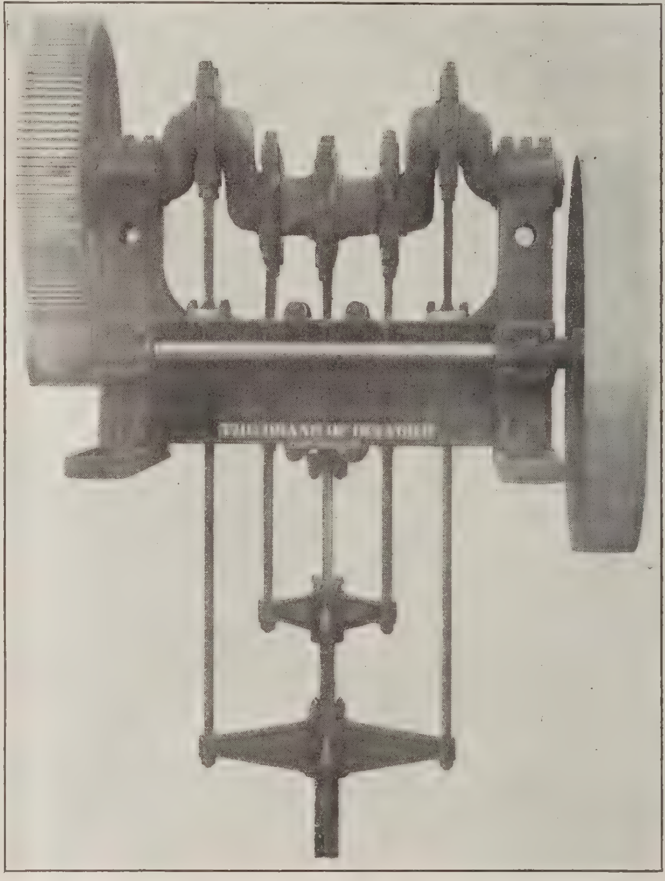
The Pump Is Efficient in Power Consumption

The superiority of the triplex electric sinker over the duplex steam pump as regards efficiency in the use of power is maintained in the pump above described. The three plungers are operated by cranks set 120 deg. apart, and a smooth flow of water tends to give the best results. Every acceptance test of this pump has shown an efficiency of 80 per cent. or better for the pump alone.

But this high efficiency is not the only advantage to be found when the pump is employed for shaft sinking. Much time is saved in keeping the pump at work regardless of the firing of shots. There is no need of hauling the pump up out of the way or of putting up timbers to keep it from damage by flying rock. It is shielded by a wall of solid rock as thick as may be desired. The time saved in sinking a shaft by the use of the deep-well type of pump has been still further increased by the fact that larger charges of explosives may be used without endangering the operation of the pumping equipment.

The water end of any mine pump must be able to withstand the grit always encountered in this service. This is especially true of a sinking pump. The design and construction of the Glendora working barrel render it capable of long-continued operation with a minimum of wear. It is also easy of inspection and repair and will handle grit with less trouble than many other designs. On account of the continuous upward movement of the water column, the flow causes all grit to be carried along through the plungers without chance of its being deposited on the valves or their seats, as might be the case if the flow was stopped at the end of every stroke. The leather cup packing around the plunger is easily renewable at slight expense.

When such a pump is installed for sinking purposes the working barrel need be placed only so far down as to insure keeping the operation free from water for a given period. After the sinking has progressed as far down as the water end of the pump, this may then be put still further down in the borehole. In this way the pump becomes a first-class station pump after the shaft is finished.



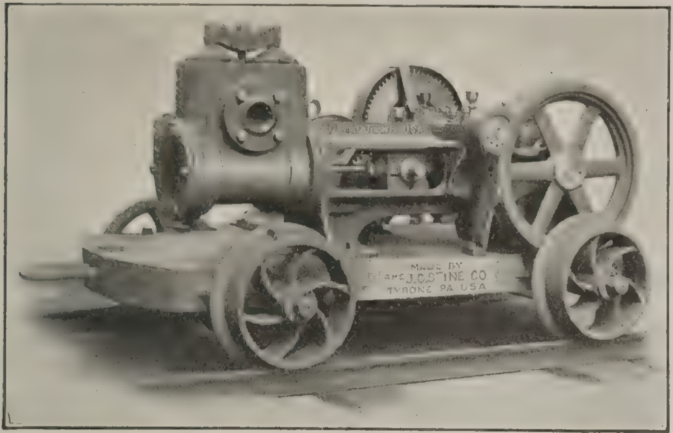
The Pump Head Showing Five Connecting Rods and Three Pump Rods

If at some future time further development is necessary the borehole may be sunk deeper and the necessary length added to the column-pipe, the pump being then ready to keep the new part of the shaft free from water, while sinking and for draining the lower levels when they are completed. As a station pump this has an advantage over other types, since it can never be flooded out, as the power is applied to it at the surface of the ground and the only part in the mine works better if below normal water level.

The Glendora triple-plunger pump has been designed and patented by the Deane Pump Co., Holyoke, Mass., by which company is has been manufactured for some time. It is built in a number of sizes for 100 hp. or less and for capacities ranging from 150 to 3000 gal. per minute.

A New Portable Pump

One of the most annoying problems around coal mines is the elimination of water from the working-face of the rooms or entries where these are not self-draining. In such a case it is necessary to install some kind of a pump, usually known as a gathering pump, to transfer the water from the working-face to some central point where a large pump may eject it from the mine.



The Pump on Its Truck

Such a gathering pump as manufactured by the J. C. Stine Co., of Tyrone, Penn., was described on page 380 of Coal Age for Feb. 27, 1915. More recently, however, another improvement has been added to this pump. This consists in making the bedplate of the pump the platform of a truck which may be made to fit any gage of mine track and is provided with removable truck wheels.

As a gathering pump is of necessity temporary in its nature and used in one place for only a short time, this feature of building the bedplate as a truck will be at once appreciated by mining-men. The pump may thus be readily transported from one portion of the workings to another and blocked in place on the track while a place is being pumped out or it may be removed from the track and blocked in position on the mine floor. In case the pump may be wanted in one position for any considerable length of time, the wheels of the truck may be removed and laid to one side and the bedplate mounted on a light foundation in the usual manner. It will thus be readily seen that the truck bedplate adds the feature of flexibility to a piece of equipment the utility and reliability of which have already been clearly demonstrated.

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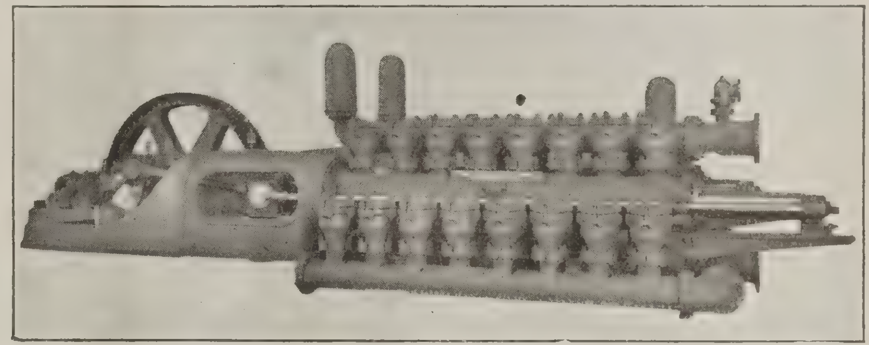
High Efficiency in Mine-Pumping Machinery

The use of electricity for power distribution in coal mines is increasing so rapidly that the necessity of keeping the cost of current at a minimum is receiving the most careful attention. Among other equipment in which a marked saving is possible the mine-pumping machinery assumes an important place; and to secure such a saving the adoption of pumps of the highest possible mechanical efficiency is necessary.

The accompanying illustration shows a mine pump of high efficiency. This machine was built by the Epping-Carpenter Pump Co., of Pittsburgh, Penn., and represents the standard practice of this builder. This machine is a horizontal duplex double-acting unit, having plungers 8½ in. in diameter with a 24-in. stroke. The pump is of the direct-flow pattern, and is guaranteed to deliver 1000 gal. per min. against a total head of 800 ft., with an efficiency of 88 per cent. Machines of this type are also built in 36-in., 42-in. and 48-in. stroke, with guaranteed efficiencies ranging from 90 to 92 per cent.

A study recently made, in connection with a certain coal-mine installation, of the relative costs of power for reciprocating and centrifugal pumps showed that the saving through using the reciprocating in preference to the centrifugal type of machine would pay for the difference in cost between the two in from 1½ to 2 years.

It will be noted that in the design of the pump here shown many features are embodied tending toward high efficiency. Among these might be mentioned the following: The direct flow of the water through the pump; that is, no reversal of flow, which eliminates shock and consequently secures a rounding-off of the peaks on the amperage curve. The use of leather-faced pump valves, and of cut herringbone gears, pinion and pinion shaft being made from one forging. Four-part adjustable main bearings; the bearings provided for the pinion shaft, are ring-oiling and made with removable shells. They are adjustable as to position, insuring perfect parallelism of gear and pinion teeth. The shafts are supported in two main bearings, securing perfect alignment. All bearings are unusually large, while the frames are in one piece, resting upon the foundation throughout the entire length.



The Power-Driven Duplex Plunger Pump

The pump illustrated herewith is installed in a mine where the water is unusually good. The same type of machine is, however, manufactured with complete wood lining for installation where bad mine water, such as is encountered in many localities in western Pennsylvania, is to be handled.

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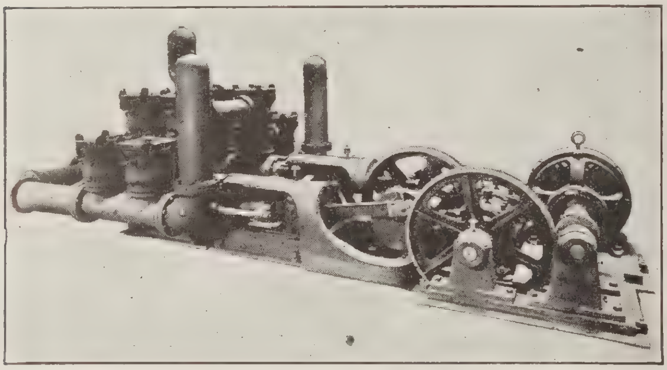
If an alternating current be transmitted through a conductor, portions of the electric energy supplied may be transformed into heat in four different ways, each resulting in an energy loss and in a corresponding reduction of the current-carrying capacity. These losses are: the energy required to overcome ohmic resistance, a loss of energy due to skim effect, foucault or eddy currents and dielectric hysteresis losses in the insulating material. While the amount of heat developed under ordinary service conditions by any one of the last three mentioned causes would probably be small, the aggregate amount tends to increase the temperature of the conductor, which increases its resistance, reduces its carrying capacity and shortens the life of the insulation.

Wood and Lead Lined Coal Mine Station Pump

The accompanying illustration shows a duplex double plunger electrically driven mine station pump of the wood and lead lined pattern built by Boyts, Porter & Co., Connellsville, Penn. The size of this machine is, plungers, 10 in. diameter, 12 in. stroke, piping 12 in. suction and 10 in. discharge. It is operated by a 75-hp. Westinghouse 230-volt d.c. motor, through double-reduction cut herringbone gears of the Falk type.

This type of pump embodies the practical experience of over 45 years in dealing with mine pumping at first hand. It is built heavy and strong and of the best grade of material, the bronze employed being especially prepared for resisting the action of mine water.

All portions of the entire water end of the pump are protected by wood lining wherever possible. Where this is impossible—as for instance, in the case of the neck of valve chambers and the lids therefor—it is protected by lead cast solid to these parts. The result is a pump which is extremely durable and one which will resist the action of mine water for a long period of time.



Reciprocating Pump with Double-Reduction Herringbone Gears

Before the present method of wood lining pumps was evolved, an entire water end of bronze was the only type that would endure. This was extremely expensive. The writer recalls some of the larger sized pumps installed in the Connellsville region with bronze water ends which weighed approximately 7½ tons. The mine water here encountered was so strongly acidulous that a cement lined water end would eat out. Enamel also proved useless in protecting cast-iron parts.

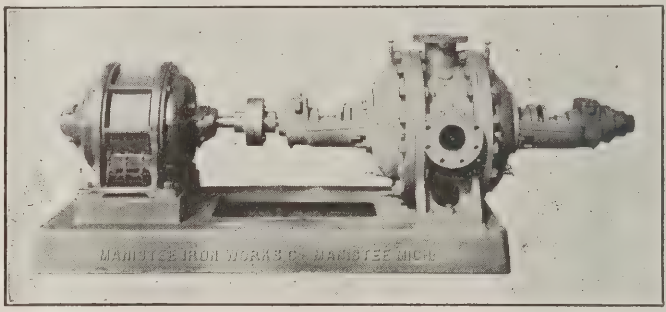
The lining of pumps with wood met these conditions admirably, not only securing greater durability and saving in repairs and attention, but also in first cost, and has proved beyond doubt the advantages of the wood lined type of pump in many years of constant service.

The demand for electrically driven mine pumps is fast exceeding that for those of the steam- or air-driven type. Many of the older mining operations have electrified, thereby effecting a considerable saving in the cost of pumping. This has been shown by test.

A recent test made to show a comparison of cost between electrically driven pumps and the old system of steam- or air-driven machines showed a reduction from 750 tons of boiler coal per month with three shifts of firemen, three pumpers and three assistants to 300 tons of coal per month with one pumper and two firemen. Furthermore, there was a decided increase in output.

A New Type of Centrifugal Pump

As centrifugal pumps are ordinarily built, an impeller is employed for each stage. The Rees Roturbo multistage pump employs the principle of impellers in series and has one-half as many impellers as there are stages. Each impeller has a double eye and answers for two stages. Because of this fact it is possible to reduce the overall dimensions of the machine and at the same time obtain a perfect hydraulic balance or neutralization of end thrust by means of conducting the water from one stage to the next in a proper manner.



A Single-Impeller Pump

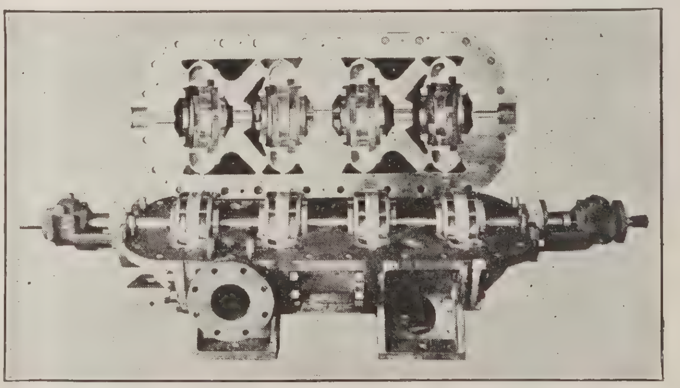
The impellers are of bronze or cast iron, fitted with renewable eye-rings which mate with renewable casing-rings, both being internally lubricated by water under pressure.

A flat bridge between the stages of each impeller eliminates leakage. The impellers are keyed to the shaft and held in position longitudinally by means of bronze sleeves which cover and protect the shaft and are keyed to and locked upon it, thereby holding the impellers securely in position.

Each diffuser is of such a type as to contain the diffusing passages of each impeller; thus two diffusers are really combined in one, the overall dimensions being thereby reduced.

The pump shaft and impellers are supported in two bearings lubricated by double oil rings, while the bearings are supported on brackets on either head of the pump and are external to the casing. The glands are ample in size and are sealed by water under pressure.

The standard casings are sufficiently heavy to easily withstand any stress to which they may be subjected. They are split vertically and all water joints are made tight by lead packing. In the tail-bearing bracket is placed a



Multistage Pump with Top of Casing Removed two-way ball thrust, which serves the purpose of keeping the impellers in line with the diffusers.

Pumps of this type obtain a high efficiency over a wide range. This range generally extends from 50 to 70 per cent. on either side of the normal duty point, without dropping over 5 per cent. from the highest efficiency.

The chief reason for this high efficiency over a wide range of duty is the fact that the impellers, being drums or reservoirs of considerable size, have a capacity such that the water passing through them moves slowly. This reduces the friction in the impeller without the necessity of polishing its inner surfaces.

This slow movement of the water through the impellers and other passages of the pump has many advantages, chief among which is the fact that under these circumstances the abrading or wearing away of the impellers, casing and diffusers is much less when handling gritty water or that containing sand than in pumps where the water velocity is high. Under these circumstances the normal efficiency of the pump is maintained over a considerable period of time.

A Gathering Pump Embodying Some New Ideas

Although the initial outlay in one gathering pump is comparatively small, it should be considered as important, as in most cases it is necessary to use a considerable number of these machines scattered about the mine. For this reason, the investment should be considered not as applying to a single machine representing a small amount, but as applying to a number of pumps amounting in the aggregate to a large sum.

The extent to which a mine depends upon the gathering pump should impress the manufacturer with the importance of designing and building such a machine for service rather than to sell at a low price. The extent of development and the rate at which it may be carried on are largely dependent upon the service rendered by the gathering pump. If working-places cannot be kept dry, too great a number of such places are required in order to secure a given production, and the development cost becomes excessive. On the other hand, if water cannot be kept away from the faces in advancing headings, the development is slow, and not enough working-places can be secured to insure a given tonnage.

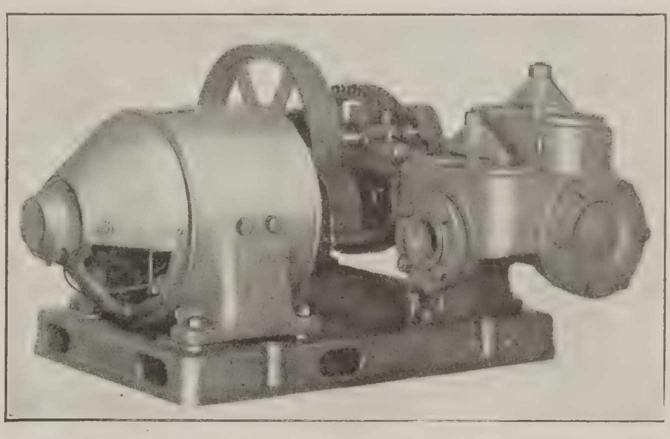
It is therefore of first importance that the gathering pump employed should be reliable in every particular. Next to reliability it should be obtainable at the lowest price consistent with known quality.

A pump that has been designed and is being built with this idea in mind has been recently placed upon the market by the Pneumelectric Machine Co., of Syracuse, N. Y. Some features of unusual interest have been embodied in its design.

There has always been a divergence of opinion among mining-men as to what constitutes the most desirable features for pumps of this kind. In order to ascertain what ideas were most commonly held concerning the various points to be taken into consideration in the construction of such a pump, many practical as well as scientific mining-men were consulted, and the pump as now made represents the composite of ideas thus secured.

Advantage has been taken of the careful study and practical application of the use of different alloys and the special heat treatment thereof in order to produce parts of the greatest strength and longest wearing qualities. The material used for each individual element has been selected, therefore, particularly for the service which it is to perform, both with respect to strength and wearing qualities. Simplicity has also been carefully studied, so that but few parts are employed, all of which are easy of access, both for examination and replacement. In addition to this the method of oiling and lubrication is unusual and has proved to be quite satisfactory.

The pump is of the piston type, with a stuffing-box of ample size and easily accessible. The piston design has been carefully worked out, and no small bolts or tapped holes which are liable to corrode have been employed. All studs in the cylinder are anchored in bottomed holes in order to protect them from the effect of acidulous water. The pump lining is pressed into the bore thus eliminating the necessity for screws, while all openings and water passages are exceptionally large, allowing the water to flow through the pump with but slight resistance.



THE PUMP AND ITS DRIVING MOTOR

All bearings are of bronze, so that their replacement or repair may be accomplished without removing the pump from the mine. All bearings are lubricated by a felt wiper oil reservoir system. This entirely eliminates the use of oil cups or other devices which may require attention at the time of starting or stopping the pump. Reservoirs are cast into the frame at points near the bearings, with openings leading thereto. These openings are provided with wicks, so that oil is fed to the shaft only at such times as it may be in motion. These reservoirs are carefully covered to prevent the entrance of dirt, but are easily accessible and may be readily cleaned.

The crosshead guides are also lubricated from an oil reservoir cast into the frame. The connecting-rod is provided with a suitable oil reservoir, which is connected to each bushing by channels through which the lubricant is forced by the splashing caused in the reciprocation of the rod. Felt wicks and grooves cut in the bushings distribute the lubricant uniformly and to a proper amount over the bearing surfaces.

This system of oiling not only results in economy but also insures the proper lubrication of all surfaces with the least amount of attention, and is consequently a highly desirable feature in connection with a machine of this kind that must be employed at distant points and frequently started and stopped without having an attendant make certain that it is in proper working condition

In order to make it possible to start and stop this pump without the necessity for a man going to it, a motor is employed which can be thrown directly onto the line without the necessity of a starting resistance. It is therefore possible for the pump to be started by simply throwing a switch in the power house or at any other convenient point in the mine.

In many cases the use of acid-resisting materials in the water end of the pump becomes necessary on account of the strong acidity of the water encountered. Special attention has accordingly been given this point, and an acid-resisting material of high quality has been secured from which to construct the water end. The pump has been operated in some of the strongest mine water to be found, and the results have been highly satisfactory. The material employed has fully demonstrated its ability to withstand extremely strong acid water without undue deterioration.

The water end is constructed of materials suited to the kind of water that is to be handled. The pump can therefore be procured with plain cast-iron water end, with acid-resisting cylinder lining, piston and rod, valves and valve seats, or with a solid acid-resisting water end.

The base is constructed so that axles may be employed and truck wheels placed thereon, so that the pump may be easily moved from one place to another. It is believed by the manufacturers that every point has been considered in connection with this pump and that a machine has been produced of the greatest reliability at a comparatively small price.

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An Acid-Proof Pump

By C. W. Crawford*

In the development of pumps used in mines the original plan was a vertical plunger or piston driven by a crank and gearing at the surface. In the plunger pumps, the plunger and pump-rods were designed to equal about one-half the weight of the column of water to equalize the power on both strokes, the plunger being arranged to work through a chamber or cup of oil on the stuffing-box whereby the lubrication was constant and directly applied. This was the best of all mine pumps when properly installed—then called lifting pumps.

Piston pumps were used more or less at the same time, 50 years and more ago. In the latter the cylinders were bored, but not always lined with brass, and the bucket plungers made of brass were fitted with cup leathers in a substantial way. But in those times, as now, the acid water played havoc with the cylinders. These were used in some of the extensive mines in Pennsylvania with very indifferent success.

Later on, during the Civil War, direct steam pumps came into use, and these, like the bucket plunger type, were at first made with plain iron cylinders, which gave trouble in acid water. Later pump-makers used liners of rolled brass fitted with butt joints. These soon wore out and made more trouble.

Plunger Pumps Have an Advantage When Worked Vertically

The steam pumps held the field when fairly introduced because of their convenience and portability, but it was soon found the cylinder liners had to be of more substantial material than sheet brass. The majority of the pumps to the present time have been piston pumps, but the plunger pumps have some advantage when worked vertically, as above stated. The valve seats of all pumps give as much trouble as the cylinders, while pump-rods and pistons fare very little better in strong acid water. The experiment of babbitt-covered rods has met with considerable success in the hands of careful engineers, but this cannot be considered permanent.

The principal terror of the coal-mining trade consists in the vicious acid water found in nearly all mines and its action on the pumps discharging it. The dullness of the coal trade is discouraging, but it is temporary, while the menace of the acid water is perpetual and everlasting whether the mine is working or idle. Plenty of pumps are to be had in the market, and all of them are efficient for the time being, but they are not built to resist acid water indefinitely; hence the duty of the pumpman is more or less onerous, and it frequently happens that pumps of the most reputable makers are eaten up past repairing in six months.

These are iron-body pumps with bronze cylinder liners, pistons, rods and valve seats, all parts of which are attacked by the acid, aggravated by the friction of packing and the wash of the water. Solid bronze water-ends are subject to the same wear and tear and frequently give out in a year. The ultimate fact in the pump proposition is that there are but few acid-proof pumps adapted to mining purposes.

The history of one such machine is a long story of partial success and partial failure in combating the enemy. The wearing parts of this particular pump are of a metallic composition that is as hard as tempered tool steel, and at the same time proof against all the ordinary acids contained in mine water; hence the wear is reduced to a minimum, and the life of the pump, barring accidents and abuse, is prolonged indefinitely. The preference is given to piston pumps for the present, but plunger pumps will be included later. As a necessary consequence the added material and labor will enhance the cost of these pumps somewhat, but the slight advance will be rebated in the reduced operating expense and the longer life of the pumps, every part of the interior of these pumps being practically invulnerable.

The acid-proof pumps designed for mines and referred to in the foregoing are built by Crawford & McCrimmon Co., Brazil, Ind. They may be driven by steam or electricity.

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A Monster Centrifugal Pump Installation

Modern engineering enterprises are, wherever possible, conducted on a gigantic scale; for it has been found here, as in business, that doing things by wholesale is cheaper than retail methods. A recent case illustrating this occurred in New Orleans, where very large quantities of water had to be handled in drainage work; and to meet the requirements four immense centrifugal pumps were ordered, which are said to be the largest of their kind in the world.

These big pumps have a delivery opening of 78 in. diameter, and are capable of delivering 168,000 gal. of water per minute at a 1-ft. head, which is equal to the flow of a good-sized stream. The head of water will vary under different working conditions from 1 to 13 ft., and at this latter difference of level 90,000 gal. per min. can be handled; but the pumps are required to turn much faster than at low lifts, for whereas they do their work at 55 r.p.m. when the head is but 1 ft., it requires 113 r.p.m. to move the stated amount at the 13-ft. head. This, however, is by no means excessive, and the pumps will be economically operated by Nordberg-Corliss compound condensing engines.

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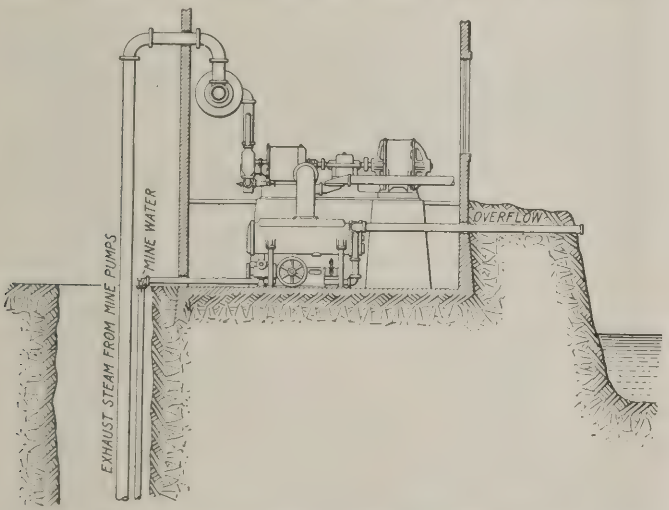
*President, Crawford & McCrimmon Co., Brazil, Ind.

Besides these monsters there is a fifth pump in the outfit which has an outlet of 48 in. and a capacity of 47,500 gal. per minute at a 3-ft. head, as against 156,000 gal. at the corresponding lift by its big brothers. These pumps are built by the Southwark Foundry & Machine Co., of Philadelphia.

Securing Power from the Exhaust of a Pump

At many coal mines direct-acting steam pumps are employed under ground to rid the workings of water. This water is raised to the surface and discharged into some nearby stream or watercourse. The steam after operating the pump is piped to the surface and allowed to escape into the atmosphere.

The accompanying illustration shows how some of the heat contained in the exhaust steam may be utilized for the generation of electric current. The steam as it comes from the mine pump is passed through an eliminator, and thence to a low-pressure turbine, which exhausts to a surface condenser. The water discharged from the mine pump is passed through this condenser on its way to the watercourse, and thus condenses the steam.



Cross-Section through Power House Using Pump Exhaust

By this means a source of energy which goes to waste in considerable quantity around many coal mines is turned to a useful end. In the particular case which is illustrated herewith, approximately 200 kw. of power is secured from steam which hitherto had gone to waste. The only live steam required is that necessary to operate the condenser pump, which is shown placed under the condenser. There is of course an overhead charge owing to the investment in the necessary low-pressure turbine and generator, together with a slight amount of extra piping. The motive power, however, costs practically nothing.

Kentucky Mining Institute Meeting

The Kentucky Mining Institute will hold its fourth annual meeting at Pineville, Ky., on May 14 and 15. The tentative program is as follows: Friday morning, starting at 7 o'clock, trip to the mines in the vicinity of Pineville, going as far as Benham and returning by way of Coxton, Ky., where lunch will be served by K. U. Meguire, of the Harlan Coal Co., reaching Pineville at 4 p.m. Friday evening, at 7 o'clock sharp, the banquet will be held. Saturday morning at 8:30, business meeting and consideration of papers; Saturday afternoon at 2 o'clock, first-aid meet with prizes, amounting to over $400; Saturday night, consideration of papers.

COMING MEETINGS

International Railway Fuel Association will hold its annual meeting at Chicago, May 17-20. Secretary, C. G. Hall, 922 McCormick Bldg., Chicago, Ill.

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

The American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 W. 39th St., New York City.

The Illinois Mining Institute will hold its next meeting at Danville, Ill., May 27-29, 1915. The officers of the Institute are: President, J. W. Starks, Georgetown, Ill.; first vice-president, William Burton, Herrin, Ill.; second vice-president, Fred C. Pfahler, Belleville, Ill.; secretary and treasurer, Martin Bolt, Springfield, Ill.

The Kentucky Mining Institute will hold its summer meeting at Pineville, Ky., May 14 and 15, 1915. Secretary-treasurer, Ivan P. Tashof, Lexington, Ky.

The American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, inclusive, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

The Coal Operators of West Virginia under the auspices of the Norfolk & Western operators, in conjunction with the U. S. Bureau of Mines and the Huntington Chamber of Commerce, will hold a state-wide first-aid and mine-rescue field meet and contest in Huntington, W. Va., May 14, 1915.

Recent Legal Decisions

Company's Liability for Malicious Prosecution—A coal company is liable in damages for malicious prosecution instituted against a person by its superintendent acting in the line of the corporation's business affairs. (West Virginia Supreme Court of Appeals, Lyons vs. Davy-Pocahontas Coal Co., 84 Southeastern Reporter 744.)

Validity of Ohio Anti-Screen Law—The Ohio law which provides that where miners' compensation is based upon tonnage of coal mined they must be paid according to the total of all coal contained in the mine car in which it has been removed from the mine, except that no greater percentage of dirt and impurities shall be contained therein than that ascertained to be unavoidable by the State Industrial Commission, whose orders are subject to review, and except that operators and miners may agree upon a docking system, is not invalid as violating the constitutional guaranty of freedom of contract, but is a valid exercise of the state's police power. (United States Supreme Court, Rail & River Coal Co. vs. Yaple, 35 Supreme Court Reporter 359.)

Equipment of Coal Cars—Under the laws of Alabama a coal operator is liable for injury to a miner resulting as a direct consequence of the operator's failure to equip cars with safety appliances to prevent their running away and down into a mine to the peril of miners. (Alabama Supreme Court, Setzer vs. Burnwell Coal Co., 67 Southern Reporter 604.)

Some Large Steam Pumps

The art of building direct-acting steam pumps for mine service might appear to the casual observer to be making but slow progress. The type of these machines now built and installed closely parallels, if not exactly duplicates, the units constructed 5 to 10 years ago.

The direct-acting duplex pump has always been the steam-driven machine most favored for use in draining American coal mines. This is probably due to the fact that the space available underground places a limit upon the dimensions of the subterranean pumping engine. This limit of height, length and breadth was for the majority of cases reached some years ago. Today if greater pumping capacity is required, it is in many cases, more economical to install several units than one extremely large pump.

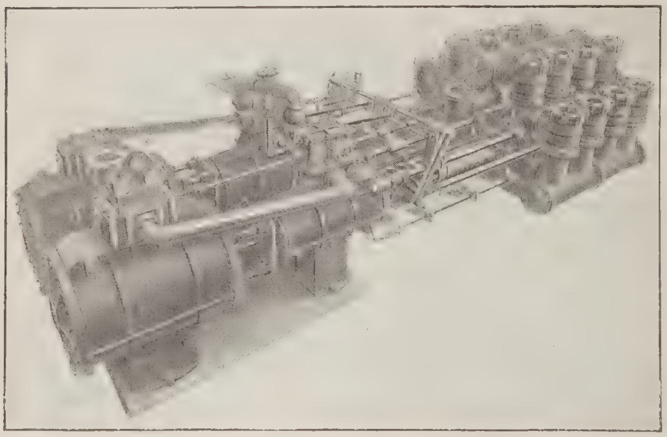


Fig. 1. General View of Pump

The Goyne Steam Pump Co., of Ashland, Penn., is at present building two duplex direct-acting compound steam pumps of large size. One of these units is for the Mid-Valley Coal Co., and is an exact duplicate of a pump built some seven years ago and will be installed in a continuation of the original pump-room. The size of this machine is 23&39x14x48 in. The condenser employed will be a 12x18x18-in. single-cylinder machine of the spray type.

This pump differs from the other that will be installed in the Mary D. colliery only in the size of the steam end. This is due to a slight difference in the head against which the two machines will act and to the conditions of steam pressure.

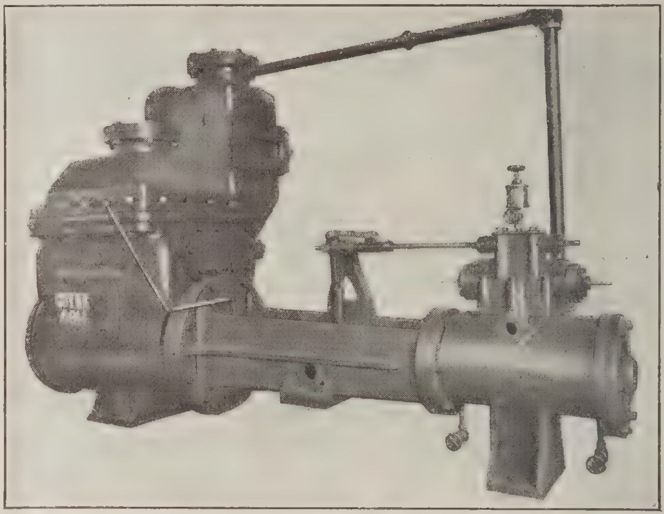


Fig. 3. The Condenser Employed

The accompanying illustrations show the pump that will be installed in the Mary D. colliery and the condenser to which exhaust will be made. The size of the pump is 24&42x14x48 in. It will be located about 1200 ft. from the boiler-house and will handle 2500 gal. per min. against a vertical head of 620 ft.

The steam end of the pump is of Goyne standard compound type, the high-pressure cylinders equipped with the Goyne cutoff attachment, which effects a considerable saving of steam, while at the same time permitting the pump to operate at a higher piston speed than would otherwise be obtainable.

The water end of the pump, which is of the 16-valve-chamber type, is protected from the action of acidulous mine-water in its entirety. The entire water end is designed especially for wood lining, and all the castings, except the division plates between the working barrels, form true circles, into which are accurately fitted staves of seasoned white pine. The division plates are protected from the action of the water by having

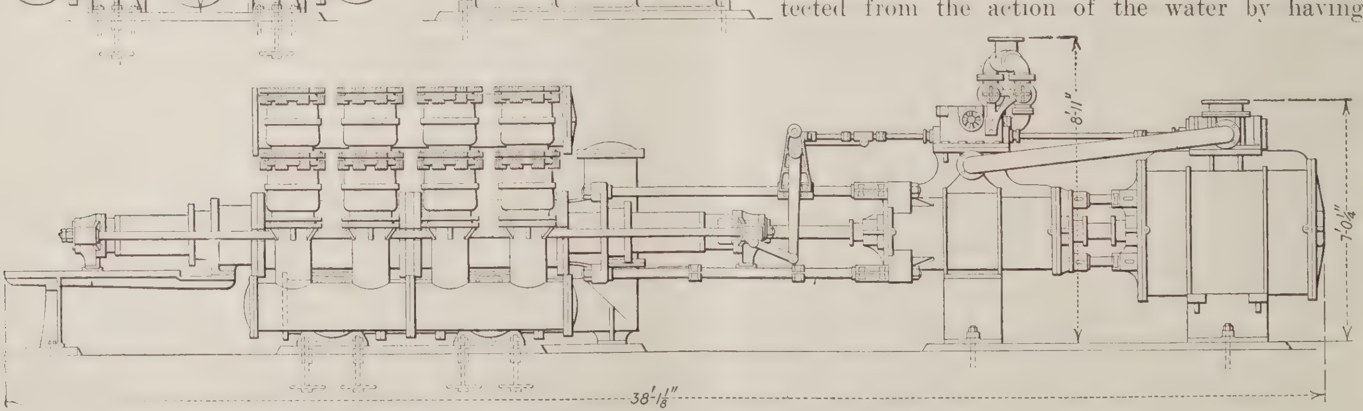


Fig. 2. Side and End Views of the Pump

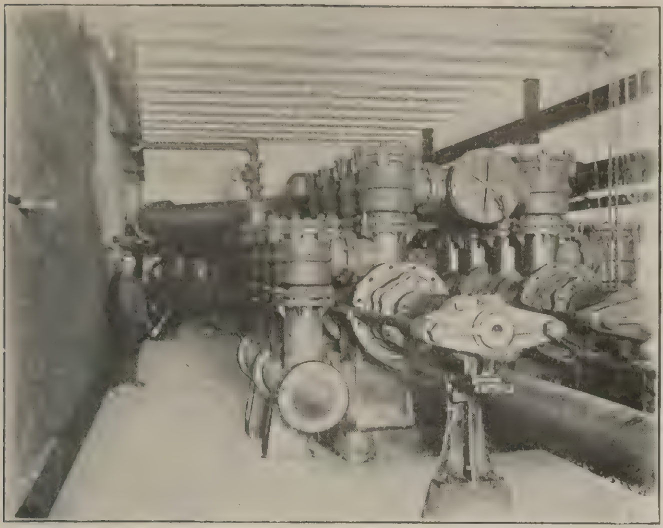


FIG. 4. PUMP INSTALLATION AT EXETER COLLIERY, 600 FT. UNDERGROUND

their faces covered with a special acid-resisting alloy. All packing-box throats are thoroughly protected by heavy machined bronze bushings which are tightly forced into place.

The condenser employed is of a heavy pattern spray type designed especially to cope with acidulous mine-water. It is full bronze fitted throughout. This condenser avoids the delicate mechanism sometimes found in machines for this purpose, and therefore reduces the upkeep to a minimum.

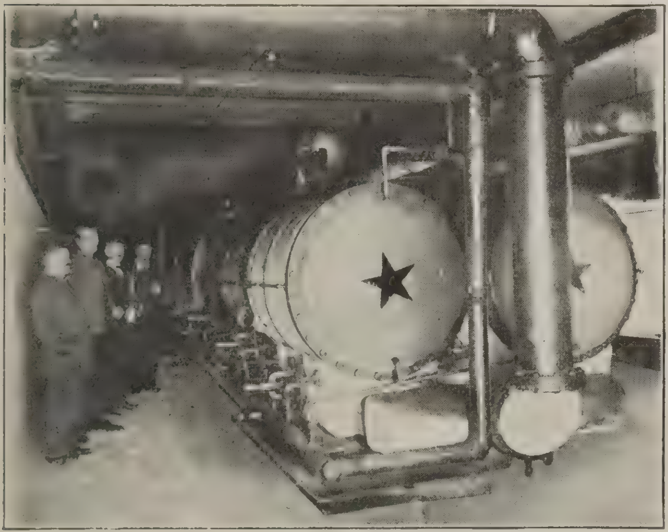


FIG. 5. ANOTHER VIEW OF THE GOYNE PUMP AT EXETER COLLIERY

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March Anthracite Shipments

The shipment of anthracite during March was 4,985,398 tons as compared with 5,164,703 tons in March, 1914, a decrease of 219,305 tons, but the tonnage of the Lehigh & New England was not given by the Bureau of Anthracite Statistics. The amount of coal on hand at tidewater shipping ports increased 91,117 tons, from 782,581 tons on Feb. 28 to 873,698 tons on Mar. 31.

The Philadelphia & Reading led for the month with 961,415 tons, the Lehigh Valley was second with 894,031 tons and the Lackawanna was third with 644,932 tons. The Delaware & Hudson carried 617,605 tons, the Erie 593,250 tons, the Central of New Jersey 578,322 tons, the Pennsylvania 544,023 tons and the New York, Ontario & Western 151,820 tons.

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Itinerary of Bureau of Mines Rescue Cars

CAR NO. 8

Glenalum, W. Va., Mar. 23 to Mar. 28.
Thacker, W. Va., Mar. 29 to Apr. 7.
Redjacket, W. Va., Apr. 8 to Apr. 18.
Williamson, W. Va., Apr. 19 to Apr. 29.
Chattaroy, W. Va., Apr. 30 to May 9.
Huntington, W. Va., May 10 to May 15.

CAR NO. 6

Yatesboro, Penn., Apr. 17 to May 1.
Soldier, Penn., May 1 to May 8.
Wishaw, Penn., May 8 to May 15.

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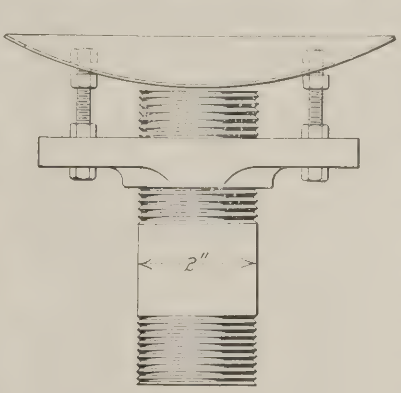
New Sprinkler System for Coal Breakers

Sprinkler systems which can be turned on by hand from outside the building have been installed in 14 of the wooden anthracite-breakers of the Lehigh Valley Coal Co., Wilkes-Barre, Penn. Tests of these systems before a committee of the Underwriters' Association of Pennsylvania have resulted in a substantial reduction in the high rate of coal-breaker insurance now in force, for breakers thus equipped.



SPECIAL SPRAY-HEAD

The new sprinkler system consists of pipes spaced 10 or 15 ft. apart and equipped with nozzles pointing upward which dash water against convex or flat metal plates fastened to the feed pipes as shown. The water is thus diffused. About one hundred 2-in. nozzles are required to protect a large breaker. The nozzles are fed by 2-in. pipes, leading from various sizes of water mains.

The new system supplements, but does not replace, the regular fire-fighting apparatus installed in every breaker, such as hose, standpipes, fire-pails, sand-pails, water-barrels and hand-grenades. When the system is operated, the interior is filled with a steady downpour of water, similar to a heavy rainstorm. At such a time it is possible for men to enter the structure and attack the fire with the regular fire-fighting apparatus, the spray system being independent of the regular apparatus. Without such a system, it is almost impossible to enter a breaker which has caught fire; the conflagration is quick and hot, because of the numerous drafts throughout the immense structure.—From *Engineering News.*

The ring system of steam piping is a thing of the past and should never be used. It involves unnecessary expense, mechanical complications, increased losses through radiation, increased danger from water collection and water hammer and it does not afford the additional security to the supply which is supposed to justify its adoption.

The Labor Situation

SYNOPSIS—Workingmen at the Nesquehoning colliery claimed the right to quit work at 3 p.m. instead of at 4 p.m., the time specified by the Lehigh Coal & Navigation Co. The umpire denied the miners' contention. In the Walsh-Rockefeller controversy the former charges that the latter has misrepresented the relation in which he stood to the management of the Colorado Fuel & Iron Co. and declares that the letters of Governor Ammons were written by Rockefeller agents. In southeastern Ohio attempts at mediation continue.

George Gray, one of the umpires of the Anthracite Conciliation Board, has decided against certain classes of workmen employed in the Nesquehoning colliery of the Lehigh Coal & Navigation Co. They contended that they ought to be permitted to quit work at 3 p.m. instead of at 4 p.m. The decision of the umpire was that the agreement in 1909 fixed 4 p.m. as quitting time and the miners could not claim exemption from this provision.

"Miners" Are Men Who Work in a Mine

It was decided on Apr. 19 that the word "miner" in the state mining law was broad enough to cover all the 160 candidates for mine foremen and assistant mine foremen in Schuylkill County whose certification had been held up by process of injunction because the men had not actually shot coal for five years at the face.

The court says that all employees working in the mine may receive certificates if they are otherwise qualified. The mine workers are given three weeks in which to file an appeal to the Supreme Court from the decision of the Dauphin County Court. Until that time the injunction restraining the Department of Mines from granting the certificates is still in force.

The Manners and Morals of Committeemen

The United States Commission on Industrial Relations is about to resume sessions in Washington, D. C., and Frank P. Walsh, the chairman, is again telling the public in advance what he expects to prove.

When we remember that the President appointed a labor agitator and a man who might well be regarded as a neutral, Hywell Davies, to decide the rights and wrongs of the eastern Ohio situation and then held up the report for several weeks in order to help a final settlement, we are surprised at the contrast in this instance. Here the chairman of the commission, because he is the friend of a party in the controversy, instead of trying to conciliate matters, gives out his conclusions before the whole evidence is presented and in such a provocative manner that it is well calculated to prevent harmonious relations.

What Committeemen Should Not Do

Government commissions need to learn something from the courts. Their decisions should not be subject to presidential demurrers and certainly not to presidential correction, neither should they state their conclusions prior to the completion of the investigation on which their judgment is supposed to be based. Men like Senator Martine and F. J. Walsh, who have both conducted commissions as means of advancing political propaganda, should be brought sharply to task.

The pulpit in the church, the class-room of the Sunday School and the rostrums of Cooper Union and Carnegie Hall are places to be avoided by those whose work is judicial. They are no places in which to discuss conclusions before the inquiry is completed. The manners of government investigators need regulation. The action of Senator Martine should be a crime punishable by impeachment and that of Frank S. Walsh should be gently corrected by fine and imprisonment, wholly without regard to the truth or falsehood of their conclusions. It must be conceded, however, that the offenses of these commissioners have been against the ethics of their profession rather than against the law.

Walsh Says that Rockefeller Wrote Letters for Ammons

Mr. Walsh declares that John D. Rockefeller, Jr., actually directed the action of his subordinates throughout the Colorado strike and did not leave matters so unreservedly in their hands as he testified on the stand. He says John D. Rockefeller, Jr., "presumed to dictate letters that were sent out to the President of the United States and to the governors of the States over the signature of the Governor of Colorado."

The first categorical denial came from Governor Ammons. Rockefeller's final reply was more detailed and therefore appeared later, on Apr. 25. He stated that Governor Ammons sent Major E. J. Boughton, adjutant-general of Colorado, in May of last year to New York City. Mr. Rockefeller says in his letter:

> I never met Major Boughton, but he told Mr. Lee, of the Rockefeller office, that Governor Ammons had been much disturbed over the misunderstanding which prevailed in the Eastern States concerning many phases of the Colorado strike.
>
> Major Boughton asked Mr. Lee if he had in mind any effective way of getting the facts before the public, and he suggested that a letter be written by Governor Ammons to the President of the United States and to the governors of other states setting forth the situation as Governor Ammons saw it. Major Boughton stated that he could not tell how the Governor would regard such a suggestion and that even Major Boughton himself would have to convey the suggestion through General Chase, Major Boughton's superior officer. To get the matter into shape for consideration Major Boughton asked Mr. Lee to make his suggestion concrete by preparing a draft of the kind of letter which he had in mind. As a basis for the preparation of this draft Major Boughton sent Mr. Lee a memorandum of his own views of the situation.
>
> The memorandum written by me and referred to in one of my letters as having been sent by me to Mr. Lee was nothing more than a rough draft of a statement concerning the Colorado situation which I had drawn up in answer to statements which had appeared in the press, but which had never been used.
>
> This memorandum was incomplete and only suggestive. When I learned of Mr. Lee's suggestion to Major Boughton, it occurred to me that this memorandum contained material which Mr. Lee might find helpful in that connection. Mr. Lee drafted his ideas and sent them to Major Boughton, but they were never even submitted to General Chase, let alone to the Governor. From Governor Ammons' statement in the mining papers it is obvious that he never knew that such a suggestion had been made.

Rockefeller Did Not Plan to Buy Up Newspapers

Mr. Rockefeller denies that he at any time ventured to direct the action of his subordinates relative to the strike situation and says that the correspondence secured by the commission in response to the subpoena duces tecum proves only that he did not influence their action. He denies another charge that he had a plan to publish a string of daily papers. A man Mr. Rockefeller had never even heard of wrote to Mr. Lee suggesting such a course, and Mr. Rockefeller declares that the only excuse Mr. Walsh has for his charges is that Mr. Lee referred to this letter in his correspondence with Mr. Rockefeller.

Nor is it true that Mr. Rockefeller had a plan of financing the official organ of the National Chamber of Commerce. This publication is known as "The Nation's Business" and is distributed without charge to the members of the Chamber of Commerce of the United States. Mr. Rockefeller states that the president of that body applied to him for his support for the paper on various occasions, and though he thought the proposition legitimate he never acted favorably on it.

Another statement to the effect that Mr. Bowers praised Mr. Murphy for not giving information regarding the Colorado Fuel & Iron Co. to Ethelbert Stewart, the representative of the Department of Labor, is denied, and Mr. Rockefeller further denies that Mr. Stewart asked for any information whatever.

Mr. Walsh expects to call Mr. Rockefeller, Mother Jones and several other persons connected with the Colorado troubles. On Apr. 28 Mr. Walsh made a reply to Mr. Rockefeller which had but one effect—that of substantiating the force of Mr. Rockefeller's argument.

There May Soon Be Peace in Eastern Ohio

The principal event in the eastern Ohio strike situation during the past week was the effort of Governor Willis to bring about an agreement. He undertook the role of mediator and called a conference of miners and operators at Canton, Apr. 24. He spoke at length to both sides urging a settlement. While it was presumed that he had a plan, he frankly said he had none, although he believed that an adjustment could be reached. Governor Willis was accompanied by J. M. Roan, chief deputy of the Industrial Commission of Ohio and the safety commissioner of mines, who took a part in the meeting.

After the talk from the Governor each side met separately and named members of the joint scale committee. The operators' representatives consist of W. R. Woodford, H. E. Willard, C. E. Maurer, R. L. Wildermuth, Joseph Pursglove, S. H. Robbins and G. M. Jones. The miners' representatives are J. P. White, national president of the United Mine Workers of America; Lee Hall, Charles J. Albasin, Fritz Fraetz, Charles Fischer, Jerome Watson and William Somerville. After organizing, the joint scale committee immediately adjourned to meet in Cleveland at 10 a.m., Apr. 27.

Dangers of Mining According to Methods Favored by Union

One of the features of the session at Cleveland was the attendance of the mine superintendents to discuss methods of safety in mining and the conservation of the coal supply. Mining with wide rooms and a road up the center as now practiced is not conducive either to the safety of the men or the conservation of the coal supply.

The meeting at Cleveland in the Hollenden Hotel really appears on going to press to be likely to result in an agreement. The miners' representatives still hold firm to the 47c. rate, to which they are irrevocably pledged. But they see that concessions must be made in every other direction, and it is rumored that they are willing to reduce allowances for rock handling and brushing to such an extent that the price of run-of-mine machine-mined coal at 42c., with the present allowances, would be practically equivalent to 47c. with those allowances modified as suggested.

C. E. Maurer, of the Glen's Run Coal Co., the chairman of the preliminary conference of operators, mine superintendents and bosses, is said to have remarked, "I believe this is the first time the miners have met us with the definite idea of making a contract."

Baird Halberstadt's Anniversary Party

On Saturday, Apr. 24, Capt. Baird Halberstadt, geologist and coal-mining man of Pottsville, Penn., invited a number of his friends to join him in a little celebration, marking one-third of a century's service in the field of geology and mining. The whole affair was unique in its character and brought together a notable assemblage of American scientists. Admiral Robert E. Peary was the guest of honor, while geologists and coal-mining men from far and near made up the remainder of the party.

Captain Baird Halberstadt

Captain Halberstadt has long desired to show his co-workers in the field of geology the wonders of the coal formations in the southern anthracite field, and he selected this anniversary occasion as a suitable time for such a reunion. Mr. Halberstadt's guests arrived in Pottsville Friday evening, at which time where was an informal reception at the Pottsville Club. Early Saturday morning the entire party left Pottsville in automobiles, which carried them through the various nearby coal-mining towns. Special attention was paid to the large stripping operations of the Philadelphia & Reading Coal & Iron Co. It was in these open-cut pits that the visiting geologists had their best opportunity to study the peculiarities of the coal measures.

W. J. Richards, president of the Philadelphia & Reading Coal & Iron Co. and a close friend of Captain Halberstadt, arranged a most interesting and instructive mining program for the visitors. During the morning, after inspecting the Bear Run stripping of the Reading company, the party was entertained by the Reading rescue corps, which gave a demonstration of first-aid and rescue work. Draeger apparatus was used. The Reading company was one of the pioneers in this kind of work in the United States, and the thoroughness with which their first-aid men do their work indicates plainly the long and careful instruction they have received.

Shortly after this the party arrived at the Maple Hill colliery, where a luncheon was served. Many of the visitors went down into the Maple Hill mine and were shown the methods of practical anthracite mining. In the afternoon, on the return trip to Pottsville, the Pine Knot colliery was visited, and the party was shown one of the newest and most modern power and hoisting plants in the anthracite field. It was especially noted by all that Mr. Richards' mines are models of order.

Saturday evening, again at the Pottsville Club, Captain Halberstadt entertained all his friends at a dinner commencing at 9 o'clock. The party was a merry one, and the after-dinner speeches were given in a vein of humor that kept the assemblage greatly amused until past the midnight hour. There were no dull moments for anyone, and few men were ever so highly honored, or so sincerely appreciated for their real worth as was Baird Halberstadt on Saturday evening. Captain Halberstadt has worked with industry and intelligence and to prove it the following met to pay their respects:

Rear Admiral Robert E. Peary, George Otis Smith, Marius R. Campbell, Prof. Frank Knowlton, Prof. George H. Ashley, Dr. Alfred H. Brooks, Dr. W. C. Mendenhall, Frank Sutton, Edward W. Parker, Charles Enzian, Prof. Henry Kummel, Prof. Thomas L. Watson, Dr. I. C. White, Dr. Edward B. Mathews, Prof. Frank De Wolf, Prof. H. A. Buehler, Prof. W. O. Hotchkiss, Prof. R. C. Allen, Dr. H. L. Fairchild, Dr. Gilbert Van Ingen, Dr. Charles E. Munroe, Prof. George W. Littlehales, Dr. W. R. Crane, Dr. Frederick B. Peck, Prof. Andrew S. McCreath, Prof. Bailey Willis, Capt. A. F. Lucas, Frank L. Hess, Floyd W. Parsons, Frederick W. Saward, W. J. Richards, S. D. Warriner, Edwin Ludlow, W. C. Whildin, Thomas Fisher, Morris Williams, Robert A. Quin, Frank A. Hill, John J. Tierney, E. A. Delaney, George M. Keiser, James B. Neale, William Auman, D. V. Randall, W. Corde Snyder, W. R. Reinhardt, Reese Tasker, George S. Clemens, Claude F. Lewis, William P. Smythe, Joseph H. Garner, John F. Bevan, E. E. Kaercher, George B. Hadesty, John H. Pollard, James McDonald, J. P. Jones, John Wood, Francis Critz, A. G. Blakeley, W. H. Lesser, J. P. Jennings, James Morris, J. E. Turk, R. H. Buchannon, A. E. Lehman, Edwin M. Chance, Horatio Morris, Edwin C. Luther, Arthur W. Shaefer, William A. Cochran, William S. Pugh, Charles W. Wagner, Edward Brennan, Hon. James E. Roderick, M. J. Brennan, John Curran, Herbert Kynor, William Wells, Hon. MacHenry Wilhelm, Hon. R. H. Koch, Hon. Charles N. Brumm, William S. Leib, William B. Rockwell, E. L. Herndon, Robert Allison, W. H. Stout, William H. Lewis, Harry Hunter, Col. James Archbald, Hon. F. Pierce Mortimer, Hugh Dolan, Hon. A. L. Shay, J. S. Ulmer, C. T. Brown, J. W. Fox, B. J. Smith, C. T. Mould, Dr. J. B. Rogers, Dr. L. T. Kennedy, Dr. W. C. Bowers, C. W. Unger, Dr. H. J. Herbein, James R. Williams, Frank Muehlhof, Capt. C. M. Wilhelm, Capt. S. B. Edwards, J. J. McKnight, Rev. Dr. James F. Powers, D. W. Kaercher, George M. Roads, Dr. G. H. Halberstadt, G. A. Muehlhof, Dr. A. L. Gillars, Hon. James B. Reilly, W. G. Gregory, B. S. Simonds, H. I. Silliman, A. H. Roehrig, R. C. Shearer, A. H. Tiley, George H. Steidel, Hon. C. A. Snyder, Capt. Harry Chambers, Hon. R. D. Heaton, Daniel Duffy, T. B. Van Buren, George D. Evans.

Editorials

Men and Americans Only

Some time ago the industries were run "for revenue only." In fact, if you read the incorporation articles of our companies you will see that any other purpose is wholly alien to the ends of corporations. Positively unlawful, however beneficial, are many of the modern developments. But these deviations from the strict letter of the law, these sundry engraftings of soul into organizations framed only to obey the letter of the law and to make a profit, are excused by the public, by a sort of general consent.

Not a single bold spirit has risen in the courts to test the right of the corporation to become in all respects like a man and contribute to almost anything—except of course a political party or a selling agency. And every one is pleased that the corporation has been permitted to assert its place in the sun of genial friendship and fellowship.

But so far most of the generosity exhibited by these fictitious individuals—corporations—has been confined to men and Americans only. The employees have been considered to the exclusion of the women and children dependent on them, and non-English speaking men have been too often forgotten. But this is being rectified rapidly. The schools are being bettered; the villages are cleaned; the milk is made pure; domestic science is taught, and sewing circles are established. Safety work is not now the sole end of sociological work, though it had its beginning in it.

In its sociological work the Colorado Fuel & Iron Co. has advanced far beyond the rule of "men and Americans only" and is seeking the welfare of the women and children and of the aliens as well as those who speak English. At its meet in Trinidad it expects to have a *boccia* contest for the Italians. The directors have noted that these foreigners are not playing baseball or basket-ball, but are amusing themselves with *boccia* (pronounced we believe boh-chee-ah), and so in order to enlist their interest in this absorbing game of bowls on an earthen alley it is to be made the basis for several eliminations and for a final contest at Trinidad, Colo.

The boys and girls will have their fun competing for the basket-ball award. A 100-yd. race for boys under 16, a 50-yd. dash for girls of the same age, an egg race for girls under 12, a three-legged race for boys of equal immaturity, a nail-driving contest for women and a drill for the Boy Scouts will remove the partiality with which in so many coal villages the inhabitants have been treated.

The tendency is to make welfare work general and not to take up only those parts of it which are easily performed—the work among English-speaking people for instance. The Ellsworth Collieries Co. is making earnest efforts to assist the Russians, Italians and Slavs in forming glee clubs and bands, the men arraying themselves in their native costumes. The H. C. Frick Coke Co. is showing a similar interest in these musical developments, and in the parades at Gary the foreign beneficial societies are also represented.

The narrow-minded native sees in the formation of racial societies a source of danger. They do not so appear to us, because it is always found that to avoid antagonizing any man's national, as also his religious, animosities is the surest way to make him a good citizen. The game of *boccia,* for instance, will be played whether frowned on or encouraged. If welcomed it will form a link between the Italians and their American friends. If it is merely regarded as a queer game of an alien people, the Italians will be confirmed in their exclusion from Americans for they will still continue to play it among themselves.

Seeing that corporations are permitted to spend their funds to advance the interests of their employees, the broadening of the movement to include all the workmen and every member of their families is an extremely welcome feature in recent developments. For the foreigners and the women altogether too little has been done in the past.

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Why the Roof Is Usually Weak under Valleys

Dr. White, in his recently published remarks on the paper of the late lamented Frederick C. Keighley at the last meeting of the West Virginia Coal Mining Institute, stated that there is no apparent geologic reason why the roof under valleys should be less reliable than that under the hills. He added with perfect frankness, however, a comment which we might well paraphrase into the statement that facts frequently show a disturbing indifference to the arguments of the geologists.

Later, he declared that the removal of cover might have caused the percolation of water and the consequent decrease in strength. Frank Haas urged that the measures in Scotland which were mined under the sea with not over 100 ft. of cover were found to be in good condition. Consequently he did not believe that water affected the condition of the measures under valleys.

It is probable, however, that where the water is from the sea it does not have an equally solvent effect with that derived from rain or impregnated with the acids from vegetation, being already saturated with solutions and devoid of one of the best lime solvents—carbon dioxide. In many cases carbonate of lime is being deposited, and in such waters we may be sure it is not being dissolved. Furthermore, deep-sea water carries but little entrained oxygen to affect the rock binders.

Another important matter is the level of the water table. When the water rises and falls in the measures, the effect is much more severe than if it continues at any given level. In fact, total submergence is helpful rather than detrimental as one can note in mines that have been flooded with water for some 30 or 40 years. Both timber and rock are unfavorably affected by frequent changes in their water content. Dryness and immersion are neither so severe in their action as alternation and variation of those states.

There is another cause perhaps more important than those just mentioned, and that is the fact that most valleys tend to become the *loci* of small anticlinals. The overbalancing weight of the hills on soft or softened strata thickens the coal and heaves up the clays, shales and even the sandstone.

The valleys thus are subjected to creep, and it is generally found that on opening coal on the side of a valley it dips into the hill from the level at which it is first found as a fully developed bed. The wash, of course, may be seen well below the bed level, but as the hill is entered and the coal is found of the full normal thickness or even thicker it is seen to dip toward the heart of the hill. The thickness also appears to be greater at the crop for like reasons.

There is no question but geological readjustments are always taking place. The hills are settling and the floor of the valleys tilting up. The weight of a hill 200 ft. high is 16 tons per sq.ft. This is twice as much as it is permissible to put on dry clay, nearly three times as much as moderately dry clay should have to sustain and from 8 to 16 times as much as should be loaded onto soft clay. No one would think of up-ending the Washington Monument on a bed of the last-mentioned material without preparing first of all a broad base on which to rest it. So apparent is this that an architectural structure without an adequate base is considered a monstrosity. The eye instinctively condemns it as a freak and the aesthetic sense is offended accordingly.

We must never pass over the fact that the hills are in a condition of unstable equilibrium. Where shelving shores approach the coast, the floor of the sea may not be broken as in the instance of which Mr. Haas aptly reminds us. Where the measures are solid limestone and have not been weakened by percolation, they may stand the strain, as is the testimony of C. E. Krebs in relation to the coal at Steubenville under 90 feet of such cover. But where the measures are weak and subject to creep, nature will enact one of her silent revolutions by which hills and valleys tend to become level and are only prevented from fluxing, in approximation to a perfect plain, by the continued action of the eroding water. Even where the measures in valleys are strong in compression they may yet fail in tension when the clays below heave under them and thrust them upward.

Nature and nature's laws are therefore hardly in conflict. About 10 years ago the facts here suggested were the occasion of extended comment in the technical press, and there seems little reason to doubt that they explain why the roof under the valleys is more treacherous than that under the burden of the hill.

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Boiler Compounds in Coal-Mine Power Plants

The primary business of a coal-mine superintendent is to mine coal. He must do this in the cheapest and most economical manner consistent with safety and the natural life of the mine. The operation and upkeep of the mechanical equipment necessary for the attainment of this end are of necessity a side issue, regarded by many superintendents as an unwelcome duty and a necessary evil.

If the feed-water employed in the boiler plant is drawn from a surface supply, as is frequently the case, it is not only apt to contain various scale-forming materials in suspension or solution, but humic acids formed by the decomposition of animal or vegetable matter. Also, if the supply comes from streams into which mine drainage is introduced free sulphuric acid in more or less quantity is almost certain to be encountered. Water from deep wells which might be regarded as of most excellent quality for household or drinking purposes is apt to contain a considerable percentage of carbonate or sulphate of lime or magnesia, the scale-forming qualities of which are well known to power-plant men. In short, the coal-mine boiler plant is subject to practically all the troubles and disorders due to feed-water which beset industrial steam plants, with a few others not ordinarily encountered elsewhere thrown in for good measure.

And possibly because of the fact that a mine manager is a man wise in the ways of mines and miners, but not versed in those of acids and the scale-forming ingredients of boiler-feed waters, the coal-mining field has always been one of the best places for the operations of the boiler-compound salesman.

Certain boiler compounds have their legitimate fields, and there exist many reputable firms regularly vending chemicals or chemical mixtures to be introduced into steam boilers for the purpose of neutralizing acids or decreasing the baleful effect of the scale-forming materials carried by the boiler-feed water. But no boiler compound in the usually accepted sense of the term was ever invented, evolved or discovered that proved in every-day use to be the panacea that many smooth-tongued and unscrupulous salesmen would lead us to believe.

In the majority of cases the boiler compounds offered for sale contain a soda-ash base with often tannic ingredients added. While the employment of such compounds may not cause trouble unless the boiler is given an overdose (in which case severe priming, or blistering, and burning of tubes may ensue), the results obtained are seldom, if ever, commensurate with those secured by treating the bad feed-water before it enters the boiler.

There are two facts which it is well to keep carefully in mind whenever a compound salesman unlimbers his artillery and expatiates volubly on the virtues of his particular brand of boiler cure-all: First, a steam boiler is a closed vessel in which it was intended that physical and not chemical changes should take place. Second, the treatment of a boiler-feed water by any chemical, either inside or outside the boiler, is a chemical process and should be under the supervision of a competent chemist. In other words, chemicals are introduced into a boiler-feed water solely for the purpose of acting upon other chemicals contained therein. Should a quantity greater than the amount necessary for this purpose be introduced the effect on the boiler and steam plant generally may be as disastrous as that resulting from the original impurities in the water. If it is impossible or impracticable to treat the water before it enters the boiler, a compound should be prepared especially for that particular water, the various ingredients and their amount being determined only after a careful analysis. Where the quality of the feed-water changes, as is frequently the case with a surface supply, the ingredients or amount of the compound employed should be varied from week to week to suit the changing conditions.

Sociological Department

Colorado Fuel & Iron Co.'s Contests

The Colorado Fuel & Iron Co. will hold a field day at Central Park, Trinidad, Las Animas County, Colo., on Aug. 14, at which members of the Fuel Department, the Colorado Supply Co. and the Colorado & Wyoming Ry. Co. in Huerfano and Las Animas Counties will be eligible to compete.

The camp doctor will certify on July 1 the names of all employees who have completed the training and who are eligible, in his judgment, to receive a first-aid certificate. The two camps in each county having the greatest number of proficient men thus certified will furnish a team for the contest. Employees already having certificates must present them to the doctor of the camp at which they are working not later than July 1, and the certificates must receive the doctor's indorsement.

The judges will be chosen from the medical staff of the Colorado Fuel & Iron Co. As said, there are two competing teams from each county, or four teams in all. The prize will be a banner for the successful team and a watch charm suitably inscribed for each member of the corps.

Baseball, Boccia and Basket-Ball

Las Animas and Huerfano County mines will hold elimination contests to select the best baseball team in each county, and these teams will contest for the prize on the field day, the award being 12 baseball uniforms with the name of the camp on the shirt. The Italians will be represented by two teams of boccia players, one from each county. A team consists of two men and the winners will receive $5 apiece.

A basket-ball contest will be held, open to the brothers, sisters, sons or daughters of employees only, the contestants being from 12 to 16 years old. The girls representing Huerfano County will line up against those of Las Animas County, and the boys from those two counties will be similarly pitted against one another. There will be a basket-ball and a pennant for each winning team. The elimination contest will be supervised by the school principals in each county, and the umpire and referee will be chosen from among the school teachers on the day of the contest.

Races, Nail Driving, Coal Shoveling and a Drill

There will be a 100-yd. footrace for men and boys over 16 years of age, another for boys under 16, and a 50-yd. dash for girls of the same age. There will be an entry from each camp in each of these races, and only the sons, daughters, sisters or brothers of employees or employees themselves may participate.

There is also an egg race for girls under 12, a fat men's race for those who weigh over 220 lb. and a three-legged race for boys under 12 years of age. The ladies will pound their fingers in a nail-driving contest, with a kitchen cabinet, a set of dishes and a washing machine as a reward for the three best wielders of the hammer. Each candidate for honors will have to drive 10 tenpenny nails with an ordinary carpenter's hammer. For this fearsome event it is announced that "first-aid teams will be in attendance."

A coal-shoveling contest in which a ton of nut or slack will be shoveled from one bin to another will be open to one representative from each camp. The Boy Scouts will drill, their efficiency being judged by a military man, and the best drill team will receive a 16x20-ft. tent and a United States flag.

A Nanaimo, B. C., Rescue Team

The accompanying illustration shows the team for mine rescue and first aid at the East Wellington Mine No. 1, of the Vancouver-Nanaimo Coal Mining Co. All the men but two have government certificates of competency. The teams meet periodically for practice in order to maintain a high standard of efficiency.

The Vancouver-Nanaimo Coal Mining Co. Mine-Rescue and First-Aid Teams 1914

Those in rear from left to right are: R. Hamilton, miner; J. Dixon, underground superintendent; C. Dikenson, miner. The men standing in a line in front of these from left to right are: J. Stewart, trainer; J. Knowles, fireboss; W. Williams, fireboss; J. McArthur, miner; R. Reid, fireboss; H. N. Freeman, manager; G. Grey, miner; G. Carson, miner; H. Hemer, master mechanic, and A. Jardine, miner. Crouching from left to right are: J. Hamilton, fireboss; J. Barton, miner; W. E. Tipton, miner; A. McNeil, fireboss, and W. Moore, overman. The patient is J. Diamond.

Operators Cannot Sell Sites for Homes

The oft-repeated charge that miners in West Virginia and other states are not home owners because the operators do not permit it has been well answered by a student of the conditions in West Virginia. He shows that in most cases the operators could not sell homes to the miners, no matter how much they might so desire. He also explains that it would be unwise for a miner to buy a home in a mining camp, even if the company were free to sell it to him.

In the first place there are but few tracts of coal land in West Virginia that are owned in fee simple by the mining companies. Nearly all real property is leased for the purpose of getting out the coal, and the corporations have no right to sell it to miners or anybody else—and they do not. But not having the right to sell, the operating companies do the best they can under the circumstances. They rent homes, and an investigation will show the house rent costs less in mining villages than anywhere else in the country.

Then again, suppose the operator could sell the miner land on which to build a house, would it be a good thing for the workman? In the mining villages there is no occupation not connected with mining, and everybody except the postmaster and the station agent works for the operating company. There is no other employer. Suppose a miner owns the place where he lives in this village, and he loses his job. How is he going to live? He will have to go elsewhere for employment, and if he cannot sell his home he must abandon it. Furthermore, if a man is not engaged in mining or some occupation connected with it he will not want to live at the mines, and as he grows old he wants a home where he can till the land around his cottage and where he is away from the scene of his years of toil.

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Teach at the Y. M. C. A. both Night and Day

In spite of all that the state and the anthracite coal operators are doing to educate the 175,000 anthracite mine workers in Pennsylvania, the Wilkes-Barre Young Men's Christian Association is conducting also regular classes night and day for their benefit. The students who are on a night shift sleep until about noon and come to the school fresher than those who have worked all day and come to the school in the evenings. There are at present 94 men enrolled in the mining school of the Wilkes-Barre Y. M. C. A., and the average attendance is 60. The total enrollment in all the classes conducted by the association is 320.

The mining school has a three-year course, and there is a preparatory year for those who have no education and must begin at the bottom. During the first year of the mining school, instruction is given in arithmetic, mine gases, ventilation and mine law. The second year advances the students further in arithmetic and mine ventilation, and teaches mine surveying and more mine law. In the third year advanced mathematics are taught, mine surveying, ventilation, electricity and magnetism, mechanics and air compression and the course in mine law is completed. There are lectures on mining subjects throughout the course.

"You can always tell how the school is coming on by the look of the mines," said a mine foreman in charge of one of the classes. "When all is going well and the men are interested you find problems figured out in chalk on the sides of the mine cars and all over the doors directing the air currents below ground. Most of our men come from the Lehigh Valley, the Lehigh & Wilkes Barre and the Kingston Coal Co. Out of this class of twenty men only seven went to school after they were ten and only four after they were twelve, but some of them would stump you now in mathematics."

The mine school is conducted two days in the week, on Tuesdays and Fridays. In addition to the mining courses there are elementary classes for employed boys, a men's English class, and classes in arithmetic, algebra, geometry, grammar, spelling, penmanship, architectural drawing, mechanical drawing, elementary and advanced English for foreigners, for mail clerks and carriers, and in salesmanship and public speaking. The association has been successful in preparing a number of candidates for the Civil Service examinations.

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Red Films for Danger

The New Jersey Zinc Co., Franklin Furnace, N. J., has had several moving pictures made of operations in their mines with a view to promoting safety. In this they have collaborated with the United States Bureau of Mines. The films are extremely clear and the information they impart most valuable.

They were presented on Apr. 7 before the New York Section of the American Institute of Mining Engineers at the Machinery Club, 50 Church St., New York City. One feature which received much favorable comment was the reddening of all parts of films which illustrated danger.

Thus when a drunken man comes forward to get his check at the office before going down the slope, the film illustrating the act is reddened to show to the non-English speaking foreigner the dangers of drunkenness. When a man tries to crowd into the man-skip after it has been filled to its complement, a red blush over the film visually condemns the action. When timbers are piled without crosspieces the films blush red again. The same is true when timbers are placed with nails standing up and the man who has been placing a double-set drops down on one of the upstanding points.

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Coal Company Plants Fruit Trees and Truck Gardens

The Stearns Coal & Lumber Co., of Whitley County, Kentucky, is planting an orchard and will continue to set out trees until 4000 have been planted; 1000 to be apple trees, with fillers of 2400 peach trees, 200 each of pear and cherry trees and 100 plum trees. A large vineyard and an extensive area of bush fruits will be planted, J. E. Butler, general manager of the mining company, having provided a plot of 25 acres for the purpose.

G. D. Smith, of Richmond, Ky., was indirectly the originator of the movement, Mr. Butler being present at one of the farmers' institute meetings when Mr. Smith made a talk on the possibility of fruit-growing in the mountains. He has assisted Mr. Butler in his plans and has coached C. W. Broyles, of Pine Knot, on his own fruit farm near Richmond, so that the latter has been qualified for the work of preparing the ground and directing the planting and care of the trees.

The spaces between the rows will be used for a time in growing vegetables, and those which cannot be sold in the company's commissaries will be canned in a factory now to be built and equipped. There are numerous small orchards in the 70,000 acres held by the company, and Mr. Broyles will develop them.

Discussion By Readers

The Air Chamber of a Pump

In all that has been written concerning the pump and its action and the frequent mention made of the purpose of the air chamber of the pump, for maintaining a constant flow of water in the discharge or column pipe, I have never seen any mention of a point that frequently gives considerable trouble in pumping practice. I refer to what may be called the "waterlogging" of the air chamber of a pump.

As early as 1859 Joseph French, then superintendent of the Pittsburgh water-works, made the discovery that when a pump was operated under a high pressure the air in the air chamber became gradually depleted. The pump at the water-works of which Mr. French took charge had always worked badly, having a chronic pound or jar that could be felt by the tremor of the streets and buildings a block away. The plunger of the pump was 20 in. in diameter and had a 12-ft. stroke. The trouble was one of long duration. For years it had been a source of annoyance, and no one could offer a solution of the difficulty. Engineers East and West had been consulted without result.

Upon close investigation Mr. French found that the air chamber of the pump contained little or no air. This chamber was very large. He immediately set to work and installed a device to supply sufficient air to keep the chamber fully charged at the working pressure, with the result that the trouble was completely overcome. The pounding ceased and the pressure-gage indicated a steady, even pressure.

The lesson taught by this experience is that the air in the air chamber of a pump working under high pressure is more rapidly absorbed and carried away in the discharge of the pump when operating under a high than under a low pressure. The expedient adopted by Mr. French has since been followed by numerous other engineers; but few, if any, pump manufacturers pay any attention to the matter. The device consisted of putting a simple air valve in the suction pipe of the pump, which admitted sufficient air to replace that withdrawn from the air chamber by the discharge.

It has been generally supposed that the air contained in the water drawn into the pump would find its way into the air chamber and be sufficient to prevent the exhaustion of the air from that chamber that would otherwise occur. Experience, however, has shown this to be a false hope, and some means must be provided to replenish the supply of air in the air chamber, under the conditions named.

It required but a small air vent in the suction pipe to supply this need; but, strange to say, it was considered a crime in the installation of a pump to permit even the slightest leak of air into the suction pipe. Too much air admitted into the suction will certainly reduce the capacity of the pump, and it is necessary to carefully guard against this result.

A somewhat amusing incident is narrated of a Spanish engineer who, in 1766, attempted to raise water 50 ft. by means of a suction lift. The attempt naturally failed, and the engineer getting mad threw his hatchet with great force against the suction pipe. The hole cut in the pipe by the sharp hatchet admitted air to the suction, with the result that the pump caught the water and started working. The fact in this case was that the suction column was thus converted into an air lift, enough air entering the pipe to render the water column sufficiently buoyant for the atmospheric pressure to overcome the 50-ft. head. This experience has been since confirmed in numerous instances, where water has been raised by suction to a greater height than the theoretical 34 ft. at sea level. There is no advantage, however, claimed for the expedient in general pumping practice.

C. W. CRAWFORD, President,
Crawford & McCrimmon Co.

Brazil, Ind.

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Directors' Visits

I can indorse what was said by Mr. Liddell, in reference to the visits of certain directors to the plants in their charge, in COAL AGE, Apr. 3, p. 612. It reminds me of some incidents that occurred on a similar visit of directors and officials to a mine, in my own experience. The results of that visit suggested to me the necessity of posting signs in various places on such occasions, "Hands Off." To make my meaning clear, I will recount briefly two or three of these incidents:

1. A few company officials recently going through the weigh-office at the noon hour discovered, as they thought, that the scales were out of balance and proceeded to remedy the supposed difficulty. The change made by the officials, however, caused considerable annoyance to the weighmaster, who found on his return that the cars were weighing heavy. On investigation he found that the average weight of empty mine cars agreed upon by the company and the union was balanced off by someone who had been meddling with the scales. He at once corrected the mistake.

2. The same noon hour one of the officials pocketed the weighsheet of the day before and carried it to the office, without the knowledge of the weighmaster, who had the habit of retaining the sheet for the previous day for checking purposes. He was compelled to borrow the checkweighman's sheet, of which he made a copy, which would have been unnecessary had the said official attended to what was his own business.

3. Inside the mine, a "brakie" in trying to avoid a runaway trip had set the brakes before starting. An official who happened to be in the mine that day and was behind the "brakie," with the best of intentions, began jerking the brakes out of the holders. Those who know how a loose brake will wabble back and forth will appreciate the trouble the "brakie" had in catching and setting the brakes again and will also know that he stood a good chance to be injured in so doing. Later he proceeded to tell the official a few things, and the burden of his remarks was "Hands off."

There is work for directors, as well as for weighmasters, "brakies" and many others about the mine. From trapperboy to president, all have their work to perform. The director cannot trap and the trapper cannot direct. When one man butts in on another man's job, it's a case of a square peg in a round hole.

Moral: Attend strictly to your own duties and do not attempt to do the work in charge of another man, until his failure to perform his part compromises your own responsibilities.

Co-operation in Coal Industry

Fearing that the editorial that appeared in Coal Age, Mar. 27, p. 547, entitled "A Lesson from Germany," may create the impression that it is the aim of the coal operators of this section to unduly inflate prices, I desire to add a few words by way of comparing our conditions in this country with those that gave rise to the formation of the Westphalian Syndicate.

Though a German by birth, I think I can say without prejudice that the German method of selling coal was far better than any existing in either England, Belgium or France, although the Belgian and French selling methods are patterned closely after the Westphalian Syndicate.

This statement is true, notwithstanding the fact that France has a very stringent antitrust law. But in some 20 years of operation by the French Coal-Owners' Association, no attacks have been made by the government, the French officials having reached the conclusion that while the methods of the syndicate were technically a violation of the law, they were actually a benefit to the community as a whole. If I recall correctly, one suit was brought against a syndicate owning the iron mines, but the case was never brought to trial.

I believe the establishment of a trade commission will ultimately solve our difficulties, and I hope this will come before the situation becomes too bad and that it will result in recommendations beneficial to the country's industries. I believe our people as a whole are gradually getting over the hysteria that has existed against the so-called trusts and that this sentiment includes every businessman and employer. I think I have been consistent when I argued for publicity and for coöperation on the part of business-men with legislators. The press can help us greatly by urging that more business-men and fewer lawyers be sent to our legislative halls, also by urging that the actual solution of problems is the duty of legislators rather than making attacks on corporations and businessmen. Legislators should realize that labor-men cannot get anything unless they get it from their employers and that employers are entitled to reasonable returns on their investments.

It is true that some corporations have taken undue advantage of their positions and have indulged in unfair treatment of their employees or their customers; but this fact alone should not condemn every business and every corporation or every official of such industries. The opinion that every employer or official of the company is dishonest and would steal from his workmen for the benefit of his company is too absurd to deserve notice, and yet this opinion prevails in the minds of many.

Our people as a whole are too ready to charge conditions to the most convenient cause, and since the people here are the government, the prevailing condition seriously interferes with true progress. I do not believe that government supervision has ever or will ever be resented, provided it is handled on proper lines. Unfortunately too many investigators are prosecutors more than impartial representatives. This statement I make from personal observation. Government officials in any capacity should not take sides with the popular phase of a question, but should study carefully the economic aspect of industrial problems.

Government supervision in Germany is very rigid, because taxes are based on the earnings of coal companies—the higher the returns the greater the income to the government. This seems a popular method in other lines of business; why should it not be well adapted to the coal business?

What coal operators generally aim for (and this is not confined to the present efforts of some Indiana and Illinois coal operators) is permission to do business on the most businesslike basis. The efforts of the individual cannot succeed as well as the efforts of combination. Individual selling means individual advertising, which is further limited by insufficient returns. Collective methods seem to solve many problems. If labor is permitted to bargain for its product on a collective scale, why should not the employers of labor have the same permission in disposing of the product of that labor? Monopolies are to be discouraged because of their possible abuse of power, but combinations should be encouraged because of the unquestioned advantages to be gained by the wise coöperation of all concerned in the industry.

Carl Scholz,
Vice-President and General Manager,
Consolidated Indiana Coal Co.

Chicago, Ill.

Following up his excellent suggestion that well-informed representatives of the mining industry should be on hand at all state and national assemblies when mining legislation is contemplated, which was made in his letter No. 3, Coal Age, Vol. 6, p. 798, Carl Scholz has sent the following open letter to the secretary of the American Mining Congress, of which he is the honored president:

> Dear Mr. Callbreath:
>
> I believe that one of the most important functions of the American Mining Congress should be to call attention to the crying need of sending better representatives to state and national legislatures. The enormous amount of bills against business generally that are introduced every year makes it especially imperative that any action we can bring about to remedy the situation should be taken and will certainly be of help, not only to mining, but to other industries as well.
>
> As Senator Lewis recently stated at the Hurley dinner, in Congress alone 1000 bills were introduced last year, of which 700 affected general interests. It seems to me the chief occupation of Congress should be to eliminate all bills except those that bear the stamp of necessity, rather than to add more to the present number. There is no question that we should have more business men and fewer lawyers in our legislative halls.
>
> CARL SCHOLZ,
> President, American Mining Congress.
>
> Chicago, Ill.

Mr. Scholz has explained clearly, Coal Age, Jan. 9, p. 93, Letter No. 18, that this suggestion is not to be taken as advocating the principle of lobbying for any purpose of exerting an undue influence on legislators, but rather and only to give information that would make lawmakers more competent to judge of mining matters from a practical standpoint.—Editor.

The Layland Mine Explosion

Letter No. 3—After reading the numerous references and comments relating to the deplorable Layland mine explosion of Mar. 2, I feel it my duty as one of the apparatus party that reached the 42 miners barricaded in the tenth-left heading of No. 3 mine to give briefly a few facts of personal knowledge of the conditions and work performed at that time. In doing this I want also to correct the mistake that has been made in many of these references in regard to the apparatus used by the rescuers. There were no helmets worn, as has been stated, but breathing apparatus was used instead.

In my experience of 27 years as a coal miner in England and in this country, which has included many mine accidents and explosions, I have never known the ill-feeling and controversy that this disaster has aroused. The miraculous escape from death of so many entombed men should rather excite feelings of the deepest gratitude to Almighty God. Instead, however, it seems that a strife has arisen as to who should receive the greatest credit.

Statements have been attributed to men who I had supposed were too big and broad-minded to argue over such a matter. I cannot feel that it would be right to keep silence and permit my comrades and myself to be accused of cowardice when we knew in our hearts we were doing everything possible to be done at the time. Men who have never worn a 42-lb. apparatus on their backs are often heard to say what they could do with the same; but men who have had the actual experience in the face of danger are never boastful of what can be accomplished.

With this preliminary, permit me to state that our party of 11 volunteers from the United States Coal & Coke Co., at Gary, W. Va., were authorized by our General Manager O'Toole to make the 300-mi. trip necessary to reach Layland and to do what we could for our fellow-miners entombed in that mine. We reached the mine the day following the explosion and worked side by side with the Bureau of Mines apparatus-men every day from Wednesday evening until Friday night, when we were withdrawn from the mine so that the air current might be reversed, as I will explain shortly. It was the following morning, Saturday, Mar. 6, that 47 men escaped from the mine alive, having barricaded themselves immediately after the explosion occurred, in a portion of the mine not yet explored.

In what I have to say I want it clearly understood that Earl A. Henry, Chief of the Department of Mines, and General Superintendent Bertolet, of the New River & Pocahontas Consolidated Coal Co., were in complete control of the rescue work, and all those who went into the mine for the purpose of rescue obeyed their orders. There were eight of us wearing breathing apparatus, and we made at least six explorations, advancing 1000 ft. ahead of the brattice-men, who were busy repairing stoppings and erecting brattices to conduct the air forward. In respect to the order in which the workings should be explored, we simply obeyed orders.

It will not be necessary to describe the work that was done in exploring the mine during the 60 hr. from the time of our arrival at the mine Wednesday afternoon to Saturday morning when the men walked out of the mine alive, further than to say that Chief Henry, Friday evening, ordered three of us, Mason, German and myself, all wearing apparatus, to explore the third-main entry as far as the sixth-left heading, a distance of 3000 ft., which was at the time the return air-course for that portion of the mine already explored, the air coming through the sixth-left entry from No. 4 mine and passing out through the main-third airway.

We obeyed this order and reported to Chief Henry and Mining Engineer James W. Paul that the air was fairly good as far as the sixth-left. It was then that Chief Henry ordered all parties out of the mine and had the fans stopped, to enable certain changes to be made so that the air could be reversed the following day, when it was proposed to explore No. 3 mine beyond the sixth-left. I am confident that this decision of Chief Henry was the means of saving the lives of the 47 men who came out of the mine the following morning.

Saturday morning, as previously stated, five men walked out of the mine from the ninth-left entry, where they had barricaded themselves after the explosion. They were met at the mine entrance by Mr. Paul, mining engineer of the Bureau of Mines. They knew nothing of the 42 men remaining in the mine, and it was in the hope of saving others, who might be similarly barricaded as these men on the tenth-left entry, that the apparatus-men were hastily summoned and sent into the mine.

There were eight of us wearing apparatus out of the 14 men who at once started into the mine to endeavor to reach the tenth-left entry, not knowing the condition of the mine beyond the ninth-left heading from which the five men had just escaped. The eight apparatus-men were as follows: German, Klier, Mason, Christian, Payne, Toshie, Kovacs and myself. German and his party were the first to reach the tenth-left, where they found a note at the switch, saying that there were 42 men alive in the tenth-left heading. A messenger was at once sent back with this word, and soon Mine Inspectors L. B. Holliday and R. B. Cobb came up and assisted to tear down the first of the two brattices which had been built across the mouth of the entry by the entombed men.

The first and then the second brattice were soon torn down, and we did all we could to help those 42 men and get them safely outside of the mine. It was a sight that I shall always remember. I know my own feelings were nothing but happiness and thankfulness that it was my good fortune to have some little part in restoring these men to their homes and families. This feeling was shared by all the men from Gary, as well as by those of the Bureau of Mines and the State Department of Mines, all of whom were devoutly thankful for having been of some little service to their fellows.

In closing, permit me to say that we cannot understand the seeming attempt that has been made to belittle the work of would-be rescuers, who asked nobody for praise or credit and desired no gold medals. May I say that it is hard for one who feels he has done his duty to have imputed to him, in the public press, cowardice or failure to do whatever was possible.

In the editorial that appeared in COAL AGE, Apr. 10, p. 645, the question seems to be implied, Why were not these 47 men discovered sooner? The same suggestion appears in a brief article, COAL AGE, Mar. 27, p. 549. Later developments, however, proved that it was an all-wise Providence that directed that these men should not be discovered until Saturday morning, when the air on the main-third entry had sufficiently cleared to make their escape possible through a distance of 3900 ft.

It would be hard indeed to say what would have been the result had the apparatus-men succeeded in reaching these barricaded men on Thursday or Friday, when the afterdamp yet filled the third-main entry. We doubt not that all would have died very shortly after the brattices that protected them were removed. The truth of this conclusion is proven by the fact that Angelo Aliprandi, who carried out the note to the main entry Thursday evening, 4:30 p.m., was overcome before he could make his way back and had to be pulled through the brattices by his comrades.

I am glad to say that Chief Henry and all his district inspectors worked tirelessly and courageously. They all seemed square, manly men, which is sufficient to disprove any adverse criticism. The rescue work following a mine disaster is a poor place to look for acts of cowardice, and the Layland mine was no exception to this rule.

I am glad to indorse the suggestion made in the Coal Age editorial, p. 645, that a suitable medal be awarded to the veteran who took charge of the 42 men, if the accounts be true, and prevailed on them to barricade themselves behind an improvised stopping and kept them brave and patient for four long dark days. Their names will go down in the annals of coal mining.

James Thirtle.

Gary, W. Va.

Electric Mine Laws

My attention was recently called to the inquiry of Fred Vinton, Coal Age, Mar. 20, p. 516, asking for an explanation of a rule in the electrical section of the bituminous mine law of Pennsylvania which reads as follows:

> For work underground, when supplied with current at a voltage higher than medium voltage, no transformer shall have a normal capacity of less than 5 kw.; nor shall a motor have a normal capacity of less than 15 b.hp.

As explained in the preamble to these rules, a "medium voltage" is understood in the law to mean any voltage over 300 and not exceeding 650 volts. The nearest commercial voltage to this requirement in electrical practice would be 2200 volts. In my opinion, there is a very good reason for limiting motors for mine use to a minimum size of 15 hp. and transformers to a minimum of 5 kw.

For example, if a smaller motor than that specified in the law is wound for 2200 volts the size of wire required would be so small that the construction would be too frail.

The same reasoning will apply to transformers. For example, a 1-kw. transformer has extremely small wire in the primary coil, and as it could readily be overloaded, the danger of a burnout is comparatively great. A 5-kw. transformer gives a wider margin for overload.

W. M. Hoen, Electrical Engineer.

East Pittsburgh, Penn.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

PUMPING FORMULAS

The formulas in common use in estimating the size, speed, capacity and power required to operate reciprocating pumps are developed from the well-known principles of mensuration. The following are the symbols employed:

H = horsepower required to operate pump;
G = water pumped or actual discharge (gal. per min.);
G_1 = theoretical capacity of pump (gal. per min.);
Q = piston or plunger displacement (cu.ft. per min.);
E = efficiency of water-end of pump;
S = piston or plunger speed (ft. per min.);
P_s = total pressure on steam piston (lb.);
P_w = total pressure on water piston or plunger (lb.);
D = diameter of steam cylinder (in.);
d = diameter of water piston or plunger (in.);
d_c = diameter of column or discharge pipe (in.);
d_s = diameter of suction pipe (in.);
p_s = unit pressure in steam cylinder (lb. per sq.in.);
p_w = unit pressure in water cylinder (lb. per sq.in.);
l = length of stroke (in.);
n = number of strokes per minute;
h = actual head or vertical lift (ft.);
h_f = friction head (ft.); . . . . . assume $f = 0.01$;
h_1 = effective head ($h + h_f + h_v$).

The most used and important of these formulas are the following, in the order of their development:

Piston or plunger speed $$S = \frac{nl}{12} \qquad (1)$$

Piston or plunger displacement, $$Q = \frac{0.7854\ d^2nl}{1728} = 0.00545\ d^2S \qquad (2)$$

Theoretical capacity, $$G_1 = \frac{1728\ Q}{231} = 0.0408\ d^2S \qquad (3)$$

Actual capacity or discharge, $$G = EG_1 = 0.0408\ Ed^2S \qquad (4)$$
(Assume E = 85 per cent.) $$G = 0.03468\ d^2S \qquad (4a)$$

Diameter of column pipe, (Assumed velocity, 400 ft.p.m.) $$d_c = \sqrt{\frac{G}{400 \times 0.0408}} = 0.25\sqrt{G} \qquad (5)$$

Diameter of suction pipe, (Assumed velocity, 200 ft. p.m.) $$d_s = \sqrt{\frac{G}{200 \times 0.0408}} = 0.35\sqrt{G} \qquad (6)$$

Diameter of piston or plunger, (Assume E = 85 per cent.) $$d = \sqrt{\frac{G}{0.0408\ ES}} = 4.95\sqrt{\frac{G}{ES}} \qquad (7)$$

Velocity in discharge pipe, (ft. per sec.) $$v = \frac{231\ G}{60 \times 12\ (0.7854\ d_c)} = 0.408\frac{G}{d_c^2} \qquad (8)$$

Velocity head, $$h_v = \frac{v^2}{2\,g} = \frac{(0.408\ G/d_c^2)^2}{2 \times 32.16} = \frac{G^2}{400\ d^4} \qquad (9)$$

Friction head, (Vertical lift) $$h_f = \frac{f\,hG^2}{8\ d_c^5} = \frac{hG^2}{800\ d_c^5} \qquad (10)$$

The Coal Age Pocket Book

Effective head, ($h_1 = h + h_f + h_v$) $$h_1 = h + \frac{G^2}{800\ d_c^4}\left(\frac{h}{d_c} + 2\right) \qquad (11)$$

Static water pressure, $$p = \frac{62.5\ h}{144} = 0.434\ h \qquad (12)$$

Working pressure, $$p_w = 0.434\ h_1 \qquad (13)$$

ESTIMATING FOR PUMPS

In pumping, the effective work of the steam-end per minute is equal to the work performed in raising the weight of water discharged each minute through a height equal to the effective head. Assuming an efficiency of 75 per cent. for the steam-end,

$$0.75\ (0.7854\ D^2)\ p_sS = \frac{62.5 \times 231}{1728}\ Gh_1$$

Again, assuming a water-end efficiency of 85 per cent.

$$0.85\ (0.7854\ d^2)\ 12\ S = 231\ G$$

Then, dividing the first of these equations by the second, member by member, it is possible to estimate the ratio of the diameter of the steam-end to that of the water-end of the pump, for a given effective head and a given steam pressure in the cylinder; thus,

Diameter ratio, $$\frac{D}{d} = 0.7\sqrt{\frac{h_1}{p_s}} \qquad (14)$$

Diameter of water-end, $$d = \sqrt{\frac{231\ G}{0.85 \times 0.7854 \times 12\ S}} = 5.37\sqrt{\frac{G}{S}} \qquad (15)$$

Diameter of steam-end, $$D = 0.7\sqrt{\frac{h_1}{p_s}} \times 5.37\sqrt{\frac{G}{S}} = 3.76\sqrt{\frac{G\,h_1}{S\,p_s}} \qquad (16)$$

Assuming, as before, an efficiency at the steam-end of 75 per cent., the horsepower required to operate a pump that will discharge G gallons of water per minute against an effective head h_1 in feet is calculated as follows:

Horsepower required, $$H = \frac{62.5 \times 231\ G\,h_1}{0.75 \times 1728 \times 33{,}000} = 0.00034\ G\,h_1 \qquad (17)$$

The steam pressure required at the throttle to operate a pump of given dimensions against a given effective head h_1 is found by transposing formula 14; thus,

Steam pressure required, $$p_s = \frac{h_1}{2}\left(\frac{d}{D}\right)^2$$

Speed of Reciprocating Pumps—It is usual pump practice to estimate on a piston speed varying from 50 to 100 ft. per min., depending on the size and style of pump and numerous other conditions relating to the head or pressure against which the pump is to operate, quantity of water to be pumped, length of stroke, etc.

In general, the smaller sizes of reciprocating pumps have naturally a shorter stroke and, although run at a higher speed (r.p.m.), have a less piston speed in feet per minute, than the larger sizes, which make a less number of strokes but have a greater piston speed.

Inquiries of General Interest

Capacity of Double-Acting Pumps

Will you kindly explain what is meant by a "double-acting" pump and what is the stroke of such a pump. Also, show how to calculate the capacity of a double-acting pump when the diameter of the plunger is 20 in. and the length of stroke 40 in., assuming the pump is running at a speed of 25 r.p.m.

PUMP-RUNNER.

Greensburg, Penn.

A double-acting pump is one that pumps water at each stroke of the piston or plunger. Water is drawn into one end of the pump barrel at the same time that the water in the other end is driven out into the discharge pipe.

The stroke of a pump is the distance through which the piston or plunger moves. A pump makes two strokes to every complete revolution of the flywheel.

As shown in the accompanying diagram, which illustrates the action of a double-acting piston pump, water enters the pump through the suction pipe *S*. As the piston moves to the right, a partial vacuum is formed in the left end of the pump barrel, and the atmospheric pressure forces the water up the suction pipe and through the valve *A*. At the same time, the water in the right end of the pump barrel is forced out through the discharge valve B_1 and passes into the discharge pipe *D*.

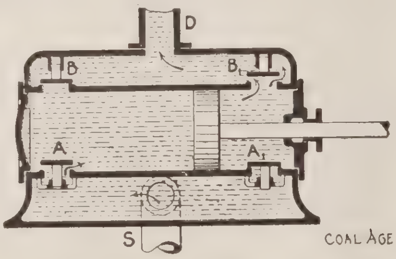

DIAGRAM OF DOUBLE-ACTING PISTON PUMP

The succeeding stroke of the piston as it moves to the left promptly closes both the suction valve *A* and the discharge valve B_1, while at the same time the suction valve A_1 and the discharge valve *B* are opened. The conditions are now reversed, and the water entering the pump through the suction pipe *S* passes through the suction valve A_1 into the right end of the pump barrel, while the water in the left end is driven out through the discharge valve *B* and passes as before into the discharge pipe *D*. The action of the pump is such as to produce a continuous discharge.

In order to find the capacity of a pump, it is necessary to calculate the piston or plunger displacement in cubic feet per minute or gallons per minute, as desired. The piston or plunger displacement is found by multiplying the sectional area of the piston or plunger by the length of stroke and that product by the number of strokes the pump makes per minute. Thus, in this case,

$$G = \frac{50 \times 40\,(0.7854 \times 20^2)}{231} = 2720 \textit{ gal. per min.}$$

It is customary to assume an efficiency of the water-end of a pump as varying from 80 to 85 per cent. In this case assuming an efficiency of 85 per cent., the actual capacity of this pump will be $0.85 \times 2720 = 2312$ gal. per min.

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Two Questions on Gases

A practical miner has asked me some questions that I would be pleased to see answered in COAL AGE. They are as follows:

1. How much carbon monoxide is present in the exhaust of a gasoline mine motor when it is suddenly moved into an atmosphere containing enough carbon dioxide to seriously affect the efficiency of the engine?

I understand this question to mean the *relative* amount of carbon monoxide in such an atmosphere, as compared with the amount that would be produced in an atmosphere free from carbon dioxide.

2. What effect has gas pressure on black powder in drill holes after they have been tamped, in the interval between charging and firing?

This last question assumes that a strong gas pressure accumulates in the hole and is exerted on the powder after the hole is tamped.

PRACTICAL COAL MINER.

Springfield Ill.

The statement of the first question is quite indefinite, as no indication is given of the extent to which the efficiency of the engine is impaired; but even if it were to be assumed that the efficiency is decreased by a certain percentage, it would still be impossible to estimate how much this condition would increase the percentage of carbon monoxide in the exhaust of the engine. For these reasons the question can only be answered in a general way.

As stated in COAL AGE, Vol. 6, p. 840, the quantity of carbon monoxide produced in the cylinder of a gasoline engine will depend largely on the supply of available oxygen. Under normal running conditions, the exhaust of the engine contains about 6 per cent. of this gas, according to a statement made by O. P. Hood, Chief Mechanical Engineer of the Federal Bureau of Mines, in his paper read at the October, 1914, meeting of the American Institute of Mining Engineers. It may reasonably be assumed that a percentage of carbon dioxide in the mine air sufficient to seriously affect the efficiency of the engine would result in greatly increasing this percentage of carbon monoxide in the exhaust gases; but the amount of this increase cannot be estimated without more accurate data.

In answer to the second question, it may be stated that the gas pressure would have no effect on the black powder of the charge in the hole. However, the presence of this gas under considerable pressure would produce a very pronounced effect when that charge of powder is exploded. The explosive effect would be greatly increased by the presence of the compressed gas. Probably the greatest effect, however, would be the extension of the flame of the explosion by reason of the presence of the gas.

Examination Questions

Pennsylvania Bituminous Mine Foremen's Examination, April 6-8, 1914

(*Continued from last issue*)

Ques.—State briefly the duties of a driver, motorman, cager, triprider and miner.

Ans.—A driver in a mine is required by law to always leave his trip in a safe place where it will not endanger other drivers or get loose and do possible damage. He must so adjust the brakes or sprags as to keep his cars under complete control. He must not allow any person to ride on a loaded car and must see that every door is closed after passing through it.

It is the duty of a motorman to look after the locomotive in his charge and permit no one to handle it but himself. He must not exceed the speed permitted by the mine foreman and must sound the whistle or other alarm when approaching switches or crossings where danger to men or animals may exist. When running the locomotive he must keep a sharp lookout ahead to see that the road is clear and the track safe. He must permit no one but his attendant to ride on the locomotive. He must see that the motors, cables and controlling parts are kept clean and in safe condition and that the headlight is burning properly when running the locomotive.

The cager at the bottom of the shaft must not attempt to remove the car from the cage or put another car on until the cage comes to rest on the bottom. When placing a car on a cage he must see that the springs or other fastenings hold the car securely from moving. The cager must not allow anyone to give signals for the movement of the cage when he is in charge.

A triprider must see that all cars are properly coupled and that the ropes are in place and attached to both ends of the trip before starting the same by giving the signal. He must examine all rope connections, chains, links, etc., to see that they are in perfect condition and report any defects he may find. He must not allow any person to ride on the full trip or on an empty trip without permission of the mine foreman. He must see that the speed of the trip does not exceed 6 mi. per hr.

The miner is required by law to examine his working-place before beginning work and take down all dangerous slate or make it safe by timbering. He must examine to see that the fireboss has left his mark at the face each morning and, not finding the same, notify the mine foreman or his assistant. If his place becomes dangerous from gas or bad-roof conditions, he must cease working at once and, placing a suitable warning or danger signal across the entrance, proceed to inform the mine foreman or his assistant of the danger.

The miner is required by law to mine his coal properly before blasting and to set sprags under the coal while undercutting the same. He must examine carefully the roof and coal after firing a shot and make his place safe before starting to work. He must order what props and cap-pieces he may need, at least one day in advance. The law prohibits the use of coal dust or other combustible material for tamping. The miner is not allowed to charge or fire any shots in a place liable to generate explosive gas, except with the consent and under the supervision of the foreman, his assistant or other competent person who is duly authorized. The law requires the miner to remain in his working-place and not to leave the same to go to another working-place without permission of the mine foreman or his assistant.

Ques.—What is the area of an airway 8 ft. wide at the top, 10 ft. wide at the bottom and 7 ft. high?

Ans.—The average width of this airway is $\frac{1}{2}(8 + 10) = 9$ ft. and the sectional area of the airway is therefore $7 \times 9 = 63$ sq.ft.

Ques.—How much air is passing in the airway, in the last question, when the anemometer makes 165 r.p.m.?

Ans.—This reading of the anemometer, for all practical purposes, indicates a velocity of the air current of 165 ft. per min. The quantity of air passing in the airway is therefore $165 \times 63 = 10{,}395$ cu.ft. per min.

Ques.—What are the chief causes of mine fires and how would you proceed to guard against them?

Ans.—The chief causes of mine fires are the accidental ignition of gas blowers when blasting coal; or the ignition of fine coal and slack by spontaneous combustion in waste and abandoned places in the mine; or the use of open lights in stables, pumprooms, enginerooms and other places where hay, waste and like combustible material are used; or by the short-circuiting of electric currents, or the blowing out of fuses, or the ignition of gas by the sparking of wires. Mine fires may result from a local explosion of gas or dust at the working-face.

The best safeguards against mine fires are the prompt removal of the possible causes of fire, by loading out all fine coal and slack, the use of protected lights in stables, pumprooms, etc., and the enforcing of strict rules in reference to blasting and gas.

Ques.—The water gage being 1 in. and the volume of air in circulation 50,000 cu.ft. per min. in a certain mine, what will be the volume of air in circulation in this mine when the water gage is increased to 1.6 in., the increase being due to an increase of power on the air?

Ans.—Since the increased water gage is due to an increase of power, and not to any change in the mine airways that would cause an increased resistance, the quantity varies as the square root of the water gage. In other words, the quantity ratio is equal to the square root of the water-gage ratio. Then, calling the required quantity of air x, we have

$$\frac{x}{50{,}000} = \sqrt{\frac{1.6}{1}} = \sqrt{1.6} = 1.265$$

and $x = 50{,}000 \times 1.265 = 63{,}250$ *cu.ft. per min.*

Book Reviews

A Manual of Shaft Sinking

THE SINKING OF SHAFTS. Vol. II of Modern Practice in Mining. By R. A. S. Redmayne, Chief Inspector of Mines in Great Britain, late professor of mining, University of Birmingham. pp. xiv + 270 + 5 index; 5½x8¾ in. 172 ill., 2 being folded charts. Longmans, Green & Co., 443 Fourth Ave., New York City. Price, $2.25, cloth boards.

There is no more comprehensive and authoritative book on shaft sinking than this volume by R. A. S. Redmayne. It is well illustrated throughout, and only about two dozen of the cuts are halftones. The greater part of the illustrations are line-cuts, which involve more labor and expense to the author and publisher, but which tell their lesson so much more completely, rapidly and accurately.

A Shaft Mine with about Three Acres of Territory

Mr. Redmayne does not spend much time on the history of shaft sinking, but the following note will be found of interest:

> Up to the time of the invention of the atmospheric engine in 1810 by Thomas Newcomen, mine shafts were much limited in point of depth by reason of the difficulties in raising the water. The maximum depth attained by colliery shafts in Great Britain was about 360 ft., their diameter being seldom, if ever, more than 7 or 8 ft., and the area of coal worked by one shaft rarely exceeding a radius of 200 ft. with the shaft as a center. Fifty years later, amid great rejoicing, Walker colliery, on the banks of the Tyne, was sunk to the Main-Coal seam, at a depth of 600 ft. from the surface, a medal being struck to commemorate the event.

The Deepest Shaft

From such shallow shafts the coal industry has progressed until now there is one, the Providence shaft in Belgium, No. 18 pit, Machienne collieries, which, Mr. Redmayne states, is 3937 ft. to the bottom of the sump and which in 1908 had its lowest hoisting level at 3707 ft. Of course this depth is exceeded in several metal mines, notably the No. 5 shaft of the Tamarack copper mine in northern Michigan, which, by the way, is deeper than No. 3 shaft of the same Tamarack Mining Co., though the latter is declared by Mr. Redmayne to be the deepest in the world.

The No. 5 shaft is 28 ft. over a mile in depth, or 5308 ft. The shallower shaft reaches a depth of 5253 ft., and in the workings there is a blind slope on the dip of the bed, 800 ft. from the main shaft, which is 406 ft. long. So No. 3 shaft, though not as deep as No. 5, gives access to an even profounder depth. Apparently the Ashton Moss coal shaft in Lancashire is the deepest in England, with a depth of 2880 ft.

The author in his introduction discusses the position, shape, size and requisite number of shafts on a mining property. In the next chapter he deals with elementary methods of sinking. The third chapter discusses drilling and blasting. Then follows a description of the processes of sinking and lining shafts. Another chapter is devoted to drainage, ventilation and sinking and is followed by yet another in which the arrangements for sinking and the costs of sinking and lining are discussed at length.

Methods of Shaft Sinking

The methods described in the last two chapters are extremely interesting, though for the most part they reflect conditions far more severe than those with which we have to cope in America. The first systems described are those using wood and steel piling. In the latter the shapes used by the Interlocking Channel-Bar Co., of Chicago, and by Charles Walker, of England, are described. Here it might be pointed out that more space might have been devoted to American sheet-piling methods. The author has not given them the attention they deserve. Then follows an account of the system of Haniel & Lueg, in Düsseldorf. One of the drawings illustrating this German method we have reproduced, and it accompanies this article.

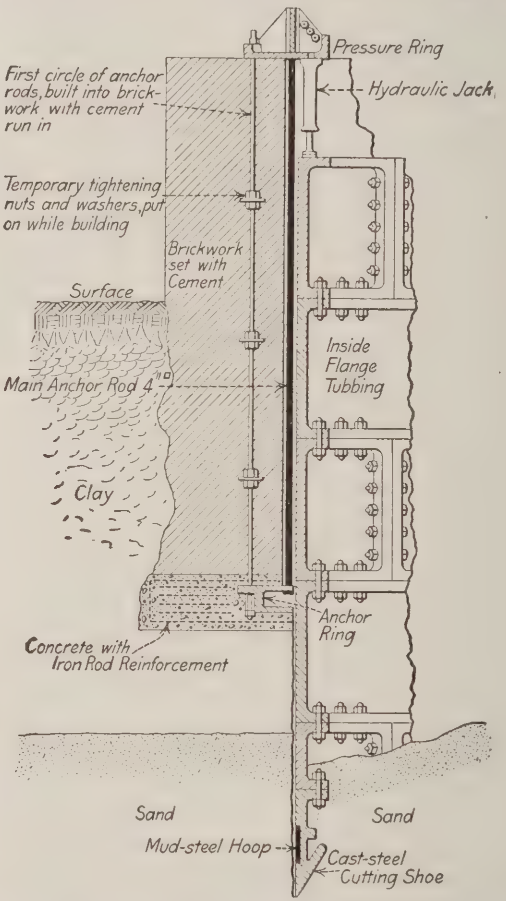
The sand shown in the lower part of the illustration lies so near the surface that it is necessary to build up the shaft with brickwork set in cement so that there may be sufficient weight against which the hydraulic jacks may be braced in pressing down the cutting shoe into the water-logged sand. The sand is removed by hand or by a clamshell bucket. In some cases a peculiar device called a sack-borer is used; this scheme though old has been greatly improved by Sassenberg & Clermont.

Sinking under Water

The Haase system uses a piling of wrought-iron tubes; the Honigmann method drills the shaft under a pressure of muddy water which prevents the sides from caving. At the same time a current of water is established in a pipe which forms the spindle of the boring tools. This water rapidly removes the sludge formed by the action of the cutting edges, and this is aided by the lifting action of air, which is discharged within the pipe mentioned. Of course this device is suited for work in quicksands only.

Some Percussive Methods

The Pattberg percussive borer is a large tool occupying the full diameter of the shaft. It cuts and crushes the soft rock. The cuttings are washed from the cutting faces by water under a pressure of about 1000 lb. per sq.in., and air, compressed to 1100 lb. per sq.in., lifts these cuttings from the shaft. The borer has a stroke of 8 to 12 in. and makes 60 to 70 strokes a minute.


Pressure Ring
First circle of anchor rods, built into brick-work with cement run in
Hydraulic Jack
Temporary tightening nuts and washers, put on while building
Brickwork set with Cement
Surface
Inside Flange Tubbing
Main Anchor Rod 4"
Clay
Anchor Ring
Concrete with Iron Rod Reinforcement
Sand
Sand
Mud-steel Hoop
Cast-steel Cutting Shoe

HANIEL & LUEG'S SYSTEM OF ADVANCING SHAFT KNOWN AS THE SINKING-DRUM PROCESS

The well-known Kind-Chaudron method, where the rock is drilled by a giant trepan, later receives attention. It also hails from Germany. Another German device is a shaft-boring apparatus worked by intermittent hydraulic pressure called by the author "shock." There are six bits which are so operated. The pressure is switched on or off by a valve which controls all the boring bits at once. The pressure is opposed by retractive springs which lift the bits when the hydraulic pressure is relieved. The cuttings are removed by the flushing of water.

The pneumatic or compressed-air system, which might be better described as the caisson method, is also discussed. This was invented by a Frenchman over 60 years ago.

The process of preparing a shaft for sinking by cementing the measures around it was first tried in the Béthune colliery in Pas-de-Calais, now just within the British army lines. The congelation process, in which the measures are frozen, was invented by Poetsch in 1883, though the process in a modified form had been tried in Wales as far back as 1862.

The author says nothing about methods of cementing the cracks in the measures in sinking nor about the sealing of shafts by pumping cement mortar or other material into the measures around the shaft. In fact, while Mr. Redmayne shows a somewhat complete knowledge of European practice, he does not seem to be as well acquainted with American methods.

Costly Shaft Sinking

A quotation from page 2 of this volume may well conclude this review. It shows clearly how great the problem of shaft sinking is in Europe and why invention has been so greatly stimulated, especially on the Continent.

> A still more costly sinking was recently made in Belgium, where the putting down and lining of two pits through 1968½ ft. of water-bearing strata cost about $2,338,000 and a further 338 ft. in coal measures cost about $20,000, or a total cost of roughly $2,358,000—equivalent to nearly $511 per ft. sunk and lined. The full cost in sinking and equipping the colliery amounted to $3,394,000.

A book like the one we are reviewing it would not pay to write in America as the demand for it is so limited. For this reason we believe no legislation should be passed restricting the importation of foreign books. While they describe oftentimes processes of much value to a few people in America who have great need of them, a book about such methods is not of such general interest that native talent is likely to be engaged in writing it.

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A Pioneer in Mine Accident Prevention

GREAT COLLIERY EXPLOSIONS AND THEIR MEANS OF PREVENTION. By W. Galloway. pp. viii + 130. 5⅝x8½ in. 24 ill. and 11 plates. The Colliery Guardian Co., Ltd., 30 and 31 Furnival St., Holborn, London, E. C., England, 1914. Paper cover.

This book being in small type contains an immense amount of information. It is a reprint of papers mostly read before British societies by the author, the first dating back to 1872. Many of these are printed here at greater length than in the societies' proceedings. The relation of Mr. Galloway to the present state of knowledge regarding mine explosions is most intimate. The industry owes him a great debt for his work.

An Article in 1872 on Explosions as a Result of Weather Conditions

The first paper discusses most completely the connection between explosions in collieries and weather, Robert H. Scott, the Director of the Meteorological Office, collaborating with him in its production.

Another paper on the same subject followed in the next year, being read before the Meteorological Society. In those days the importance of barometer and temperature readings was far greater than today, for the ventilation was either natural or only feebly assisted. Fans such as the Waddle were just beginning to be introduced. Consequently the weather conditions needed close observation.

In 1874 Mr. Galloway addressed the Royal Society on his experiments with safety lamps, some of which on the protective action of gauze dated back to early in 1872. He urged in this paper the effect of the sound wave in aiding the passing of a flame through gauze. A description of the explosion in the Llan colliery near Cardiff, reprinted from an issue of "Iron" in 1878, then follows in which the author discusses the influence of coal dust in extending explosions and even starting them if any gas is present. This article is followed by several from the "Proceedings" of the Royal Society, 1876 to 1884, on the influence of coal dust in colliery explosions.

Galloway Urged Stone-Dusting in 1896

Before the Royal Commission on Explosions from Coal Dust in Mines in 1891, Mr. Galloway urged the using of dust-tight mine cars, and in a letter addressed to the London "Daily Chronicle" in 1896 he says:

> I would suggest that the adoption of one or the other of the following alternatives be made compulsory in every dry and dusty mine: (1) All roadways along which coal is being hauled from the working-places to the shaft shall be kept damp continually, and all roadways which have ever been, but are no longer, used as haulage-roads shall have the coal dust cleared from them and be thereupon liberally coated all over with fine dried clay dust. (2) All roadways which are, or ever have been, used for the purpose of hauling coal shall be coated with dried clay dust throughout their entire length and a similar coating shall be applied from time to time at regular stated intervals to all roadways which continue to be used as haulage-roads.

We are unable to understand why this book was published. A reprint is never so satisfactory as a new and uptodate statement of facts. If it is a defense of Mr. Galloway's work as a pioneer it largely fails to produce the right effect, because the author merely reprints his papers without any statement relative to their originality or to the opposition they aroused.

Anyone at all well acquainted with the chronological history of mining will realize, however, that Mr. Galloway has been in the forefront for many years and is one of the original thinkers among the many which the mining profession of Great Britain has produced.

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An Institute Issues Its Proceedings Monthly

WEST VIRGINIA COAL MINING INSTITUTE BULLETIN.—E. N. Zern, editor, Morgantown, W. Va. pp. 40. 6x9 in., 2 ill. Paper cover. Monthly issue.

We welcome a new child to the large family of coal-mining publications. The mining industry will surely "not be ashamed when it meets its enemy in the gate" with such a bunch of healthy children if this last born is a fair sample of the others.

The editor under the head, "A Patient, a Prescription and a Plea," most aptly describes the reason why the bulletin was started. It was founded as a last resort when the institute support failed, as has happened all too frequently in other states of recent years. Some of us who believe it takes a little fortune to start a paper of course are not convinced that it is a job for a deficit to tackle, and some of the editors of this paper and of other state institutes are going to put E. N. Zern on the "unfair" list for undertaking to publish a bulletin on the pittance of a state institute editor, especially to venture with such a compensation to put such a generous amount of care and good will into his work.

Is the Survey of West Virginia to Be Discontinued?

In the columns of this new periodical, Dr. I. C. White discusses the work of the State Geological Survey and deplores the fact that the necessary funds for its continuance may not be received from the state. Nineteen counties out of 55 are not yet surveyed geologically, and one-fourth of the whole area of the state has not been mapped topographically. As Dr. White says, "It is simply inconceivable that the legislature should stop the survey permanently and thus commit such a great injustice to the 13 counties of the state which have borne their share of the cost of making the 36 completed 'detailed county surveys' and of the topographic surveys in the 40 completed counties."

Tribute to Fred Keighley

"Stray Currents" is a series of short editorials ending with a tribute to Frederick C. Keighley, of Uniontown, Penn. Those who knew him—and few there were in Pennsylvania and West Virginia who did not—recognize the justice of the statement, "He was a leader in thought, progressive in action, a light to the industry and an inspiration to all favored with his friendship."

Two papers from the December meeting follow—one by Richard Smethurst on "Cost and General Accounting" and one by Frederick C. Keighley on "A Contemplated Method of Meeting the Difficulties Encountered in Mining Coal under Friable Roof in Connection with a Very Soft Floor or Bottom."

The "Ring of Steel" Around West Virginia

A cartoon originated by Wightman D. Roberts and drawn by M. B. Aleshire, a Huntington cartoonist on the Chicago "Tribune," shows West Virginia surrounded by enemies in Ohio and Pennsylvania. Mr. Roberts has great respect for the preparedness of his rivals, depicting them with a large mortar, a big armored motor car, protected with a Red Cross flag, many shells and an aëroplane. The West Virginians are taken entirely unprepared and are seen sitting on benches. They have only Mother Jones, a hound and much gas at 5c. per thousand cubic feet wherewith to asphyxiate their opponents. The "Bulletin," we suspect, is not neutral. When we see the genial smiles on the faces of the Pennsylvania coal operators we really believe that trouble may yet be averted.

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It is the custom at many collieries, as pointed out by A. Mitton Dury in a paper before the Manchester Geological & Mining Society, to drive ahead narrow roads for prospecting. Blowers of gas often discharge in such narrow roads, and this gas may be distributed along the course of the workings to points where shots are being fired. Mr. Dury asks if it would not be wise to provide that, where a road is not in use at any time, it shall be kept entirely free from gas or be so built off that no dangerous quantities can escape.

Coal and Coke News

Harrisburg, Penn.

The Senate, on Apr. 21, passed finally the Catlin Bill No. 160 to bring anthracite miners under the proposed workman's Compensation Act. The final effort of the operators was to amend the bill regarding the definition of a miner, it being their contention that the bill, as finally amended on Apr. 20, was by far too severe.

According to the bill the term "miner" means the person who cuts or blasts coal or rock at the face of a gangway, airway, breast, pillar or other working place. The operators wanted this definition to include also any person engaged to do general work in a mine and qualified to do the work of a miner.

Another thing fought for by the coal companies was to keep the new act from becoming operative until Jan. 1, 1916.

The bill now goes to the House where the miners do not anticipate any serious trouble, for in the past this body has always been favorable to the miners, and the Senate, the pit in which all mining bills perished.

The Catlin bill accomplishes the following for anthracite workers.

1. Makes the mine operators responsible for injury to a workman if the injury is caused by the negligence of the mine foreman, assistant mine foreman or any person in charge of the mine or any part thereof. This places the mine operator in the same position as all other employers with respect to liability.
2. The anthracite coal miners go under the workmen's compensation law, if such law is enacted.
3. The word "miner" is positively defined.
4. An adult member of the family of a man killed in the mines has the right to examine witnesses at a coroner's inquest and counsel for the family also has the right and may explain the law to the coroner's jury.
5. None others than miners will be allowed to fire blasts.

Amount and Distribution of Coal Tax Still Indefinite

Nothing definite resulted at the conference of the representatives from the anthracite counties with the Ways and Means Committee, with respect to the amount and distribution of the tonnage tax, as covered by the Dawson bill, but there were several important developments.

One is that the Governor is standing by his proposition to have the distribution 60 per cent. to the state and 40 percent. to the anthracite counties.

The other is that it has not been decided whether the amount of tax under the Dawson bill shall be 2½ or 3½ per cent. ad valorem.

The committee also gave a hearing to the operators to protest against any increase in the anthracite tonnage tax levy, and incidentally to bear witness that the Roney Act of 1913 is a burden.

One of the most remarkable arguments on behalf of the coal companies was made by W. H. Williams, vice-president of the Delaware & Hudson Co. of New York. He emphasized these points. That in spite of the immense dividends, the Lackawanna Coal Co. is earning only 4½ per cent. on its capitalization; that the coal companies have not increased the price of coal during the past 10 years, that the approaching termination of the miners' agreement will mean increased costs in production, and finally, that the legislature will impose upon consumers of coal an increased price of 10 cents merely by the enactment of the workmen's compensation bill.

Mr. Williams' explanations of the slim earnings, in spite of the occasional melon cut in Wall Street, was that this company was able to pay large dividends for the reason that money earned in previous years had not been expended, and the surplus has always been large. The Hudson company is paying taxes on $20,000,000 worth of property, when its capitalization is $43,000,000, but this capitalization, he said, included some railroad property.

Major Everett Warren, James H. Torrey and Ex-Judge Frank Wheaton presented arguments to show that the imposition of the tonnage tax is a burden which is causing lessees of coal land actually to lose money, as in many cases the coal royalties paid do not overbalance the anthracite tax, amounting to 7 cents a ton.

Mr. Torrey insisted that the coal companies are being over burdened, the Hudson company, he said, is earning less than 6 per cent. and now the Catlin bill will make the operators liable for damages for injury to the workmen, and the operation of such an act would increase the cost of coal 10 cents a ton. This statement is made in contradiction to the assertion of the Attorney General at a hearing some time ago that the compensation cost could be met by one cent a ton increase.

It was also brought out that coal company taxes had jumped five times in 10 years.

Vice-President Williams of the Hudson company said that while in 1902 the cost of production advanced 17 per cent. by reason of the strike, and that in 1912 another increase amounted to 7 per cent., the price of coal remained stationary at tidewater. The smaller sizes of coal are sold, he said, for less than the cost of production. Companies are selling less steam sizes than three years ago because of competition with bituminous coal and coke and that at the present time anthracite conditions are chaotic. "We have stored 236,000 tons of coal in the winter months," he said significantly. "The wage agreement with the miners comes up next year and we must protect ourselves against a strike."

One of the reasons for hard times in this country, Major Warren says, is the anthracite tonnage tax. The retailers say they find lessened opportunity to sell anthracite, people shake their grates less frequently and the result is a decreased production. "The companies I represent mined 1,000,000 tons less in one month as compared with a year ago. At the ground of all assaults upon anthracite companies is the increased price. We are charging too much. You add a tonnage tax. The result is a lessened production."

Commission to Investigate Rise in Coal Prices

Senator Vare has introduced a joint resolution, providing for a commission to investigate and report on the increased cost of anthracite coal alleged to be due to the tax imposed in 1913, which reads as follows:

Whereas . . . An act laying a tax on anthracite coal and providing for the collection and distribution of the same, the tax or two and one-half per cent. was imposed upon the value when prepared for market of every ton of anthracite coal which said tax did not on the average exceed five cents per ton and

Whereas, The operators of the anthracite coal mines, although refusing except in a few isolated instances to pay tax or any part thereof and although contesting the validity thereof in the courts, and it having been stated publicly in the press of the state and not denied that they have combined either among themselves or with retailers to raise the price of anthracite coal and did actually raise said price 25 cents per ton, upon the pretense, that the said amount was for the purpose of paying said tax, therefore:

Be it enacted, etc. That a commission of three be appointed by the Governor to serve without compensation to investigate the cause of causes of the rise of said price of anthracite coal, either by operators of anchracite mines or dealers in anthracite coal, whether the same was justified or not, and whether the same was done as a result of any illegal combination or confederation upon the part of the operators of anthracite coal mines or dealers in anthracite coal, and investigate and report all other facts and circumstances in reference thereto, said commission to report to the Governor on the first of January, 1916, and make a further report to the Governor and to the Legislature on the first day of January 1917.

For the purpose of enabling said commission to carry out and perform its duties, the said commission shall have the right to sit in any part of this Commonwealth and shall have power to compel the attendance of witnesses and the production of books, papers and other evidence at the meeting of the commission and for that purpose may issue subpoenas signed by the president of the commission and cause the same to be served and executed in any court of the Commonwealth and if any witness refuses to testify any fact within his knowledge or to produce any books or papers within his possession or under his control, the secretary of the commission shall forthwith report the facts and of such refusal to the court of Common Pleas of the county wherein such witness resides or wherein his attendance was required and all questions arising upon such refusal shall at once be heard by said court. If the court determines that the testimony or evidence required by such witness is legal and properly competent and ought to be given or produced by him, then said county shall make an order commanding such witness to testify or produce books or papers or both as the case may be and if such witness shall thereafter refuse to testify or produce books or papers as aforesaid in disobedience of such order of the court, then the said court shall have the power to order the commitment of such witness to the county jail of the proper county for contempt.

The sum of $10,000 is appropriated for the expenses of the commission.

The bill to bring clay, ore and graphite mines and stone, slate, marble and granite quarries of the state under the supervision of the Department of Mines, and to be inspected by the various mine inspectors has been so amended, that the real purpose of the bill is killed. Section 1 reads as follows: "That on and after the passage of this act the clay quarries or mines of Pennsylvania in which bituminous coal is also mined shall be operated under the supervision of the State Department of Mines and shall be subject to such rules and methods of operation as may be recommended by the Chief of the Department of Mines in accordance with such provisions of the coal mine laws of the state as may be found applicable to the supervision of clay quarries or mines." The words ore and graphite mines and stone, slate, marble and granite have been stricken out.

The bill creating a Division of Boiler Inspection in the Department of Labor, and regulating the inspection of steam boilers has been so amended that Section 4 of this bill, now reads "Provided, That nothing in this section shall refer to boilers in cities of the first, second and third class and in those counties for which special laws have been enacted for the inspection of steam boilers and boilers in use at or in connection with coal mines.

Concerning Stream Pollution

Senator Crow has introduced a bill to amend Section 16 of the Act of May 1, 1909, which will no doubt be closely watched by bituminous interests, as several suits have been started by state fish wardens against coal operators in the western part of the state for violations of this act. The amended section is as follows: "That it shall be unlawful for any person to put or place in any waters within the Commonwealth any electricity or any explosive or poisonous substances whatsoever or any drug or any poison bait for the purpose of catching, taking, killing or injuring fish or to allow dye stuff, coal or gas tar, coal oil, sawdust, tan, etc., to be turned into or allowed to run, flow, wash or to be emptied into any of the waters aforesaid, unless it is shown to the satisfaction of the commissioner of fisheries or the court that every reasonable and practical means have been used to prevent pollution of waters in question, by the escape of deleterious substances. In the case of the pollution of waters by substances known to be injurious to fishes or to fish food, it shall not be necessary to prove that such substances have actually caused the death of any particular fish. Provided that nothing in this section shall prohibit the use of explosives for engineering purposes when a written permit has been given therefor by the proper national, state or municipal government and Provided further, That nothing in this act shall apply to waters pumped or flowing from coal mines into waters within the Commonwealth."

PENNSYLVANIA

Anthracite

Sugar Notch—Alarmed at the rapid spread of forest fires in this vicinity, Burgess John Riley issued a call on Apr. 21 to the citizens asking them to organize fire fighting forces to battle with the flames that threaten to destroy much valuable timber and probably damage the town. Two collieries operated by the Lehigh & Wilkes-Barre Coal Co. were in danger. They furnish employment for practically every male resident of the borough. Officials of the collieries called the employees to the workings and instead of sending them to their work inside the mines, organized the men and boys into fire-fighting brigades.

Wilkes-Barre—Examination of men who desire to qualify as candidates for mine inspectorships in Luzerne and Carbon Counties was conducted in the Court House on Apr. 20, 21 and 22. Twenty men took the examinations. The terms of all the mine inspectors expire this year and all are taking the examination. The candidates include the seven present inspectors, nine mine foremen, two miners, one former mine inspector and one assistant mine foreman. The Board of Mine Inspectors' Examiners who held the examination were John J. Hanlon, chairman, Patrick Dougherty and Daniel J. Bolton, practical miners; E. R. Pettebone and A. B. Jessup, mining engineers.

Tamaqua—During the year 1913 the Alliance Coal Co. operating the Kaska colliery near Middleport encountered a number of hindrances to the operation. Facing these conditions the operation was closed on Dec. 24, 1913. For several months the force of outside employees was kept cleaning up and shipping material to other collieries, the pumps were finally withdrawn and the shaft allowed to fill with water. This colliery adjoins the profitable and busy Silver Creek operation of the Reading company and since pumping has stopped, the latter colliery has felt the effects of the water from Kaska in some degree. In order to safeguard the men from possible drowning should the water break the barrier pillars between the two mines, the Reading company has a force of men drilling proving holes in the third level of Silver Creek shaft, to ascertain the exact thickness of the veins which lie between them and the water stored in the Kaska shaft. The presence of officials of the interested companies making tests at the abandoned shaft caused the loosing of a number of unfounded rumors concerning the early resumption of the place. Contrary to printed reports none of the former employees have been asked to report and the watchmen are the only men about the plant.

Pottsville—Owing to the extraordinary dry weather considerable areas of woodland are being swept by fires, which are in a number of instances getting into proximity to large culm piles. Some of these contain many thousands of tons of combustible material. The state police are aiding in fighting these fires.

Bituminous

Connellsville—The production of Connellsville coke recently amounted to 298,000 tons per week, while shipments were at the rate of 295,000 tons. The number of active merchant ovens were increased by 200 and better running time has been made in those in operation, the result being an increase in production of approximately 5000 tons per week.

Pittsburgh—The stages of the three rivers recently reached the lowest point recorded in more than 50 years for this season, and Pittsburgh coal operators with 4,000,000 bu. of coal awaiting shipment were facing a situation almost unprecedented in the history of western Pennsylvania water traffic. It is seldom that shipping on the river has been interrupted by low water before July 1, for longer than a week or so at a time. No coal has left the Pittsburgh harbor since Feb. 20. As a result barges have accumulated until more than 500 are tied up in this vicinity at the present time. It is estimated that it will require 25 tows to remove the coal now lying in the local harbor.

Tarentum—The tipple, brickmaking plant and boiler house of the Cornell Coal Co., near here were recently damaged by fire to the extent of $15,000. This fire originated in the boiler house. The mine will be shut down for a few days until temporary repairs can be made.

Brownsville—E. S. DeArmit, division superintendent of the Knob Albany and Chamouni Mines of the Monongahela Consolidated Coal & Coke Co., and Joseph Barshotti were instantly killed in the Knob mine, Apr. 21, when 30 ft. of solid rock fell upon and buried them. DeArmit, Barshotti and Richard McKenna were inspecting rails in the mine. McKenna narrowly escaped being buried with the other two men.

Irwin—The University of Pittsburgh evening course in the principles of coal mining, conducted by Robert M. Black, assistant professor of mining, closed on Apr. 21. This course is the second years' work in the program in the University extension outlined by the School of Mines. Those receiving certificates of proficiency were William H. Evans, Albert H. Jones, John W. Luteman, Joseph W. Rymer, and James M Stein.

West Virginia

Clarksburg—The Consolidation Coal Co. recently began shipments of coal to the Lakes. This trade will increase the output for some time at least. Only those mines operated before the trade started will be run; it being the intention to increase the daily output of these operations.

Charlestown—The Crown Hill mines of the National Bituminous Coal & Coke Co. were sold at auction Apr. 22, to satisfy a judgment obtained by the heirs of the Hasford estate upon which the mine is situated. But two bids were offered and the property was sold for $1800. At the time of the purchase by the National Bituminous Coal & Coke Co., the consideration named in the transaction was $60,000.

Grafton—The loading record of the Monongah Division of the Baltimore & Ohio R.R. was recently the largest that it has been in any single day since last summer. The number of cars loaded of all commodities amounted to 1368, the largest previous record was 1605, which was made during the rush of business last year. Eleven hundred and thirty-five cars of coal and coke entered into the 1368 of the recent record, the remainder being various commodities with lumber in the majority. Cars are being rushed into the district to insure an ample supply to carry the increased shipments, and the railroad company anticipates no difficulty in handling the business, no matter how much increase it may show.

Fairmont—The Baltimore & Ohio R.R. recently put the Underwood night train and crew to work to haul empty and loaded cars to and from the Jamison mines. The opening of the Lake trade and the demand for coal made this necessary. About 110 cars is the average being loaded at the

Jamison mines at the present time—the normal loading capacity being 140.

An extra train and crew have also been put on the Chiefton run at night. About 145 cars are being loaded daily on this run and two train crews are kept busy day and night handling the traffic.

Another indication of the resumption of business activities in the Fairmont region was the order recently issued by Manager H. H. Watson for the resumption of full time at the shaft mines of the Consolidation Coal Co. This plant when working to normal capacity gives employment to over 300 men and was practically closed down last fall when orders for coal ceased to come in. The Lake season is now open and with orders plentiful this mine as well as others now operating will devote its coal to Western shipments.

VIRGINIA

Bristol—Due to a drought in the southwest Virginia mountains, coal mines and mining plants have been threatened by forest fires for some time. These fires have made such progress as to require the efforts of hundreds of miners to protect the mines and plants at the Inman operations near Appalachia and also at the plants of the Stonega Coal & Coke Co. at Stonega, the Virginia Lee mines in Lee County and other mining operations in their vicinity. The Stonega Coal & Coke Co. is said to have lost considerable timber while its plants have been protected only by determined efforts.

Appalachia—Four hundred miners on Apr. 20 escaped from a fire which started in the Inman mines Nos. 1 and 2, owned by the Virginia Coal & Coke Co. Mine inspectors reported this escape was due to improved facilities.

TENNESSEE

Knoxville—Optimistic reports of committees featured in the quarterly meeting of the Southern Appalachian Coal Operators' Association recently held in this city. Each of the reports showed that business was becoming much better and indications were that a prosperous year is ahead. Operators representing all parts of the Appalachian region were present and discussed the improved conditions in their respective territories.

KENTUCKY

Pineville—Sale of the lease and property of the Luke & Drummond Coal Co. in Bell County has been ordered in the case of H. W. Sanford and others against the coal company by the United States Court in which the suit has been tried. The sale will be conducted by L. C. Gunter, receiver. The company has a lease of 1600 acres and a well equipped plant.

A feature of the fourth annual meeting of the Kentucky Mining Institute, which will be held here on May 14 and 15, will be a state wide first aid meet, which the committee in charge is endeavoring to make the most interesting of all similar contests ever held in Kentucky. A large number of valuable prizes have been offered for the winners and it is expected that the American Mine Safety Association will announce a schedule of medals to be awarded. All over the state, according to reports received here, rescue teams are drilling in preparation for the contest and the various events promise to be hard fought. Numbers of papers on important topics will be read and trips will be arranged to the mines in the vicinity of Pineville.

Fleming—There has been a marked increase in tonnage for the mines of the Elk Horn Mining Corporation and everything points to a gradual resumption of work at all mines in the near future. The company is working full time and is increasing tonnage as fast as it can get the men necessary to do so.

Barbourville—The coal mining industry in southeastern Kentucky seems to be on the eve of a revival after a temporary shutdown. Operators in Harlan, Bell, Knox and Whitley counties report an increasing business with large orders from points of consumption. Mines have not yet resumed full time but orders on hand insure a steadier run than there has been for several months past.

OHIO

Columbus—Failing to secure favorable action on his bill to fix maximum freight rates on coal in Ohio, Senator Vorheis has introduced in the Ohio Legislature a joint resolution calling upon the State Utilities Commission to immediately investigate intrastate rates on coal. The resolution states that the leadership of the state in the coal-mining industry is being imperiled by alleged discriminatory rates on coal shipments. It is believed there will be no substantial objection to this joint resolution in either house.

INDIANA

Clinton—The J. K. Dering Coal Co., of this city, has just distributed to the mine bosses, stable bosses, weigh bosses and other heads of departments prizes amounting to $1000, for efficiency in their departments. The prizes ranged from $15 to $100.

Indianapolis—Delegates representing coal operators who mine about 80% of the coal output of Indiana visited Washington, Apr. 20, seeking permission to establish a selling agency to handle their entire output. The committee made its representations to the Federal Trade Commission and later conferred with one of the assistants to the Attorney-General of the United States and the Department of Justice officer who is in charge of trust prosecutions. The coal operators said they desired to avoid violating the Sherman anti-trust law. They said they wished simply to reduce the cost of marketing their output; that there is now much cut-throat competition. It is said the federal officials intimated that the coal companies might be permitted to effect a limited combination for purposes of conservation. The delegation represented 114 mining companies whose properties are valued at $30,000,000.

ILLINOIS

Taylorville—The Mammoth mine of the Christian County Coal Co., located near Taylorville, was sold Apr. 20, to the Peabody interests of Chicago, owners of a number of coal mines in central and southern Illinois. The price paid was $185,000; $50,000 being in cash and a mortgage given for the balance. This mine was sunk in 1900; the company owning it being incorporated for $100,000. It is said that dividends to the amount of $190,000 have been earned; $90,000 of which have been paid back into the company in acquiring new coal rights and in making repairs.

Pawnee—Many coal miners in this section are seeking work on farms; they believe that the local mines will resume operations in the fall, and hope to keep employed between now and that time.

Canton—Following close upon the suspension of activities at the Maplewood mine No. 2, at Farmington, came the announcement that the Simmons mine, north of Canton, would close indefinitely. This makes the third mine in this section that has closed down recently, the mine at Norris being the first.

MINNESOTA

Virginia—H. O. Johnson recently returned from a trip to Mentor, Polk County, where he started the first drill at work in that section, exploring what is believed to be a bituminous coal field of considerable extent. Mr. Johnson believes there is no question about the Polk County coal field, and thinks that large measures exist there of a good grade of bituminous coal. It is also claimed that anthracite has been found. It is believed that these deposits at Mentor are distinct from the lignite beds in the northwestern section of the state.

COLORADO

Trinidad—The selection of a jury to try John R. Lawson, international board member of the United Mine Workers of America, charged with the murder of John Nimmo, a mine guard, on Oct. 25, 1913, began in the District Court here, Apr. 21. Talesmen were examined by Attorneys H. N. Hawkins for the defense and Deputy Attorney General Norton Montgomery for the state.

UTAH

Price—The coal and coke trade of Carbon County is steadily improving as is evidenced by the fact that 600 ovens out of about 700 are going at full capacity at Sunnyside, while the reserve coke stored at that plant and amounting to several thousand tons is now exhausted. Considerable coal for railroad use on the east end of the Denver & Rio Grande is also coming from Sunnyside while something like a dozen cars a day goes to the gas and commercial coke plants at Salt Lake City. It is believed that the mines and coke ovens will be kept going fairly steadily throughout the entire summer. At present five days per week are being worked, with the prospect that this will soon be increased to seven.

PERSONALS

J. B. McClary was recently reëlected president and general manager of the Yolande Coal & Coke Co. No changes were made in the organization of this firm at the election.

Samuel Dixon who for 35 years was a resident of Fayette County, W. Va., being identified with several of the large coal operations, is making arrangements to return to this county. He is to be at the head of a sales agency, handling the output of the Deegans interests. Mr. Dixon will also handle a couple of Loup Creek operations.

C. H. King has been appointed general agent of the coal and ore department of the New York Central lines with headquarters in Pittsburgh. Mr. King succeeds M. D. Flanigan who resigned to enter other business.

Alexander Thompson, aged 71 years, foreman for the Pennsylvania Coal Co. at No. 4 shaft, is critically ill of pneumonia in St. Frances' Hospital, San Francisco. He was stricken while on a pleasure trip to the West, incidentally the first vacation he had taken in his 50 years' work for the company. He is president of the City Planning Commission of Pittston.

Neil Robinson, of Charleston, W. Va., who was a few weeks ago appointed temporary receiver for the LaFollette Iron Co., was recently appointed by the Federal Court of Knoxville, Tenn., permanent receiver for this company, with Daniel D. Carter, cashier of the East Tennessee National Bank of Knoxville, as co-receiver. The furnace of this company at LaFollette is still being operated. Mr. Robinson is also receiver for the LaFollette Coal, Iron & Ry. Co.

OBITUARY

Francis S. Lambie, 48 years of age and a coal operator of Clarksburg, W. Va., died at his home recently. He is survived by his widow, two sons, and one daughter.

A severe attack of pneumonia caused the recent death at his home in Allentown, Penn., of William C. Walters, connected with the Lehigh Valley Coal Sales Co. Mr. Walters, who was 40 years old, entered the employ of the coal company at an early age, and never severed his connection with it, being promoted to the local office some years ago.

George Vaux, who in his earlier years was secretary and treasurer of the Swatara Coal Co. which carried on extensive operations in the Lykens Valley regions prior to the sale of its coal lands to the Philadelphia & Reading Coal & Iron Co., recently died at Bryn Mawr at the age of 83 years. Mr. Vaux was recognized as the highest authority on the history of the Society of Friends in and near Philadelphia.

Alexander Law, mine foreman for the Pennsylvania Coal Co. at the No. 8 Colliery, died suddenly, Apr. 22, at his residence in Pittston, Penn. He was the son of William Law, one of the pioneer mine superintendents in the anthracite coal field. Either heart failure or the bursting of a blood vessel is believed to have been the cause of his sudden death. Mr. Law is survived by his wife and three children, also three sisters and one brother.

INDUSTRIAL NEWS

Cincinnati, Ohio—Goodin, Reid & Co. recently purchased the entire plant and has the exclusive use of the patent rights of the American Rubberfelt Co. of Chicago. It is operating the plant in Cincinnati.

New York, N. Y.—M. N. MacLaren, New York manager of the Nordberg Mfg. Co., of Milwaukee, Wis., announces the removal on Apr. 26, 1915, of the New York Office from 42 Broadway to offices in the new Equitable Bldg., 120 Broadway.

Columbus, Ohio—The general offices of the Toledo & Ohio Central and the Kanawha & Michigan railroads have been moved from Toledo, Ohio, and Charleston, W. Va., respectively, to the New York Central Building on East Gay St., Columbus.

Washington, D. C.—Assistant Secretary of the Treasury Newton on Apr. 21 awarded the contract for the mechanical equipment for the Laboratory Building of the Bureau of Mines at Pittsburgh, to the Standard Engineering Co. of that city. The contract was for $63,650.

Charleston, W. Va.—Just half as many corporations doing business in West Virginia were dissolved or surrendered their charters as were newly incorporated during the month of March. Sixty-six new charters were issued during March, 55 to resident and 11 to non-resident companies. Thirty-three withdrew from the state by one process or another. Twelve corporations increased their capital stock and 14 decreased it.

Bluefield, W. Va.—Eight large electric locomotives have been placed in service on the Norfolk & Western Ry. to be used in handling heavy coal trains over Bluestone mountain. The motors displace about 40 steam locomotives formerly used for this work, and thus accomplish a considerable economy. Preparations are now under way for the complete electrification of the division, in order to enable coal traffic to be handled exclusively by these large motors.

Charlestown, W. Va.—The shipments of coal and coke over the lines of the Chesapeake & Ohio Ry., during the month of February, and for the first two months of the year, show that 1,404,177 tons were shipped during February as compared with 1,187,833 tons during the same months of 1914. This is an increase of 216,344 tons. During the first two months of the year a total of 3,106,224 tons were shipped as against 2,867,284 tons during the corresponding period of the previous year. This is an increase of 238,940 tons.

Fairmont, W. Va.—The Consolidation Coal Co. recently let a contract for the sinking of two shafts in the Helen's Run field. One will be sunk by the Dravo Contracting Co. of Pittsburgh, and the other by H. S. Stark of Greensburg, Penn. The shafts will be 520 ft. in depth and will cost $50,000 each. They will have an annual capacity of 750,000 tons. The contractors will start work immediately. Western Maryland R.R. Co. engineers are surveying for the new railroad to market the coal from these shafts.

Buffalo, N. Y.—The Buffalo shipping trestle of the Delaware, Lackawanna & Western R.R., which had been ordered closed by the government as an obstruction to navigation, was lately taken entirely out of the possession of the company. A third order has now been issued, permitting its use till a new shipping station can be built, when the present trestle will be removed and the mouth of Buffalo River widened 60 ft. at that point. It is expected that the company will build a car dump on the new water frontage of the yard.

Cincinnati, Ohio—A. A. Kramer, attorney for the Marmet Coal Co. of W. Va., now in the hands of receivers, recently confirmed the report of a sale of the $2,000,000 West Virginia and Ohio coal properties and steamboats of the Marmet Co. to a $35,000,000 Eastern coal syndicate, subject to the confirmation of the courts of West Virginia and of Cincinnati. The new owners intend mining operations on large proportions, also marketing the product of additional West Virginia mines, particularly in Central and Northwestern territory.

Cincinnati, Ohio—A course of six lectures, for the especial benefit of engineers, and firemen at industrial plants, and all others interested, is announced by the University of Cincinnati, to be extended over a period of some months. These lectures deal with proper methods of firing stationary boilers. The course was decided upon after conference with a committee of local stationary engineers. Analysis of coal, the theory of combustion, losses in boiler plants due to improper firing, various types of furnaces in use, and other subjects of practical value will be dealt with in the course.

Charleston, W. Va.—The statement of the shipments of coal and coke over the lines of the Norfolk & Western R.R., during the month of March, and for the first three months of the year, shows a decrease as compared with the shipping during the same period of last year. During the month of March 1,975,876 tons were shipped, as compared with 2,215,188 tons in the same month of 1914. This is a decrease of 239,312 tons. For the first three months of the year, a total of 5,622,635 tons were shipped as compared with 6,062,091 tons during the corresponding period of the previous year, or a decrease of 439,356 tons.

Birmingham, Ala.—The changes in the organization of the Woodward Iron Co., which were unofficially announced and promptly denied a few weeks ago, were recently effected in New York. The position of chairman of the board was created and A. H. Woodward was elected chairman from the position of vice-president and general manager. J. H. Woodward retains the position of president, while the underofficial takes the chairmanship. R. H. Bannister was made vice-president to succeed A. H. Woodward. D. E. Wilson was elected treasurer, and Herbert Smith, assistant secretary. The office of secretary is unfilled.

Toledo, Ohio—The Cincinnati, Hamilton & Dayton R.R. recently gave its new docks and coal hoisting machine its first tryout, in loading the steamer "John P. Reiss" with coal for up-Lake shipment. The new machine is one of the largest on the Lake and one of three now in use, the others being at Sandusky and Cleveland. Its capacity is forty 75-ton cars, or forty-seven 50-ton cars of coal per hour. The height of the machine is 90 ft. and its length 60 ft. 1 in. Contractors began the removal of the old coal-hoisting machine on Nov. 28, 1914, and the new dock was completed and the new machine installed and ready for use on Apr. 15. The improvements cost $350,000.

Coal Trade Reviews

General Review

April anthracite business fair but lacking the usual snap that marks the opening period. Bituminous situation mixed. Heavy increase in export business. Adverse outlook in the Lake trade.

The April business in anthracite has been fairly satisfactory, and the month has closed with a good many orders still unfilled. While the circular has been generally well maintained, prices are not very strong, and the April market was notably lacking in the customary snap and rush that characterizes the lowest price period of the year. An extraordinary heavy tonnage of Lake coal has started for the Northwest since the opening of navigation, due to heavy loading on vessels through the winter. Though agencies are not granting direct concessions on circular prices, they are occasionally holding forth inducements in the shape of long-term credits. The indications point to a slowing up in hard coal before the current month is out.

The Eastern bituminous situation continues decidedly mixed. There has been no well defined turn for the better, though inquiries seem more plentiful, and most agencies express more satisfaction with the outlook, but there are others that are of the opinion that the best that can be anticipaed is a mild spurt in the fall which cannot possibly be of sufficient proportion to compensate for the extremely dull year.

One of the most hopeful features at the moment has been the rapid broadening out of the export market, and there are conservative observers who believe that we are on the verge of a tremendous expansion in this trade. Accumulations at a number of the Tidewater ports are substantially reduced, and the movement at some points may establish new high records. Another sharp advance in ocean freights may prove a restraining influence in the export market, but it has developed that many British vessels on this side are not returning to home ports because of the fear of being requisitioned for Government service, and this should help the situation some.

Demand in the Pittsburgh district is slightly better, some of the steel manufacturers taking practically full requirements, but supplies continue excessive, and prices have not recovered. Conservative interests will not admit of any improvements while prices continue so low and the demand light. The beginning of iron ore shipments down the Lakes only serves to emphasize the adverse conditions prevailing in the Lake trade; in fact, it now seems possible that many of the Upper Lakes companies will find their supplies adequate without placing any more orders. Ohio consumers continue purchasing in the open market, and while the opening of navigation has stimulated interest to some extent, the situation is still generally discouraging.

The Middlewestern market is well sustained, considering the general dullness. The agencies are concentrating their efforts on maintaining prices, and an improvement in the demand is anticipated shortly. A few important contracts are being signed up, but at rather low figures. Interest for the time being is centered on slack coal, which is generally in short supply in all directions. Mine operations are down to the summer basis, some mines having been closed down entirely.

BUSINESS OPINIONS

Financial Chronicle—Never was there greater need for care and caution and for the exercise of wholesome restraint. A rising stock market and speculative fervor do not call for the application of repressive measures if sound sense and reasoning can be adduced in support of the same. Within such limits, advancing stock prices mean a revival of hope, and this, in turn, means a revival of energy throughout the length and breadth of the land.

Dun's—The developments of the week have served to strengthen the influences working for improvement, and business confidence further increases. The volume of trade is expanding, although the movement, taken as a whole, is not rapid, and wide differences exist, some industries working overtime, largely by reason of big war orders, others reaching a fairly normal capacity, while others still struggle with adverse conditions. Excellent reports come from the dry goods markets, in which increasing confidence and expansion are noted.

Bradstreet's—Trade continues to expand, progress is of a cumulative character, and even concededly slow lines are evincing a more lively disposition. In fact, the general situation, trade and industrial, seems to be moving on to new and higher ground. Faith in the future is more firmly rooted, and though buying of merchandise is devoid of speculative aspects, the tendency to cover distant prospective wants is rather marked, with sellers in certain textile lines assuming an independent attitude. Reports as to growing crops are flattering.

Boston News Bureau—Every day sentiment the country over shows signs of betterment. Merchants who have benefited comparatively little by the war begin to see an increased demand for their special goods. There is more disposition to do business and this comes from a gradual but steady return of confidence. Big profits have been corralled on war orders. Enormous money has been made in stock specialties. The higher security values make people generally feel better. There is, therefore, less disposition to economize.

The Iron and Steel Industry—The rapid increase in the earnings of the United States Steel Corporation reflects a greater volume of business and profits more important than the small total of $12,500,000, reported for the first quarter, would indicate, even though this is an increase of $1,500,000 as compared with the previous quarter. Pig iron buying has dwindled off, but Southern furnaces sold 35,000 tons during the week; it was estimated that in the first 22 days of April at least 350,000 tons of merchant iron were sold, which is not up to the record of March business. The operation of works is better, having been increased about 4% during the week. Some disappointment was evidenced that the Pennsylvania order for equipment was not followed up by other roads. Rail-making mills hope for better business, particularly foreign. British mills are absolutely out of the market, and colonial mills are taking all the business that is offered, of which there is a fair amount.

ATLANTIC SEABOARD

BOSTON

Spot market dull and deliveries on contract sag off. Buyers still keep out of the market. Export trade may have favorable effect on coastwise situation. Foreign steamers making heavy draft on Georges Creek. Pennsylvania grades listless. Anthracite demand holds on.

Bituminous—There is practically no spot demand for Pocahontas and New River, either here or at the loading ports. Small concessions are heard occasionally but lately no new business of any consequence has developed. Contract requirements are rather less than a month ago, but it is felt that the demand from New England mills must improve soon, with the better conditions that are being predicted for textiles. At present writing, however, manufacturers are holding off, both those who have yet to buy and those who have contracted.

Sales agents are despairing of any marked increase in the volume of business for some months to come. New England is usually about the last section to be hit by any wave of prosperity and unless there is a spurt in the fall, 1915 will be charged off as another extremely dull year.

At the same time, the export market is recognized as having possibilities. The recent order of the Italian Railways for more than 300,000 tons leads some of the shippers to believe we are only at the threshold of a broad foreign demand that will lift the coastwise market out of the doldrums.

The Georges Creek shippers, by reason of their limited output, are commonly the first to feel such a development. So many steamers are waiting now at Baltimore ports that for the present coal from that field is being routed exclusively to those piers. When barges now here and en route are disposed of it is likely there will be a fortnight or more when receipts of Georges Creek will be extremely light.

Cambria and Somerset coals show the same listlessness that has been characteristic the last month or so. Anthracite barges are gradually being released to the bituminous trade but the demand is not in any way improved. One cargo of Pennsylvania coal has been on the market here for nearly three weeks.

Water Freight are a trifle easier, 75c. having been named this week for barges, Hampton Roads to Boston. On Long Island Sound rates are up 5c. on account of an extra demand for anthracite at the April circular.

Anthracite—The demand for late April loading continued strong to the end of the month. Most of the companies are carrying over a fair supply of orders for May shipment. All sizes are easy at the piers although egg is occasionally reported short.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.40@2.85	2.92@3.02	
New York*	2.40@2.95	2.70@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.65@2.80
Boston†	....	....	....	3.55@3.73
Providence†	....	....	....	3.53@3.73

* F.o.b. †On cars.

PHILADELPHIA

Anthracite still shows strength. Close of the month finds domestic sizes in good demand. Bituminous lacks tone, with no immediate improvement looked for.

Anthracite—The closing week of the month finds the operators well supplied with orders for the domestic sizes. Chestnut has fallen off somewhat, but it is understood that the surplus was very easily taken care of in other directions. The Lake season will soon be in full sway, and surplus sizes can be well taken care of, for the present at least. Broken still maintains a good lead and egg and stove are about the same as last week. Pea coal seems to be moving well, but the exceedingly low price prevailing has doubtless caused many dealers to lay in supplies now, who probably would have waited until the fall to take on their supplies of this size; $2 is now the general price prevailing at the mines, with the tax added, and in some cases absorbed.

Prices at Tidewater, closing week of the month:

	Circular	Individuals
Broken	$4.25	$4.25@4.35
Egg	4.50	4.50
Stove	4.50	4.50
Chestnut	4.75	4.65@4.75

Bituminous—There is practically no change in the bituminous situation. Georges Creek coals seem to be somewhat short of the market, but little delay is experienced in having orders filled. All the coal standing at Tidewater has been sent there for orders already in hand, and little spot coal is available.

NEW YORK

Bituminous quiet but trade is optimistic. Better outlook on prices. Current business in anthracite continues active but the outlook is uncertain.

Bituminous—While there is apparently little if any change in the bituminous market, wholesale dealers are optimistic. Business indications are encouraging and the prospects are considered bright for a fair summer. Shippers of the best grades are not over-stocked but are able to meet all immediate demands. Inquiries from manufacturers are on the increase. Some operators who held off closing contracts for the major portion of their output at the low prices which prevailed a couple of months ago are now looking forward to obtaining better figures, in view of the larger number of inquiries being received. Shipments to New England have increased considerably.

The export business is gradually picking up and the prospects are encouraging. Bunkering trade remains fair. Operations continue on about a half-time basis, owners apparently preferring to curtail production rather than see a further cut in prices.

Quotations run about as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.05@3.10; Georges Creek, $3.15.

Anthracite—The April business continues satisfactory. Prepared coals are moving well. Shippers report sufficient orders on hand to carry operators well into the next month but they are not making predictions as to what might follow. The mines are operating practically full time and production for the month will compare favorably with the April tonnage figures in previous years. There is some cutting of the circular but reports have it that individuals in order to maintain prices are granting longer credits. Lake shipments have opened and this will provide a new outlet which will prove a big help for the mine owners.

Steam coals, particularly the better grades of buckwheat, are in good demand. Nos. 2 and 3 in the better grades are practically out of the market; full circular is being obtained for these coals in the better qualities. There is plenty of the poorer grades to be had. Pea coal is very weak, the prevailing quotation being around $3.40.

The anthracite market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.70	$4.70	$4.65	$4.65
Egg	4.95	4.85@4.95	4.90	4.80@4.90
Stove	4.95	4.85@4.95	4.90	4.80@4.90
Chestnut	5.20	5.10@5.20	5.15	5.05@5.15
Pea	3.45@3.55	3.30@3.55	3.40@3.50	3.25@3.50
Buckwheat	2.55@2.80	2.35@2.80	2.50@2.75	2.35@2.75
Rice	2.05@2.30	2.05@2.30	2.00@2.25	2.00@2.25
Barley	1.80	1.55@1.95	1.75@2.00	1.50@1.90

BALTIMORE

Export movement continues to expand and April shipments will break all port records. Bituminous coals in a little better demand. Gas fuels quiet.

The immense amount of coal now being shipped out of this port on foreign contracts is the feature of this market. Unwillingness of British bottoms to go to home ports for fear of being taken over by the government is diverting much South American and Mediterranean business from England to us. That the month of April will see a total movement of 160,000 tons, or 30,000 tons in excess of the previous high record, seems assured.

Except for slack, which is strong, due to the light production, the gas-coal situation is still weak. The prospect of a light call from the Northwest because of heavy stocks still carried there prevented any upward move. Slack sold at from 70 to 75c., practically on a par with run-of-mine. Three-quarter brought around 80 and 85c.

HAMPTON ROADS

Heavy movement of export coal on both steam and sail vessels. Indications are for large dumpings in April.

The export movement of coal from Hampton seems to be increasing weekly and present indications are that the shipments both coastwise and foreign were heavy over the month end. Italy has taken a large share of the business moving. A fair estimate of the quantity shipped to the various Italian ports would be approximately 45,000 tons.

The accumulation of coal at Tidewater is perhaps lower than for months and with the amount of vessel tonnage now in port and that due the indications are that this will be reduced considerably below normal supply even with that now en route being rushed forward.

The movement is confined almost entirely to Pocahontas and New River mine-run, although it is expected there will be some shipments of the prepared coals soon. There has been no change in prices at the Hampton Roads ports and sales are close to the regular circular prices.

Bunker takings are still holding up well, vessels arriving during the week taking from 300 to 1200 tons according to the size of the steamer and her destination. The largest supply of bunkers taken by any one vessel went into the Argentine battleship "Moreno" which was supplied from barges at Newport News. This vessel took about 4000 tons.

The following steamers have sailed with cargoes of coal:

Norfolk

Vessel	Tons	Destination
G. M. Embiricos[1]	5746	Piraeus
Emily I. White	512	Santo Domingo
Elvaston[2]	6008	Montevideo
Three Marys[2]	1569	Bermuda
Genova[3]	5632	Genoa
Atlantide[3]	7051	Porto Ferrajo
Pacific[4]	6946	La Plata
Doris[3]	4768	Leghorn
Josef Frederik[5]	2767	St. Thomas
Itasca[3]	1033	Bermuda
Tottenham[2]	4500	St. Lucia
Breyton[6]	6344	B. Aires
Josephine[1]	1184	Pernambuco
C. A. Campbell[1]	2010	Para
O. C. Curtis[1]	3209	Rio de Janeiro
Edith S. Cum's[1]	926	Maranhao
Adriatico[3]	6025	Messina
Harwood[2]	5900	Montevideo
Alden[2]	5050	Montevideo
Franham[2]	4100	Montevideo
Mark Pend'ton[3]	734	Horta, Azores
Uranus[3]	4601	Italy
St. Kilda[4] ab.	6100	B. Aires
M. F. Barrett[1]	3100	Rio de Janeiro

Newport News

Vessel	Destination
Berwindmoor[7]	Taranto, Italy
Frankby[7]	Taranto, Italy
Llandberis[8]	Rio de Janeiro
Competitor[8]	Rio de Janeiro
Atlas[8]	Montevideo

Shippers—[1] Smokeless Fuel Co. [2] Castner, Curran & Bullitt. [3] Pocahontas Fuel Co. [4] Virginia Coaling Corp. [5] Hasler Bros. [6] W. C. Atwater & Co. [7] Berwind-White Coal Mining Co. [8] Chesapeake & Ohio Coal Agency.

Virginian Ry.—Dumpings of this road at Hampton Roads for the week ended Apr. 24 amounted to 178,738 tons.

OCEAN FREIGHTS

Further advance in vessel rates. Fewer steamers available. Grain shippers quoting higher figures for September loading.

Freight market conditions changed very materially during the last week and rates are again advancing. A number of steamers have been chartered for export coal since last report at or about rates quoted below, and the number of available steamers has decreased owing to the rapid absorption of tonnage by various trades during the last few days. For September loading, grain shippers are offering higher rates than are current for May loading. Steamers are offered at $10.80 for four trips to the West Coast of Italy; $10.20 to Marseilles or Algiers; and $9.60 to Barcelona or Valencia, and charters have been arranged recently on about these terms. Rates on grain from the Plate have advanced and consequently outward rates on coal are unchanged. .

To	Rate	To	Rate
Havana	$2.25@2.50	Guantanamo	$3.00@3.25
Cardenas or Sagua	3.00@3.25	Demerara	5.50@6.00
Cienfuegos	3.25@3.50	Bermuda	3.50@3.75
Port au Spain, Trinidad	3.75@4.00	Vera Cruz	**3.50**
St. Lucia	3.50@3.75	Tampico	**3.50**
St. Thomas	**3.25**	Rio	**9.36**
Barbados	3.75@4.00	Montevideo	**9.12**
Kingston	3.00@3.25	Buenos Aires or La Plata	**9.25**
Curacao	3.75@4.00	Mediterranean*	10.80@11.40
Santiago	3.00@3.25	Valparaiso†	8.40@ 9.00

Note—Rates noted in **bold face** type are only approximate.

* To a direct port not east of the West coast of Italy, Spain excluded.

† With 800 tons per day discharge.

W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Rosalie	British	Baltimore	Buenos Ayres	2725	$9.36
Charles Davenport		Philadelphia	Portland	1157	
Annie B. Mitchell		Philadelphia	Camden, Me.	397	1.00
Ellaline	British	Baltimore	River Plate	2491	9.12
Christoforos	Greek	Atlantic Range	Barcelona,[1]	2345	10.12
——hall	British	Virginia	Rio Janeiro		9.60
Winnfield	British	Baltimore	River Plate	2205	9.36
Egda	Norwegian	Philadelphia	Antilla	1610	
Thorsa	Norwegian	Philadelphia	Manzanillo	683	
Stella del Mare (bark)	Italian	Baltimore	Italy[2]	1026	
Florence Howard		Baltimore	Mayport	683	1.00
William Bisbee		Philadelphia	Swan Island, Me	206	1.50
Charles H. Klinck		Philadelphia	Kittery, Me.	444	1.00

[1] Valencia or Algiers. [2] West Coast.

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

PITTSBURGH

Market still demoralized, with mines operating at about 50% and very little Lake coal moving. Lake Superior iron ore market opened.

The opening of the Lake Superior iron ore market last week emphasizes the backwardness of the Lake coal trade. Ore shipments are being made in small quantities and the way in which ore has sold since the opening is held to indicate that by the middle of May there will be a fair movement down the Lakes, but the coal movement seems still far in the future. While Lake coal is being moved the tonnages are almost inconsequential and there has been scarcely any buying for the season, it being a question thus far whether the regular supplies of shippers may not prove practically equal to the demand in the Northwest.

Demand for coal from manufacturers has increased slightly, and some consumers in the steel trade are taking practically their normal tonnages under long-term contracts. The spot demand continues light and the supplies are excessive, so that prices have not recovered from their demoralization. Contract prices for the twelvemonth are supposed to be based on about $1.15 for mine-run, but hardly anything is being done.

Prices for free coal we quote the same as the reduced figures given last week, but even these prices are sometimes shaded: Slack, 75@80c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district. Lake coal is reputed to be $1.15 to consumers and $1.10 to dealers but it is not firm, at these figures. Mine operations continue at about 50% of capacity.

BUFFALO

Some improvement here and there, but prices generally slack and lower than a year ago. Demand expected to improve slowly. Heavy movement of anthracite up the Lakes.

Bituminous—There is a somewhat better feeling in the trade in general, though conservative interests are slow to admit it, giving as a proof of their position that prices are still slack and many shippers are making contracts at less than last year's figures. The industrial situation is improving, with at least some promise of a return to the normal before long, and when this occurs the price of bituminous coal must advance. But there is no doubt that sellers are discouraged, offering prices 5 to 15c. lower than last year, rather than be driven out of the market entirely. At no time in this long period of depression has the seller been in such an uncertain position. It appears that the worst of the depression is over, though improvement is likely to be slow and it may find a good many shippers tied up with burdensome contracts.

This is the season for rearranging price quotations. In view of the contract prices made during the present month, leading shippers agree that maximum figures may now be placed at $2.70 for best Pittsburgh lump, $2.55 for threequarter, $2.45 for mine-run, $2.10 for slack and $2.50 for smokeless.

Anthracite—The demand is normal and there is no complaint heard from the shippers. Retailers do not think the year has done much for them, though the Buffalo city trade has been held together well.

Shipments by Lake have begun, a large fleet sailing last week. The amount cleared to date is 178,000 tons, nearly all of it to leading ports at the head of the Lakes. This large tonnage is due to the heavy winter loading of one company. In all, the list was over 30 cargoes, aggregating close to 250,000 tons. The vessels do not find much down freight and so are not anxious to leave.

TORONTO, CAN.

Demand for both domestic and steam coal light. Stocks generally large.

The demand for domestic coal is light, consumers buying from hand to mouth. The market for steam coal is also quiet, as most factories are still running considerably below capacity, with little prospect of any improvement for some time. Dealers have ample supplies on hand in all lines. Quotations for best grades are as follows: Retail, anthracite, egg, stove and nut, $8; grate, $7.75; pea, $6.75. Bituminous steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $7.50; wholesale f.o.b. cars threequarter lump, $3.56; screenings, $2.90.

COLUMBUS

Slight stir in the Lake trade. Domestic business dull. Steam trade is not increasing to any extent.

The best feature of the Ohio market during the past week was a slight activity in the Lake trade. The season was officially opened Apr. 15 and a small amount of coal was loaded for shipment to the Northwest; a few cargoes have already moved. The tonnage, however, is not as large as formerly because of the excessive amount carried over on the docks of the Upper Lake Ports. Chartering of boats is not active and many companies have not yet started their Lake business in any way. Lake prices will be the same as last season. One of the best features is a slight stir in the ore trade which is expected to cause a better movement of boats.

Domestic trade has been dull in every way. Dealers have not been buying except when absolutely necessary to piece out the season. In some sections retailers' stocks are fairly heavy but generally speaking they will have little to carry over. Buying for early stocking is limited to anthracite and Pocahontas. Some West Virginia splints are also in demand. Hocking lump is not moving as it is never stocked this early in the year. Retail prices are still fairly well maintained although summer levels are not far off.

Production in Ohio fields has not increased materially during the past week. Despite the small amount loaded for Lake shipment the Hocking Valley has only produced about 30% of normal and the same figures are reported from Massillon, Cambridge, Crooksville and Jackson. In the Pomeroy Bend district the output is estimated at about 50% of the average.

The only strong point in the market is the demand for the small sizes which are still scarce. This is due largely to the curtailed production of lump. Anthracite business is fairly active for this period of the year.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.75	0.75	0.70
Coarse slack	0.65	0.65	0.60

CLEVELAND

The market has no absorbing power and prices are barely holding. Manufacturing companies are buying on the open market in preference to contracting.

Receipts of coal have been light, but Pan Handle, Youghiogheny, Fairmont and West Virginia No. 8 coals sold at low prices on the spot market, often for less than jobbers are paying for shipment. Pan Handle slack sold Monday at $1.65 to $1.70 Youghiogheny at $1.65 to $1.75, Fairmont at $1.65 to $1.75 Richland three-quarter at $1.80 to $1.85 and mine-run 5c. a ton lower. This coal from across the line in West Virginia is the same as Ohio No. 8.

The Lake trade is opening slowly. W. A. Pugh, of Racine, Wis., was here Monday and contracted for vessels to transport 50,000 tons of soft coal at 40c. a ton. Most of the Lake shippers are sending a few cargoes up the Lakes, but, will not ship very heavily after the first cargoes are delivered. It is not expected Lake shipping of coal will reach a large volume before June.

Iron ore prices have been established on the same basis as last year. The prices are very low and Lake freight rates will not be any higher than in 1914. Sales last week were very large considering business conditions and ore shipments will be in excess of last year.

Quotations on coal for shipment are:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	......	.....	......	......
Lump, ¾ in	......	$2.20@2.25	$2.00	$1.90@1.95	$1.80@1.90
Egg	3.10	......	......	......	......
Mine run	2.65@2.70	2.10	1.90	1.85@1.90	1.75@1.85
Slack	......	1.70@1.75	1.70@1.75	1.70@1.75	......

LOUISVILLE, KY.

Market restricted to stocking and industrial demand. Mine operations slightly stronger.

The market is now on a stocking or industrial basis, there being practically no demand of any other description. The industrial consumption is improving steadily and a generous rain over the state has been of much service in restoring confidence. Stocking orders are more plentiful and operations at the mines are on the increase. Prices continue as for the last several weeks with no changes of importance.

COKE

CONNELLSVILLE

Firmer tone sentimentally but little activity and no better prices. Production and shipments increased.

Sentimentally, the coke trade has improved further, but the merchant coke market obtains no increased strength from within. There has been a constant increase in production by the producer-consumer class, which absorbs more labor and with a little further employment, the coke operators who reduced wages last year will have to restore rates to the higher level still paid by many interests, including the Frick Company. The merchant pig-iron market is nominally on a better plane, through the opening of the Lake Superior ore market last week, with a fair volume of sales, and the buying of over 60,000 tons of pig iron by the Youngstown Sheet & Tube Co. There are fair stocks of pig iron and there is not much disposition manifested towards the blowing in of idle merchant furnaces.

Coke prices are quotable as formerly but a little additional buying would probably send them up, there being little more coke available at these figures: Prompt furnace, $1.55@1.60; contract furnace to June 30, $1.60@1.65; contract furnace to Dec. 31, $1.75; prompt foundry, $2@2.35; contract foundry, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 17 at 298,222 tons, an increase of 6007 tons, and shipments at 294,995 tons, an increase of 7166 tons.

Buffalo—There is little more coke moving, but the increase is not enough to make any real difference in the trade and prices remain as before. It will require a decided increase in volume to affect prices, which have long been at what was regarded as the bottom. Quotations remain at $4.15 for best 72-hr. Connellsville foundry, with stock coke $3.30.

Chicago—Some inquiries are being put out by large consumers for prices under contract for foundry use. The market this week has been quiet but firm, and little domestic business is reported. Quotations are as follows: Byproduct, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

MIDDLE WESTERN

GENERAL REVIEW

Dullness still prevails but signs of improvement are appearing. Screenings firmer. More activity in anthracite.

The market still continues extremely dull, but prices are generally well sustained, considering the depression. Shippers who have feared that prices would slump, because of impatience to make sales under present conditions, find their anticipations not realized. Everybody seems to be of one mind to maintain prices in the face of a paucity of orders. It is now realized forcibly that cutting prices does not create additional orders. A distinct impression prevails that things are slowly changing for the better.

The demand for steam coals is still at a low ebb, but shippers think the outlook better than for some time past. Increased inquiries are being received for future deliveries. Slow progress is still noted in contract making. The screenings situation generally shows strength, and the recent slight reaction has been entirely overcome. There is little buying in domestic coals, and the retailers are placing practically no orders, although in some cases their stocks are very moderate.

CHICAGO

Mine operations much curtailed and a number closed for the summer. Screenings active.

The Indiana mines are operating about two days per week on the average, and several additional mines have been closed down this week for the summer months. It is said that less foreign coals are being sold at the present time in the Indiana territory than last year. The operators are about to inaugurate a campaign for the consumption of home coal by state and municipal institutions which in times past largely bought coal from mines in other states. The demand for screenings is better, and prices are averaging 5c. per ton higher than last week.

The Springfield operators are closing down their mines rather than sell coal below cost of production. This has naturally decreased the output of screenings and caused the price to advance about 10c. per ton.

There is little change in the Franklin and Williamson County situation, and prices are well maintained in the face of light production. The demand is more noticeable for washed sizes for steam purposes than anything else.

The smokeless market is hesitating. There is no demand for what little coal is on track here, and the operators' representatives are not making much headway in placing contracts. Slightly better demand is said to be shown for the coarse sizes.

Anthracite shipments have increased over last week, although it can be said that the yards are not showing any great tendency to stock up at present quotations.

Prevailing quotations are as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.25@1.35	$1.35	$1.35@1.50	$1.25@1.45	$1.45@1.65
4-in. lump	....	....	....	....	....
Steam lump	1.20@1.35	1.15@1.25	1.25@1.35	1.20@1.30	....
2½-in. lump	....	....	....	....	....
1¼-in. lump	....	....	1.25@1.40	1.15@1.30	....
Mine-run	....	1.00@1.05	1.05@1.15	1.00@1.10	....
Egg	1.20@1.35	1.35	1.30@1.45	1.15@1.35	....
No. 1 washed	1.25@1.35	....	1.75	....	1.40@1.65
No. 2 washed	1.25@1.35	....	1.65	....	1.40@1.50
6x3-in. egg	....	....	....	....	1.50@1.65
Nut	....	1.25	1.15@1.35	1.10@1.20	....
No. 1 nut	1.25@1.35	....	....	....	....
No. 2 nut	1.25@1.35	....	....	....	....
No. 4 nut	1.10@1.15	....	....	....	....
Screenings	0.75@0.90	0.80@0.85	0.80@0.95	0.75@0.85	0.90

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.20@1.35	$1.35@1.40	$1.50@1.60	$1.50	....
1¼-in. lump	1.20@1.25	1.35@1.40	....	....	$1.40@1.50
Mine-run	1.10	....	1.10	1.10@1.15	1.10@1.15
Egg	....	1.00@1.10	1.50@1.60	1.35@1.50	....
No. 1 nut	1.25@1.40	....	1.35@1.40	....	....
No. 2 nut	1.20@1.35	....	....	....	....
Screenings	0.85@0.90	....	....	....	....

Greene County 5-in. lump, $1.25; 3-in. lump, $1.15; 5-in. egg, $1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.05. Screenings, 70 to 80c.

ST. LOUIS

Some contracts closed with figures generally low. Market dull except on screenings, which are active.

A few inquiries for contract coal seem to be the only life of the local market. During the past week the Frisco R.R. fuel contracts were let, and a few other minor contracts were also awarded. Prices were below what was anticipated in a general way, which would seem to indicate that the operators are not figuring on a prolonged suspension during the spring of 1916.

The domestic market is extremely quiet, there being no demand either from the city or country. Excepting for a fairly heavy movement of screenings, there is nothing unusual in the steam trade. For a few days screenings may be in demand, and again there is apparently an over-production, or the buyers are holding off to force lower prices. The screenings market will continue to be firm for the next month or two at least.

A small tonnage of anthracite is moving in, and that is practically all of the outside fuel that there is any demand for; this is largely for storage purposes. There is no change in circular prices. Carterville screenings being worth about 85c., and Standard screenings 80 to 85c.

INDIANAPOLIS

New retail prices announced. Trade very quiet but a slight improvement is noticeable. Screenings short.

Mining conditions in Indiana have been almost in a rut for a month, the only change being an almost imperceptible improvement in the industrial situation. Coal salesmen say that the improvement is evident, however gradual it may be. Mines over the state seem to be averaging three to four days a week. The demand for slack continues to be the feature of the trade and operators are getting 85 to 95c. for it. Most companies have all they can do to take care of their contract orders on screenings and are not in the open market for this grade. The supply of fine coal depends on the railroad takings of 1¼-in. lump.

The local retailers reduced their prices to the summer level, Apr. 20. The reductions amounted to 50c. a ton on most coals, with 75c. on anthracite and Pocahontas. The new schedule is:

	Per Ton
Linton No. 4, forked	$3.00
Indiana lump, forked	2.75
Indiana lump and egg, screened	2.50
Kanawha lump, forked	4.25
Ohio Hocking lump, forked	4.25
Ohio Hocking washed egg	4.50
Kentucky lump	4.50
Ohio Jackson lump, forked	5.00
Blossburg smithing	5.50
Cannel lump	6.00
Pocahontas forked lump	5.50
Pocahontas shoveled lump	5.00
Pocahontas mine run	4.00
Pocahontas nut and slack	3.50

	Per Ton
Anthracite chestnut	7.75
Anthracite stove and egg	7.50
Anthracite grate	7.25
Connellsville coke	6.00
Indianapolis byproduct coke	5.50

—Extra Delivery Charge—

Egg, 50c. a ton extra, ground floor or dumped in cellar.

Bags, 75c. a ton extra, carried into cellar.

Charge for chute or wheelbarrow, 25c. a ton.

Coke, bags 60c. bags in cellar 80c.

KANSAS CITY

Retail business quiet but the wholesale trade is improving.

The wholesale business has been doing a little better but prices, which are at the very lowest figure, have not been affected. However, more factories operating than have been for some time and the agencies expect to have the largest business this season they have had for years. Steam grades are all that have been moving and they have been rather slow.

PORTLAND, ORE.

Demand light and summer prices will soon be in effect unless mine figures are advanced.

Just as the coal dealers were planning on announcing summer quotations, the rumor reached Portland that the mines in Utah are planning an advance in prices. Whether they will become effective or not is a question yet to be answered. On account of the high charter rates it is improbable that any coal will be brought to this city from Australia next fall.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during March and the past four months in short tons:

	December	January	February	March
Pocahontas Field	798,182	912,682	835,826	1,003,437
Tug River District	227,944	298,766	243,910	282,886
Thacker District	227,938	257,580	195,557	227,817
Kenova District	90,030	98,422	67,667	66,605
Clinch Valley District	135,362	169,581	129,193	144,031
Other N. & W. Territory	1,686	3,769	1,785	2,478
Total N. & W. Fields	1,481,142	1,740,800	1,473,938	1,727,254
Williamson & Pond Creek R.R.	62,271	58,296	58,101	48,052
All other railroads	97,752	87,842	88,982	129,446
Grand total	1,641,165	1,886,938	1,621,021	1,904,752

Distribution of shipments for March was:

	Shipped	Tipple	Total
Pocahontas	879,237	13,433	892,670
Tug River	281,162	1,261	282,423
Thacker	182,943	7,986	190,929
Kenova	58,867	7,738	66,605
Total	1,402,209	30,418	1,432,627

Shipments of coke entirely from the Pocahontas field, amounted to 57,584 tons.

VIRGINIAN RAILWAY

Shipments over this road for February of the current year amounted to 283,430 short tons as compared with 344,139 during the preceding month.

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during February and the first two months of the last two years, in short tons:

	February		2 Months	
Anthracite	1914	1915	1914	1915
Baltimore & Ohio[1]	120,789	95,779	258,059	218,856
Chesapeake & Ohio[1]	1,063	962	2,106	1,731
Erie[2]	597,304	600,188	1,388,374	1,246,436
Pennsylvania[1] [3]	705,020	771,328	1,620,047	1,665,857
Virginian[2] [1]	9	......	9	98
Total 5 roads	1,424,185	1,468,257	3,268,595	3,132,978
Bituminous				
Baltimore & Ohio[1]	2,517,219	2,026,142	5,614,859	4,464,233
Buffalo, Roch. & P.[1] [2]	754,648	579,094	1,571,907	1,174,606
Buffalo & Susq.[1] [2]	135,158	102,653	282,739	195,034
Chesapeake & Ohio[1]	1,150,576	1,388,906	2,794,728	3,078,677
Erie[3]	12,127	8,610	22,107	19,866
Hunt. & Br'd T. Mt.[1] [2]	97,108	77,761	202 847	165,152
New York Central[3]	738,601	669,048	1,574,059	1,494,809
Norfolk & Western[1] [2]	1,666,475	1,621,021	3,632,289	3,507,959
Pennsylvania[1] [3]	3,556,665	3,031,069	7,674,179	6,602,414
Pitts. & Lake Erie[1] [2]	955,605	566,664	1,786,409	1,144,370
Pitts. Shaw. & North[1] [2]	246,810	193,143	534,284	425,315
Virginian[1] [2]	259,756	283,430	666,865	627,569
Western Maryland	234,895	251,020	525,897	565,354
Total 13 roads	12,325,643	10,798,561	26,883,169	23,465,358
Coke				
Baltimore & Ohio[1]	265,380	232,111	540,335	453,506
Buffalo, Roch. & P[1] [2]	22,041	31,584	50,821	65,418
Buffalo & Susq.[1] [2]	36,202	46,974	69,697	96,748
Chesapeake & Ohio[1]	36,194	14,309	70,450	25,746
Norfolk & Western[1] [2]	95,869	68,585	214,614	138,800
Pennsylvania[1] [3]	819,486	741,757	1,672,898	1,427,303
Pitts. & Lake Erie[1] [2]	415,365	299,952	819,513	578,718
Western Maryland	6,465	699	14,736	4,025
Total 8 roads	1,697,002	1,435,971	3,453,064	2,790,264

Total Coal and Coke 13 Roads	1914	1915
January	18,157,998	15,685,811
February	15,446,830	13,702,789
Total 2 months	33,604,828	29,388,600

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 356,663 short tons of bituminous coal during February, 1914, and 286,243 short tons during the two months ending February.

EXPORTS BY DISTRICTS

The following is a statement of exports of coal from the United States by states during February:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	503	40	......
Maryland	......	79,029	......
New York	2,827	1,345	131
Philadelphia	386	32,794	95
Porto Rico	......	190	......
Virginia	......	150,417	979
Mobile	......	99	......
New Orleans	......	339	2
El Paso	......	15,651	3,151
Arizona	......	2,056	......
Laredo	......	351	
San Francisco	......	......	14
Southern California	......	23	......
Washington	1	2,961	2,073
Buffalo	112,422	201,125	30,266
Dakota	882	5,814	173
Duluth and Superior	133	5,284	160
Michigan	......	56,401	5,625
Rochester	2,269	5,174	185
St. Lawrence	58,131	25,293	1,290
Vermont	686	502	165
Total	178,240	584,888	44,309

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for March of the current year and the three months of 1914 and 1915, in short tons:

	March		Three Months	
	1915	**1914**	1915	**1914**
Anthracite	814,872	1,086,344	2,480,729	2,706,391
Bituminous	3,243,270	4,740,313	9,845,684	12,414,492
Coke	876,532	1,027,339	2,303,835	2,700,237
Total	4,934,674	6,853,996	14,630,248	17,821,120

FOREIGN MARKETS

GREAT BRITAIN

Apr. 16—Outputs are more satisfactory and the market is hardly so firm. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$8.40@8.52
Best seconds	Nominal	Seconds	7.80@8.04
Seconds	$8.64@8.88	Best Cardiff coals	5.22@5.34
Best dry coals	8.76@9.00	Cargo smalls	4.44@4.68

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is less active but rates are fully maintained. Rates are approximately as follows:

Gibraltar	$3.84	Naples	$6.00	Las Palmas	$3.84
Marseilles	4.439	Venice	9.60	St. Vincent	4.44
Algiers	4.246	Alexandria	6.36	Rio de Janeiro	6.72
Genoa	6.00	Port Said	6.24	Monte Video	6.24
				River Plate	6.48

Exports—British exports for March and the first three months of past three years were as follows:

	March			Three Months		
To	1913	1914	1915	1913	1914	1915
Russia	111,338	175,134	......	445,120	552,555	......
Sweden	281,468	239,201	257,038	887,124	746,078	757,277
Norway	201,410	233,444	296,307	640,918	695,324	692,344
Denmark	252,905	271,695	285,880	783,134	719,769	733,007
Germany	615,008	737,017	......	1,877,625	1,875,014	......
Netherlands	166,439	151,146	169,040	555,320	418,192	437,652
Belgium	220,687	140,314	......	614,674	491,991	......
France	1,072,300	1,235,041	1,275,725	3,227,793	3,791,450	3,919,763
Portugal[1]	96,136	123,867	117,211	377,472	352,862	299,307
Spain[4]	321,814	319,617	156,388	1,027,019	958,922	539,043
Italy	841,966	736,565	714,993	2,429,048	2,392,315	1,760,022
Aus. Hung.	118,498	63,444	......	400,085	218,190	......
Greece	49,598	60,567	47,734	149,835	187,029	111,778
Roumania	4,239	37,991	......	7,288	46,325	......
Turkey	7,718	68,340	......	33,676	171,634	......
Algeria	112,917	105,528	76,041	375,519	321,854	252,695
Portuguese[5]	16,769	18,927	24,630	77,641	62,976	65,537
Chile	48,076	64,822	3,551	142,943	146,858	12,840
Brazil	206,160	112,893	50,616	496,519	394,219	163,504
Uruguay	53,526	63,287	43,370	182,445	184,112	128,675
Argentine	290,459	330,800	168,567	919,202	1,011,746	537,871
Channel Is.	8,967	16,661	15,194	32,782	41,451	32,295
Gibraltar	42,584	44,964	32,472	105,929	97,313	102,760
Malta	94,005	69,102	6,025	246,249	148,923	28,694
Egypt[2]	183,000	302,725	125,967	740,015	883,004	396,697
Aden[3]	4,978	29,091	......	32,614	52,651	22,095
India	34,328	18,618	1,620	65,641	40,300	10,910
Ceylon	23,067	21,971	1,505	61,121	86,716	17,131
Miscell'ous.	118,414	116,950	107,399	304,258	340,596	197,829
Coke	76,340	82,898	68,281	282,190	301,749	235,174
Briquettes	156,210	178,100	98,202	507,202	502,181	243,348
Total	5,831,324	6,170,720	4,143,756	18,028,401	18,234,299	11,698,248
Bunker	1,654,142	1,689,304	1,300,467	4,951,231	5,035,448	3,978,631

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.

FRANCE

For the first six months of last year the coal imports of France broke all records, although the native production until the outbreak of the war was normal. After Aug. 1 the supply from Germany and Belgium was shut off, so that France had to depend upon Great Britain for its foreign coal, although small quantities were received from the United States. Of the foreign coal reecipts in 1914, Great Britain furnished 10,759,085 tons, as compared with 11,257,228 tons in 1913. The receipts of Belgian and German coal were 2,032,098 and 2,341,996 tons, respectively, against 3,669,395 and 3,490,576 tons, respectively, in 1913. The bulk of the French coke imports in 1914 came from Germany, 883,033 tons, as compared with 2,392,897 tons in 1913.

DIVIDENDS

The following is a partial list of the more important dividends announced since the first of the year:

Burns Bros.—Regular quarterly dividend on the common of 1¼%, payable Feb. 15 to holders of record, Feb. 1, and also regular quarterly on the preferred No. 8 of 1¾%, payable Feb. 1 to holders of record, Jan. 15.

Consolidation Coal—Regular quarterly of 1½%, payable Jan. 30 to holders of record, Jan. 23. The transfer books are not closed for this dividend.

Dominion Coal—Preferred dividend No. 44 of 3½%, payable Feb. 1 to holders of record, Jan. 6.

Maryland Coal of West Virginia—Dividend of 1%, payable Feb. 1 to holders of record, Jan. 22 to Jan. 31 inclusive.

Pacific Coast—Regular quarterly dividend on the common and second preferred of 1%, and on the first preferred of 1¼%, all payable Feb. 1 to holders of record, Jan. 21 to Feb. 1.

Lehigh Coal & Navigation—Regular quarterly dividend of $1, payable Feb. 27 to holders of record Jan. 3.

Jefferson & Clearfield Coal & Iron—Dividend of 1¼% on the preferred, payable Feb. 15 to holders of record, Feb. 9.

American Coal—Dividend of 3%, payable Mar. 1 to holders of record, Feb. 27.

American Coal Products—Regular quarterly dividend of 1¾% on both the common and the preferred, the former payable Apr. 1 to stock of record Mar. 26 to Mar. 30, and the latter payable Apr. 15 to stock of record Apr. 11 to Apr. 14.

Central Coal & Coke—Regular quarterly dividend on the preferred of 1¼%, payable Apr. 15 to stock of record Apr. 1 to Apr. 15.

Temple Coal—Regular quarterly dividend on the preferred of 2%, payable Apr. 12 to holders of record, Apr. 2.

I. C. C. DECISIONS

I. C. C. Nos. 5336, 5336 Sub. No. 1, 5336 Sub. No. 2, 5336 Sub. No. 3, 5358, 5358 Sub. No. 1—McCan Coal Co., Elliott Splint Coal Co., Gilmer Consolidated Coal Co., Queen Shoals Coal Co., Morris Fork Coal Co., Elk Manor Coal Co., vs. Coal & Coke Ry. Co.

1. Upon a supplemental hearing the coal operators and the defendant railway company submitted a statement showing the mine ratings which shall form the basis for the distribution of coal cars during periods of car shortage. This agreement being satisfactory to all concerned, is accepted by the commission as a compliance with its original findings herein, 30 I. C. C., 531.

2. During periods of car shortage, the allotment due any particular one of the four mining operations controlled by the Davis Colliery Co. shall be used by that particular mine, and should such mine countermand its order for cars on any day, such cars shall revert to the general supply and be distributed among the mines along the line of the defendant railway company according to the respective mine ratings. Rail & River Coal Co. vs. B. & O. R.R. Co., 14 I. C. C., 86, distinguished.

3. Cars which are partially loaded and remain over until the next day to be fully loaded shall be charged against the mine loading the same, as if such cars were empty.

I. C. C. No. 6128, Sub.—No. 1 and Sub.—No. 2—Vulcan Coal & Mining Co., St. Louis—Coulterville Coal Co., Groom Coal Co. vs. Illinois Central R.R. Co.

Complainants request reparation for damages occasioned by the alleged failure of the defendant upon reasonable request to furnish cars for the shipment of coal from complainants' mines; defendant denies the Commission's jurisdiction and argues that the question raised is one for the determination of the courts: **Held:**

1. The question as to the extent to which defendant failed to comply with the duty it owed complainants is an administrative one, of which the Commission alone can take original jurisdiction.

2. It is obvious that the absolute refusal of a carrier to furnish a shipper cars would be a violation requiring no administrative determination and of which the courts could take primary jurisdiction.

3. Considerations of expediency should have no weight in deciding whether or not the Commission should assume jurisdiction.

4. Reference made to cases dealing with the question of priority of jurisdiction as between the Commission and the courts.

5. The assumption of jurisdiction in the present case is not inconsistent with the mandamus provisions of section 23 of the act. B. & O. R.R. Co. vs. Pitcairn Coal Co., 215 U. S., 481.

6. Defendant is not deprived of its rights under the seventh amendment to the Constitution.

7. A carrier must do more than provide itself with sufficient equipment for the slack period of coal production.

8. A carrier must assume the burden of explaining or excusing its failure to furnish cars.

9. The question of whether or not the car supply was reasonably adequate at these particular mines and the question of the amount of damages, if any, left for a subsequent hearing.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

+Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
+465	Board of Education	St. Louis	Mo.	30,000b	627
+465	Board of Education	St. Louis	Mo.	700a	627
+486	Board of Insanity	Boston	Mass.	46,950ab	665
+489	Municipal Electric Light Plant	Staples	Minn.		748
+497	School Board	Richmond	Va.	250a	665
+497	School Board	Richmond	Va.	2000b	665
+498	City Light & Water Plant	Grafton	N. D.	550	665
+502	Water & Light Dept.	Perry	Okla.	1,100b	665
+503	Board of Education	Evanston	Ill.	1,400ab	665
+507	Board of Education	Allentown	Penn.	1,600 to 1,800a	665
+509	City Government	Chelsea	Mass.	1,700ab	665
+513	City Government	Pawnee	Okla.	1,500b	665
+515	Board of Education	Elmira	N. Y.	687a	665
+515	Board of Education	Elmira	N. Y.	1,167b	665
+548	Purchasing Officer	Washington	D. C.	48,125b	708
+548	Purchasing Officer	Washington	D. C.	9,355a	708
+550	U. S. Engineer Office	Norfolk	Va.	3,000b	709
+564	U. S. Engineer Office	New Orleans	La.		748
+573	Board of Education	Kokomo	Ind.	800b	749
+585	U. S. Government	Washington	D. C.	73,500b	749
+585	U. S. Government	Washington	D. C.	29,510a	749

a Indicates anthracite coal. b Indicates bituminous. c Coke.

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Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

+No. 228—Cambridge, Mass.—Sealed proposals were received on this contract (p. 446) until 8 p.m., Apr. 30. There will be from 5000 to 7000 tons of bituminous coal and 4000 to 6000 tons of anthracite required in addition to some wood. All bids must be accompanied by a certified check for $500, and the successful bidder will be required to furnish a satisfactory bond for 20% of the estimated amount of the contract awarded. Proposal forms and specifications may be had on application. Address Supt. of Schools, Michael E. Fitzgerald, City Hall, Cambridge, Mass.

+No. 397—Lorain, Ohio—Bids on this contract (p. 567) will be received until May 12 instead of Apr. 19 as previously announced. All bids must be accompanied by certified checks for $100, and specifications can be seen at the rooms of the School Board. Bids must be submitted on blank forms furnished by the board for that purpose. Address Clk. E. Bruell, Board of Education, Lorain, Ohio.

+No. 402—New Haven, Conn.—Bids on this contract (p. 567), which provides for furnishing the fuel requirements for the local Board of Education, will be received until 5 p.m., May 4. Copies of specifications and proposal forms may be obtained on application. Address Secy. of Bd. of Edu. G. T. Hewelett, 87 Orange St., New Haven, Conn.

+No. 461—Boston, Mass.—Bids on this contract (pp. 627, 748), which provides for furnishing various harbor institutions with coal, were as follows:

		H. T. Sch. C. Co.		Metro. C. Co.		N.E.C. & C.Co.	Gor. Loe. C. Co.	
	Tons	1	2	1	2	1	1	2
Children's Inst. Dept.	800	...	$4.16	$4.10	...	$4.11	...	
Infirmary Dept.......	6,000	...	3.72	...	$3.68	4.06	$3.87*	$3.84*
Pub. Wks. Dept. (Ferries)..............	11,000	$3.88	3.66	...	3.69	3.89	....	...
Pub. Wks. Dept. (Pasture)..............	8,000	3.96	3.68	...	3.70	3.98	...	...
Penal Inst. Dept.....	6,500	...	3.36	...	3.38	3.67	...	...
Hospital Dept.......	9,000	...	3.46	3.80	...	3.91	...	...

*Proposal not in due form.

Address Supt. of Supplies D. Frank Doherty, Room 808, City Hall Annex, Boston, Mass.

+No. 465—St. Louis, Mo.—Bids on this contract (p. 627), which provides for furnishing the local Board of Education with about 37,000 tons of bituminous and anthracite coal, will be received until 2 p.m., May 4. Address Supply Comr. E. M. Brown, 3431 School St., St. Louis, Mo.

+No. 487—Reading, Ohio—Bids on this contract (p. 665), which provides for furnishing 2000 tons of New River smokeless coal, either nut, slack or mine-run, at the local Electric Light & Water Works Department, will be received until noon, May 10, instead of about May 1, as previously announced. Deliveries are to be made as required during the fiscal year beginning June 1. A certified check for $100 must accompany each bid. Address Clk. C. V. Dils, Bd. of Pub. Affairs, 1701 Main St., Reading, Ohio.

+No. 507—Allentown, Penn.—Bids on this contract (p. 665) were closed on Apr. 28. The contract provides for 1500 tons of pea, 100 tons of chestnut, and 75 tons of stove coal. Deliveries are to be completed by Aug. 2. Address Secy. T. P. Wenner, Board of Education, Allentown, Penn.

+No. 558—Hamilton, Ohio—The bids on this contract (p. 709) will be received until noon, May 12. Guaranteed analysis must accompany all bids, and the requirements are as follows: 1600 tons of high-grade mine-run smokeless, 1600 tons of high-grade mine-run bituminous, 400 tons of high-grade nut and slack coal. Bids must include cost of delivery in the basements of various school houses as directed, during the school year 1915-16. Address Clk. Charles F. Holdefer, Bd. of Edu., Hamilton City School District, Hamilton, Ohio.

+No. 572—New York, N. Y.—The requirements on this contract (p. 749), which provides for furnishing various army posts with coal, have been reduced the following amounts: Bituminous, 34 tons; anthracite, 20 tons. Address Col. A. L. Smith, Depot Quartermaster, Army Bldg., Whitehall St., New York City.

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New Business

+No. 596—Galveston, Tex.—Sealed bids will be received until 2 p.m., May 5, for furnishing and delivering coal to vessels of the United States Coast Guard during the fiscal year ending June 30, 1916. Address Collector F. C. Pabst, Custom House, Galveston, Tex.

No. 597—Columbus, Ohio—The Board of Education will open bids May 4 for approximately 9000 tons of coal, to be delivered to the various school buildings of the city. The specifications call for lump coal either from the Hocking Valley, Pocahontas or New River district or from other fields in West Virginia. Prospective bidders are asked to submit bids on any or all varieties. Address Clk. Bd. of E. B. McFadden, Columbus, Ohio.

No. 598—New Orleans, La.—The United Fruit Co. will receive bids beginning May 1 on a three-year contract to supply all its ships with coal. The requirements amount to 150,000 short tons annually, and this is the largest contract to be let in this vicinity. The business has heretofore been held by the Monongahela Coal & Coke Co. Address Purchasing Agent, United Fruit Co., New Orleans, La.

No. 599—Louisville, Ky.—The J. M. Robinson, Norton & Co., who use over 120 tons of coal a month, will contract June 1 for a year's supply, half of which must be No. 8 Kentucky steam nut coal and half Pittsburg and Jellico nut and slack. Delivery by wagon. Address J. B. Curry, J. M. Robinson, Norton & Co., 533 West Main St., Louisville, Ky.

No. 600—Chicago, Ill.—The American Electric Co. will be in the market about June 1 for three cars per month of Illinois mine-run coal. The contract is to cover a period of one year. Address Mr. Boice, American Electric Co., 64th and State St., Chicago, Ill.

No. 601—Clinton, Iowa—The Clinton Sugar Refining Co. will be in the market on or about June 1 for their yearly requirements, approximating 70,000 tons of coal, in average monthly shipments of 6000 tons. They have been using some Illinois 1½-in. to 2-in. screenings. Address Traffic Manager, Clinton Sugar Refining Co., Clinton, Iowa.

+No. 602—Beverly, Mass.—The City Government of this place received bids until 7 p.m., Apr. 30, to supply its coal requirements for the season of 1915. All bids must be accompanied by a certified check for $200 and must be made in accordance with specifications on file at the office of the clerk at the City Hall. Address Clk. of Coms. Frederick B. Browning, Beverly, Mass.

No. 603—Louisville, Ky.—The Inter-Southern Life Insurance Co., which usually consumes about six tons a day, will be in the Market June 1 for a year's supply of mine-run coal. Delivery is by wagon and in quantities as required. Address Supt. G. W. Weingardner, Inter-Southern Life Insurance Company, Inter-Southern Bldg. Louisville, Ky.

+No. 604—Newton, Iowa—Sealed bids will be received until 7:30 p.m., May 5, for furnishing the local Water Works Plant with coal during the fiscal year beginning June 1. Bids are requested on lump, mine-run and steam coal, and are to include cost of delivery in bins at the pumping station. Address City Clk. E. G. Finch, Newton, Iowa.

+No. 605—New York, N. Y.—Sealed bids will be received until 2 p.m., May 5, for furnishing, delivering and trimming 650,000 lb. of egg coal to the Asphalt Plant, 90th and 91st St. and East River. Deliveries are to be completed by Dec. 31. A bond for $700 will be required, and all bidders must inclose a check for 5% of their bids. Blank forms and specifications may be obtained on application. Address Pres. of the Borough Marcus M. Marks, Room 2034, Municipal Bldg., New York.

No. 606—Fort Wayne, Ind.—The Bash Fertilizer & Chemical Co. will probably enter into a contract about June 1 for steam coals. They prefer Ohio and West Virginia coals. Address Receiver E. W. Cook, Bash Fertilizer & Chemical Co., Fort Wayne, Indiana.

+No. 607—New Orleans, La.—Bids will be received until 2 p.m., May 5, for furnishing and delivering coal to vessels of the U. S. Coast Guard at this place. Address Special Deputy Collector Calhoun Fluker, Custom House, New Orleans, La.

No. 608—Louisville, Ky.—The Louisville Cereal Mills will let a contract June 1 for their annual supply of nut and slack coal, involving between two and three cars a week. Bids are let on a competitive basis. Address L. C. Ewing, Louisville Cereal Mills, Louisville, Ky.

+No. 609—Munhall, Penn.—The Board of Education at this place will receive bids until May 8 for furnishing lump and slack coal to the local school. Address Secy. Bd. of Dir. John Bell, Jr., 1302 Louise St., Munhall, Penn.

No. 610—Dubuque, Iowa—The A. Y. McDonald Manufacturing Co. will soon be in the market for their coal and coke requirements for another year beginning June 1, 1915. Address Purchasing Agent, A. Y. McDonald Manufacturing Co., Dubuque, Iowa.

+No. 611—Ada, Minn.—The Water and Light Commission at this place will receive bids until 8 p.m., May 3, for furnishing coal required at the Electric Light Plant during the fiscal year terminating Apr. 1, 1916. Address Clk. Peter Sharpe, Water and Light Commission, Ada, Minn.

+No. 612—New York—Sealed proposals will be received until 11 a.m., May 6, for furnishing and delivering approximately 84,160 gross tons of anthracite and 4700 tons of semibituminous coal to the New York schools and the several offices of the Department of Education. Separate bids must be submitted for each district, and deliveries are to be completed before Mar. 31, 1916; deliveries are to be at such times and in such quantities as may be directed. Blank forms and further information may be obtained on application. Address Supt. of School Supplies Patrick Jones, Bd. of Edu., Park Ave. and 59th St., New York City.

+No. 613—Emmetsburg, Iowa—The City Government at this place will receive bids until 8 p.m., May 3, for furnishing coal as may be required. Address City Clk. T. F. Rutledge, Emmetsburg, Iowa.

+No. 614—Titusville, Penn.—The Board of Education at this place contracts about June 1 of each year for 2000 tons of coal. The current contract provides for three quarter Youghiogheny lump at $2.40 per ton f.o.b. The call for bids is advertised. Address City Mgr., H. A. Holstein, Titusville, Penn.

+No. 615—Seattle, Wash.—Sealed proposals will be received by the Coast and Geodetic Survey for furnishing the fuel requirements of five steamers at different points in Alaska during the coming summer. Address Capt. J. F. Pratt, Inspector, Coast and Geodetic Survey, 204 Burke Bldg., Seattle, Wash.

+No. 616—San Francisco, Calif.—Sealed proposals will be received by the lighthouse inspector at this place until May 21 for furnishing the annual supply of bituminous coal. Blank proposal forms and particulars may be obtained on application. Address, Lighthouse Inspector, San Francisco, Calif.

+No. 617—Kalamazoo, Mich.—The Municipal Government at this place will be in the market about June 1 for 2000 tons of West Virginia slack coal. The call for bids is advertised and the current contract was made at about $2.72½ per ton. Address, City Clk., C. L. Miller, Kalamazoo, Mich.

+No. 618—Toledo, Ohio—Bids will be received by the local Board of Education until May 1 for furnishing approximately 10,000 tons of coal to the public schools during the fiscal year beginning June 1. Address, Dir. of Schools Geo. L. McKesson, Administration Bldg., Toledo, Ohio.

+No. 619—Appleton, Minn.—Sealed proposals will be received by the Village Council until 8 p.m., May 3, for furnishing approximately 600 tons of Youghiogheny lump coal. Prices should be quoted f.o.b. cars at Appleton. Address, Recorder Henry Lende, Appleton, Minn.

+No. 620—Webster, S. D.—The Municipal Government at this place will receive sealed bids until 8 p.m., May 3, for furnishing steam coal as required until Apr. 1, 1916. Prices should be quoted f.o.b. shipping point. Address, City Audr. J. B. Egeland, Webster, S. D.

+No. 621—Luverne, Minn.—The Municipal Government at this place will contract about June 1 for 1200 to 1500 tons of coal for delivery during the next year. The present contract is being filled with Illinois "Purity" 3x6 egg, for which $1.40 is being paid f.o.b. mines. Address Supt. Jas. Hughes, Municipal Power Plant, Luverne, Minn.

+No. 622—Lancaster, Penn.—Sealed proposals will be received by the Municipal Government until 9 a.m., May 3, for furnishing coal to the Lancaster County Prison, as follows: 125 tons of pea; 100 tons of nut; 25 tons of broken. Address, Solicitor W. H. Kready, 42 North Duke St., Lancaster, Penn.

+No. 623—Newton, Iowa—The Municipal Government at this place will be in the market about June 1 for 20 tons of Iowa mine-run coal per day. The call for bids is advertised, and the current contract was made at $2.48 per ton. Address, Supt. C. O'Leary, City Power Plant, Newton, Iowa.

+No. 624—Providence, R. I.—The Board of Education at this place will be in the market about June 1 for 8500 tons of anthracite coal to be delivered as required. The contract last year was awarded on Lehigh (Highland) egg coal at $5.94 per ton. Bids are requested by circular letter. Address School Committee, 32 Sumner St., Providence, R. I.

+No. 625—Mt. Clemens, Mich.—Sealed bids were received by the Board of Public Works until 4 p.m., Apr. 30, for furnishing the coal requirements for the local water works pumping station during the fiscal year beginning June 1. The bids were received on Hocking Valley and West Virginia threequarter lump, and for nut, pea, and slack coal. Address Deputy City Clk., Marie J. Behnke, Bd. of Pub. Wks., Mt. Clemens, Mich.

+No. 626—Boston, Mass.—Sealed proposals will be received until 2 p.m., May 5, for furnishing and delivering on board vessels, coal required by the United States Coast Guard at this place. Proposals must in all cases conform with specifications, instructions, etc., copies of which may be had on application. Address Collector Edmund Billings, Custom House, Boston, Mass.

+No. 627—Lancaster, Penn.—The School Board at this place received bids until 11 a.m., Apr. 27, for furnishing about 1000 tons of anthracite, pea, nut, stove, and egg coal. Address Chn., A. C. Welchans, 202 James St., Lancaster, Penn.

No. 628—Elkhart, Ind.—The Chicago Telephone Supply Co. is in the market for their fuel requirements for the year 1915, covering two or three carloads of West Virginia or Kentucky coal per month. They are asking quotations on Kentucky block and egg. Address Pur. Agt. A. J. Briggs, Chicago Telephone Supply Co., Elkhart, Ind.

+No. 629—Medford, Mass.—Sealed proposals were received until 9 a.m., Apr. 30, for furnishing the local Fire Department with 137 tons of the best grade anthracite egg, stove, and pea coal. Price to be quoted for delivery at the different fire houses at such times and quantities as may be required. Address Chief of Dept., C. E. Bacon, City Fire Department, Medford, Mass.

+No. 630—Norwood, Mass.—Sealed proposals were received until 8 p.m., Apr. 30, for furnishing the local Municipal Government with coal as follows: Stove, 45 tons; broken, 260 tons; egg, 50 tons; nut, 25 tons; Pocahontas bituminous, 870 tons. Bids were to be f.o.b. Norwood or delivered at the various municipal buildings. Address Gen. Mgr. C. A. Bingham, Bd. of Selectmen, Municipal Building, Norwood, Mass.

+No. 631—Milwaukee, Wis.—Sealed proposals will be received by the Department of Public Works until 10:30 a.m., May 1, for furnishing and delivering 1000 tons of coal to the High Service pumping station, delivery to commence within ten days after the award of the contract and continue at the rate of 80 tons per month. The successful bidder must furnish either a deposit of $500 or a bond for $1000. Address Deputy Comr. of Pub. Wks., Percy Braman, Department of Public Works, Milwaukee, Wis.

+No. 632—Phillipsburg, N. J.—The Board of Education at this place received bids until 8 p.m., Apr. 28, for furnishing the coal required at the public schools during the ensuing year. Specifications are on file at the office of the Secretary of the Board. Address Secy. George W. Smith, Bd. of Ed., Phillipsburg, N. J.

+No. 633—Hot Springs, S. D.—Sealed proposals will be received by the National Home for Disabled Volunteer Soldiers until 2 p.m., May 12, for furnishing 9000 net tons of lignite coal during the ensuing year. Blank proposal forms and specifications may be had on application. Address Treas. and Quartermaster, William H. Stanley, N. H. D. V. S., Hot Springs, S D.

+No. 634—Pipestone, Minn.—The City Government at this place is advertising for coal for the local pumping station. Youghiogheny lump and Elkhorn screenings are required. Address City Clerk, Pipestone, Minn.

+No. 635—Ortonville, Minn.—Sealed bids will be received by the City Government at this place until 8 p.m., May 3, for furnishing approximately 700 tons of Pocahontas coal to be delivered at the City Water and Light Plant. Address City Clk. M. E. Scheibe, Ortonville, Minn.

+No. 636—Melrose, Minn.—The Water and Light Commission at this place will receive bids until 8 p.m., May 3, for furnishing about 1200 tons of rough lump coal. Address Charles Kramer, Bd. of Water and Light Commission, Melrose, Minn.

+No. 637—Toledo, Ohio—The Board of Education at this place will receive bids until noon, May 1, for supplying coal during the year ending June 1, 1916, as follows: 3300 tons of West Virginia smokeless mine-run, 3400 tons of West Virginia gas mine-run, 3000 tons of West Virginia or Kentucky slack, 275 tons of smokeless egg or lump, 200 tons of egg, stove and chestnut. A certified check for $1000 must accompany all bids for bituminous coal and a check for $100 must accompany the bids on anthracite. Bidders must also give full particulars regarding the commercial name of the coal and price quoted is to be per short ton and cover cost of delivery in bins and trimmed. About 7000 tons is to be delivered before Sept. 1 of the current year. The coal is in all cases to be subject to inspection before unloaded from the railroad car. Address Dir. of Schools George L. McKesson, Toledo, Ohio.

+No. 638—Baltimore, Md.—Sealed proposals will be received until May 5 for supplying the United States Coast Guard, together with vessels at Arundel Cove, Md., with coal as may be required during the fiscal year ending June 30. Proposals must, in every case, conform with the specifications, instructions, etc., which may be obtained on application. Address Collector W. S. Ryan, Custom House, Baltimore, Md.

No. 639—Boston, Mass.—Sealed proposals will be received until 4:30 p.m., May 1, for furnishing 200 tons of coal to the Franklin Union Building. A certified check for $50 must accompany each bid, and details in regard to commercial name of the mine, location, etc., given. Address Pres. Richard Olney, the Franklin Foundation, Berkeley St., Boston, Mass.

Awards

+No. 282—Meriden, Conn.—This contract (p. 448), which provides for furnishing the local schools with 800 tons of anthracite coal, has been awarded to **Lyon & Billard.** Address Town School Committee, Meriden, Conn.

+No. 443—Troy, N. Y.—This contract (p. 627) has been awarded to **Peterson & Packer Coal Co.** on the following basis:

	City Hall	Schools
Grate coal	$5.48	$5.68
Egg	6.25	6.54
Stove	6.25	6.54
Chestnut	6.38	6.73
Pea	4.87	4.75

The prices given are for April delivery. On grate coal an addition of 10c. per ton is made for May delivery, 20c. on deliveries between June 1 and 15, and 25c. on deliveries made between June 15 and Mar. 31, 1916. The prices on all other grades are uniform throughout the period. For the Department of Charities deliveries of stove coal in half-ton lots will be made at $6.60, and $6.75 in quarter-ton lots; deliveries of chestnut at $6.85 in half-ton lots, and $7 in quarter-ton lots. Address Secy. John J. McLaughlin, Board of Contract and Supply, Room 21, City Hall, Troy, N. Y.

+No. 446—Buffalo, N. Y.—The Larkin Co. advises that it has closed its contract (p. 627) providing for a supply of slack coal. Address Pur. Agt. F. J. Arthurs, Larkin Co., Buffalo, N. Y.

+No. 452—San Francisco—This contract (p. 627), which provides for furnishing coal for army transports and other purposes at this place was awarded to the **Western Fuel Co.** on Wellington coal. Prices varied according to delivery as follows: In holds of vessels, transport dock, $6.86; on board vessels in sacks, $8.11; at recruiting office, Oakland, Calif., $11; at S. F. National Cemetery, $10.50. Address Depot Quartermaster, Lieut.-Col. W. H. Hart, 1086 North Point St., San Francisco, Calif.

+No. 491—Alexandria, Minn.—This contract (p. 665), which provides for furnishing the Local Board of Public Works with from 1500 to 1800 tons of Elkhorn and Youghiogheny screenings, has been awarded to the **Northwestern Fuel Co.,** of St. Paul, Minn. Address Chf. Clk., C. J. Smidblad, Board of Public Works, Alexandria, Minn.

+No. 566—Boston, Mass.—Awards on this contract (p. 709), which provides for furnishing the Board of Education with fuel requirements for the period beginning June 15 of the current year and ending Jan. 31, 1916, were as follows: BITUMINOUS—**Massachusetts Wharf Co.,** East Boston, $4.30; Brighton, $4.40. **D. Doherty Co.,** Dorchester, $4.33. **John A. Whittemore's Sons,** West Roxbury, $4.55. **Metropolitan Coal Co.,** the whole city, $4.38. **City Fuel Co.,** the whole city, $4.10. ANTHRACITE—**The Staples Coal Co.** was awarded most of the anthracite portion of this contract at $5.84 for furnace and $6.37 for egg, its contracts covering the following districts either in their entirety or in part: City proper, South Boston, East Boston (in part), Roxbury, Dorchester (in part), Charlestown, Brighton (in part), West Roxbury, Hyde Park, the whole city (in part). **The Massachusetts Wharf Coal Co.** was awarded part of the East Boston contract at $5.80 for furnace and $6.32 for egg; also part of the Brighton contract at $5.96 for furnace and $6.84 for egg. **D. Doherty Co.** was awarded part of the Dorchester contract at $5.82 for furnace and $6.37 for egg. **The Brighton Coal Co.** was awarded part of the Brighton contract at $5.83 for furnace and $6.38 for egg. **The Metropolitan Coal Co.** was awarded part of the contract for the whole city at $5.94 for furnace and $6.24 for egg. **The City Fuel Co.** was also awarded a portion of this same contract at $5.70 for furnace and $6.15 for egg. Address Bus. Agt. William T. Keough, Room 801, City Hall Annex, Boston, Mass.

+No. 568—Albany, N. Y.—This contract (pp. 709, 748) has been awarded to the **Montgomery Coal Co.,** of Albany, at prices previously noted. A bond of $10,000 is required on this contract. Address Supt. William H. Storrs, Capitol Bldg., Albany, N. Y.

+No. 595—Hartford—This contract (p. 750), which provides for furnishing the State Capitol with anthracite coal, has been awarded to **W. C. Mason & Co., Inc.,** Address Comptroller Morris C. Webster, State Capitol, Hartford, Conn.

Contract Notes

Lawrence, Mass.—Theberge Bros., Lawrence, Mass., has been awarded a contract for supplying the Water Department at this place with 1300 tons of New River coal at $4.93 per ton.

Rochester, N. Y.—Press reports state that bids were recently opened for furnishing the county institutions with a large quantity of coal. Address the Monroe County Building Commission.

Clinton, Mass.—The contract for furnishing the local school department with about 400 tons of egg coal and 70 tons of broken coal has been awarded to **Connery Bros.** at $7.65 for egg and $7.45 for broken coal. Other bidders on this contract were as follows: Charles Frazer & Sons, egg, $7.71, broken, $7.47; Consolidated Ice & Coal Co., egg, $7.81, broken, $7.56; Philbin Bros., egg, $7.76, broken, $7.56. Address Board of Education, Clinton, Mass.

Fall River, Mass.—The American Printing Co. closed its contract for about 75,000 tons to the Chesapeake & Ohio Coal Agency Co., on New River coal.

Boston, Mass.—The Central New England Ry., subsidiary to the N. Y., N. H. & H. R.R., closed its annual contract, 150,000 tons locomotive coal, to the New England Coal & Coke Co., on Federal Coal & Coke Co.'s (W. Va.) gas coal.

St. Louis—An unusual development at this season of the year is the call from Mississippi River points south, for all-rail Illinois coal. This is accounted for by low water in the Ohio River and tributaries, which is the lowest in fifty years. No coal has come down the Ohio for the south since Feb. 20, and millions of bushels are held in barges, awaiting high water.

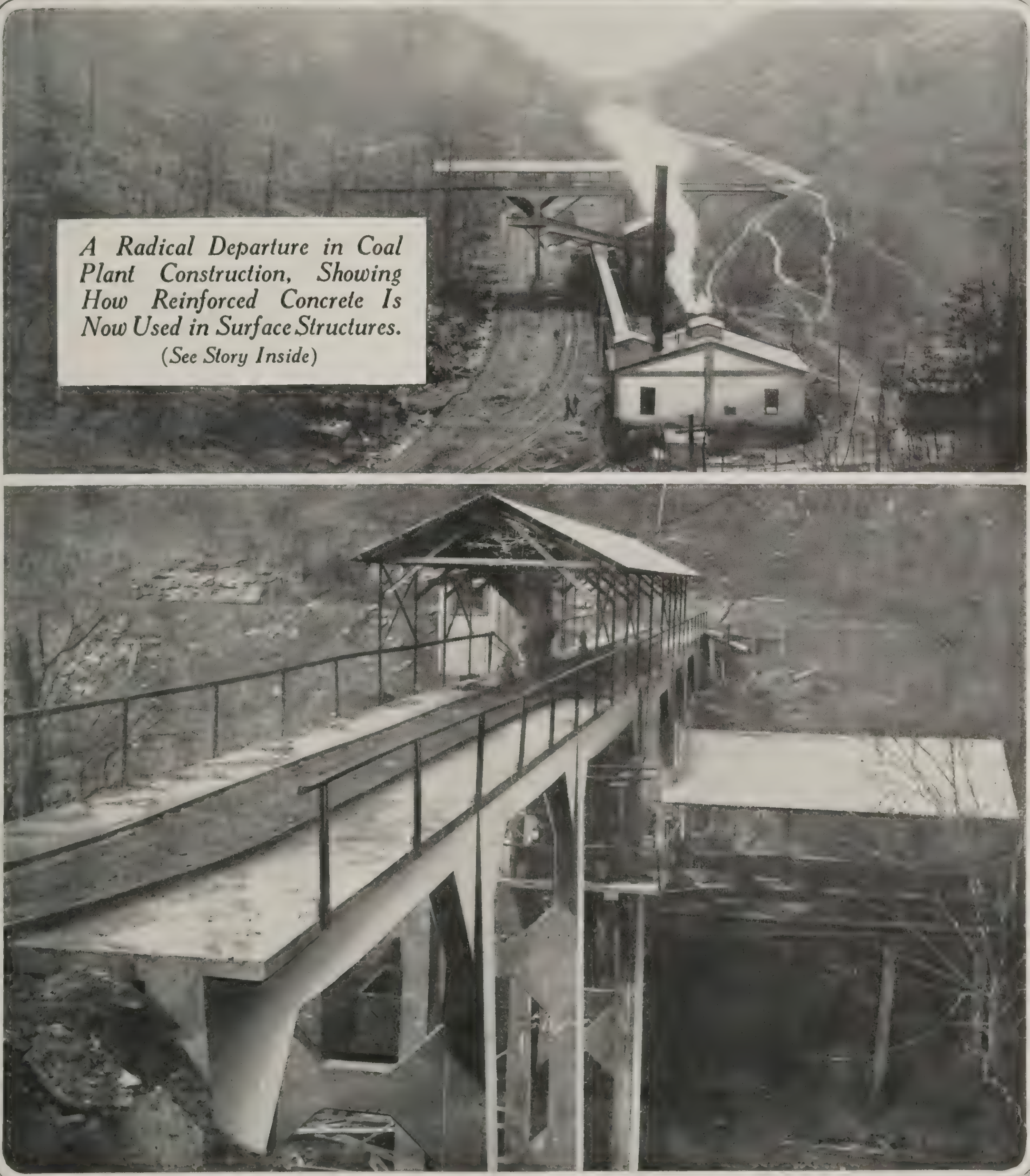
STATE GEOLOGICAL SURVEY

COAL AGE

Volume 7, No. 19
Issued Every Saturday
Hill Publishing Company

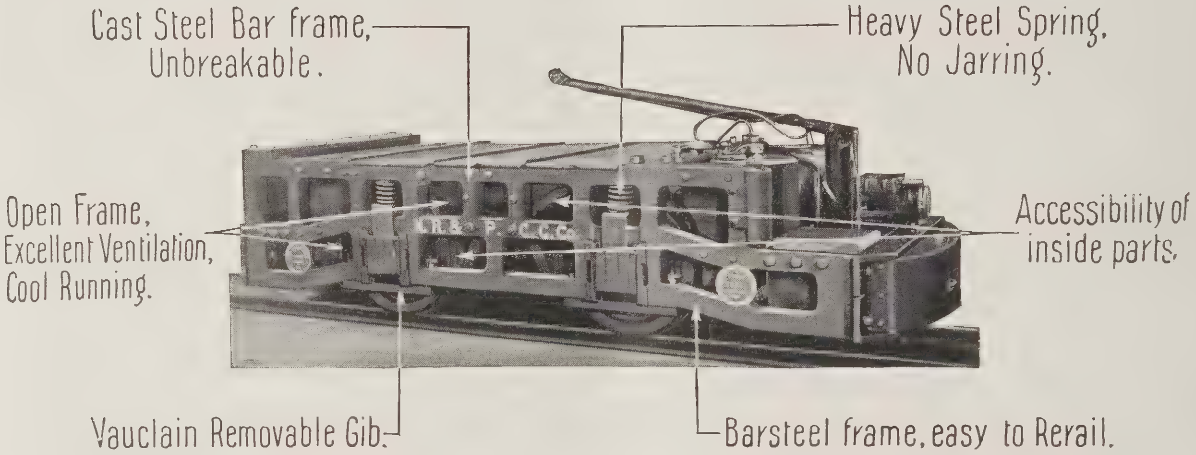
NEW YORK, MAY 8, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

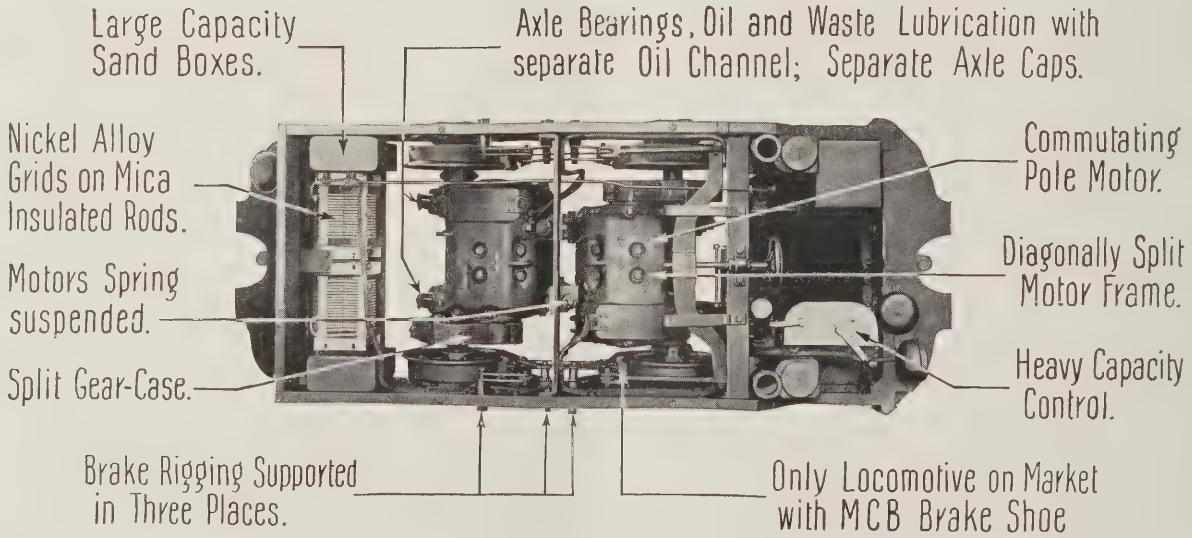


A Radical Departure in Coal Plant Construction, Showing How Reinforced Concrete Is Now Used in Surface Structures.
(See Story Inside)

For
Maximum Output at Minimum Cost
use
Baldwin-Westinghouse Barsteel Locomotives


Cast Steel Bar frame, Unbreakable.
Heavy Steel Spring, No Jarring.
Open Frame, Excellent Ventilation, Cool Running.
Accessibility of inside parts.
Vauclain Removable Gib.
Barsteel frame, easy to Rerail.

Barsteel = Reliability + Accessibility


Large Capacity Sand Boxes.
Axle Bearings, Oil and Waste Lubrication with separate Oil Channel; Separate Axle Caps.
Nickel Alloy Grids on Mica Insulated Rods.
Commutating Pole Motor.
Motors Spring suspended.
Diagonally Split Motor Frame.
Split Gear-Case.
Heavy Capacity Control.
Brake Rigging Supported in Three Places.
Only Locomotive on Market with MCB Brake Shoe

Ask any user about any feature and have him tell you

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000

None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

THE May issue of "Associated Advertising" contains some items that deserve reproducing on this page—look them over:—

* * *

"President Wilson, in his address, "Rules of the Game," had all business men in mind, of course, yet four rules he laid down do seem to have a special significance for advertising men. They are worth memorizing:

> *First*—Publicity; not doing anything under cover. Let's see how you are running the game!
>
> *Second*—Give full equivalent in service for the money you receive. Try to make profits proportionate to the satisfaction of the people you serve.
>
> *Third*—Have conscience in business. Try to make good according to the standards of the people we live with.
>
> *Fourth*—Have the spirit of service which puts the work you do above mere monetary consideration.

Don't they embrace all the real essentials for living a useful, profitable life?"

* * *

"Herbert N. Casson, speaking at Newcastle-On-Tyne, on the power of advertising, said the Dominion of Canada spent $70,000 advertising for new citizens in the United States in 1913 and got 140,000 settlers—fifty cents each, they cost—cheaper than chickens! He said there must be something unusual about the most effective advertisements, something to make people think, and he believed that, as a rule, it costs more not to advertise than to do so."

* * *

"Another man who will not advertise—the merchant who advertised through May and June once and did not get to go fishing all that summer."

COAL AGE

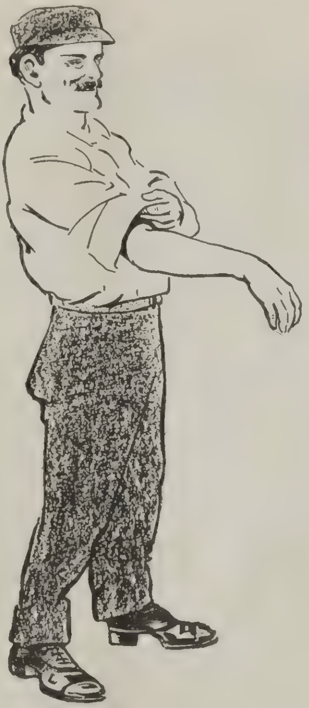
Vol. 7 NEW YORK, MAY 8, 1915 No. 19

What is a Coal-Mine Superintendent?

A coal-mine superintendent is a human being—if his salary is suddenly cut off, he might starve.

According to the reporters and the politicians he is a "hireling" of the terrible Coal Barons—whatever that (a hireling) may be or whoever they (the barons) may be—who spends most of his time tightening the shackles of industrial slavery around the common everyday people who are under him, hoping that the millionaires above him may become billionaires.

According to the "know it alls," he is the only man around a mining camp who does not have to stand an examination before receiving an appointment. If these same "know it alls" were asked to question the applicants for superintendents' positions and judge of their abilities, they (the "know it alls") would probably suddenly find that they had important business in other states.



"A coal mine superintendent is a human being . . . who keeps balky coal mines running"—which is quite contrary to the general opinion of a few prejudiced, uninformed individuals.

The shyster lawyers, in addressing juries, when superintendents are pitted against them as witnesses, refer to them as sycophantic gentlemen, with especial emphasis on the gentlemen; but their judgments should not be given very much weight, because when circumstances are such that these same lawyers have settlements to obtain that can only be obtained through superintendents they seem perfectly willing to treat with the superintendents and never question their promises.

The ladies of the camp who think that their houses need repairs or that their husbands merit promotion or better working-places look upon the superintendent as selfish and ungrateful—but their testimony is not disinterested and likewise should be given little weight.

When a group of mines are consolidated and a mine foreman assumes the responsibilities formerly carried by a superintendent in their camp, the ladies flood the general manager's office with petitions of protest assuring him that they won't live in a camp that can't afford a superintendent.

The directors of a company believe that the superintendent is the stumbling-block that robs them of all their dividends. He is always, according to them, springing some welfare work or liability fund or pension allowance to absorb every last cent of surplus, and not satisfied with that, he insists that an appropriation or two must be allowed for improvements if he is to compete with his neighbors.

To his family the superintendent is a man who has his mind on his work 24 hours in every day. Between attempting to prevent things that might happen and trying to correct things that have already happened, he has little time for himself or the family. While the rest of the community is discussing gardens and clothes he is telling his family about the gas feeder in the "9th right" or the commutator that went bad at the pump station.

Why do we want coal-mine superintendents anyway?

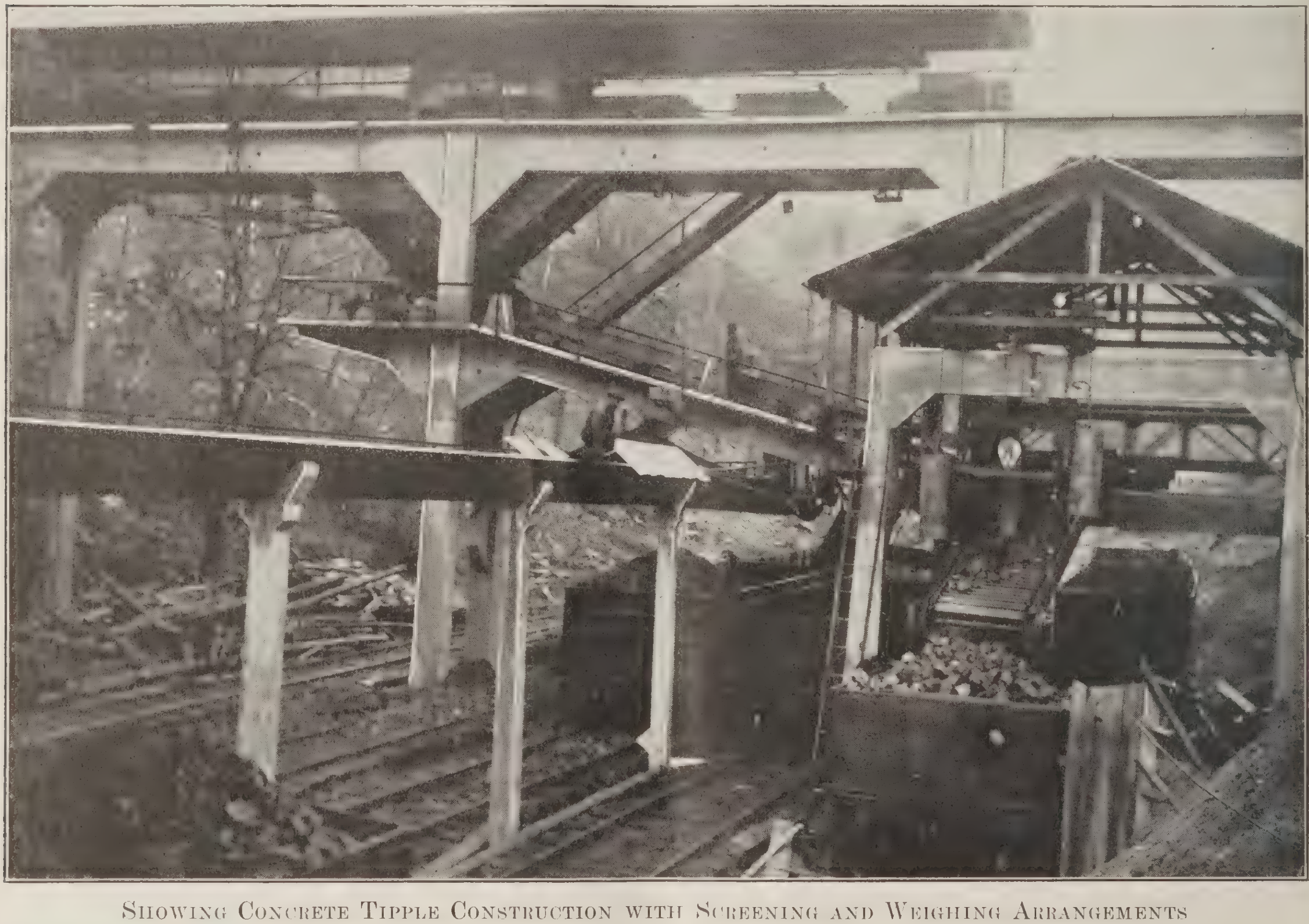
Because they are the fellows who keep balky mines running and incidentally make it possible for most of their critics to earn a living.

A Kentucky Mining Success

By J. E. Butler*

SYNOPSIS—Details of a plant that embodies in its construction ideas that are really new and to some extent original. Everything is automatic that can at present be made so. Something about Mr. Petersen, the designer.

The greatest prospective coal-mining success that I have seen this year is at Hazard, Ky. It is the equipment of a mine for the Ashless Coal Co. furnished by O. G. Petersen, of the Associated Engineering Co. I say "prospective success," for many of the ideas embodied are new to coal-mining practice and will have to be adapted to the work. Management and engineering skill will have much to do with the final result. Assuming that the proposed plans will work out as designed, some economies of a radical nature will have been secured. We often hear the term "modern equipment" applied to coal plants, and in this instance the expression seems to fit.



Showing Concrete Tipple Construction with Screening and Weighing Arrangements

The surface structures, classic in appearance, are of reinforced concrete. The power plant is a marvel of neatness and compactness and is equipped with two 150-hp. return-tubular boilers with steel jackets and one 200-kw. Curtiss turbine, occupying one open room in a building of neat design. The fuel is received directly from the tipple screens on a cable conveyor, which delivers it to the boiler-house bins, immediately behind the oven doors. Only one operative is required in this plant.

In addition to the power plant the mine equipment embraces several noteworthy features. The undercutting chain machines furnished by the Sullivan Machinery Co. have General Electric alternating-current motors, operating at 440 volts. This change from the direct current will permit extensive development without excessive copper-wire costs.

Storage-Battery Locomotives

Haulage power is furnished by storage-battery locomotives of General Electric construction. The absence of a network of dangerous overhead trolley wires is noted with satisfaction as is also the absence of bonds. With the present service the locomotives will run 14 hr. without recharging. The recharging is done in about 7 hr. at night and serves to distribute the load on the power plant.

The Streeter-Amet automatic scales of 20-ton capacity are used. There are two platforms accommodating loads from each side of the mountain, connected to one beam or recording device. This feature eliminates the disputes regarding weights between miner and company. The load passes over the scale, and the recording device does the rest.

---

*General manager, Stearns Coal & Lumber Co., Stearns, Ky.

The mine cars were built by the Sanford-Day Iron Works, of Knoxville, according to plans furnished by Mr. Petersen. Dumping of coal is brought about by a trip which automatically releases the bottom fasteners, and the coal slides out of the car into a 30-ton steel hopper. The bottoms in turn are closed and secured automatically by idler pulleys in the floor of the tipple, over which the car is hauled as soon as it is unloaded. This bottom dumping feature will undoubtedly excite the criticism of car builders throughout the country, and it will be interesting to see if the arrangement will stand up under service.

The tipple is really a bridge some 40 ft. high by 400 ft. long spanning a narrow valley, on each side of which, at tipple height, are the mine openings. The massive beams and columns of concrete are not without architectural beauty and show up in striking contrast to the jumble of wood and machinery which usually passes for a tipple. This structure spans four tracks, providing for that number of grades of coal at one operation, and supports the scales, receiving hopper, screens and loading boom. The box-car loader is on a separate pedestal.

How the Coal Is Handled

With the aid of these and other features the coal is handled with great facility. It is undercut, shot, loaded in the car and pushed to the room parting by the miner. The motorman and trip-rider with the storage-battery locomotive gather the cars into trips and haul them to the tipple, where without delay, interruption or any assistance, the coal is automatically weighed and dumped and the car bottoms are closed and made secure. The train then passes on into the opposite side of the mine as an empty trip.

At the bottom of the receiving hopper is a feeder plate which delivers the coal gradually to the shaker screen. The screens are 40 ft. in length by 5 ft. in width, giving ample screening capacity. They are driven by a geared motor, and have the short pendulum swing peculiar to Petersen installations. The lump coal is delivered to a loading boom, which has a horizontal table for slate-picking purposes, and continuous with this is an incline conveyor which lowers the coal without breakage into the railway car. This boom may be hoisted or lowered at the will of the operator so that coal may be discharged at any level desired in the gondola car, or the whole boom may be moved laterally so as to bring the discharge end opposite a box-car door for box-car loading.

The railway cars are controlled from the screen floor of the tipple by means of car retarders of ample capacity. The builders intend that but three men shall be required to operate the tipple; namely, one on the deck floor to supervise the unloading and the scales, one on the screening floor to control by means of switches and levers the screens and the loading boom and the car retarders and one on the ground to take care of the railway cars.

One has only to review the main features of this installation—namely, the alternating-current coal-cutting machines, the storage-battery locomotives, the automatic scales, the automatic dumping of cars, the car retarders with boom and screen controlled by single operator, the delivery of coal to the power house and the simplicity of the power unit—and compare them with the ordinary coal-mining outfit to appreciate that there are here combined more features tending to economy of operation than are usually found in American plants.

The designer of this plant is Oluf G. Petersen, president of the Associated Engineering Co. Mr. Petersen was born of Danish and German parentage in Erie, Penn., in 1876. His forefathers were pipe-organ builders, and he retains the instincts of his forbears—he is a builder. As a boy he amused himself building miniature telephones, repairing old gasoline engines and setting up marvelous electrical installations. He knows machines as a mother knows her babe. He has nursed them in his bosom, cried over them, fondled them, fought for them and bled for them. While rearing machines of various kinds, incidentally he completed a course in mechanical engineering in Michigan University at Ann Arbor, which place was at that time his home. His knowledge of machines and other less important things secured him a position on leaving college at the Ishpeming High School, where he spent a couple of years teaching the young men how to work with their hands, use tools and run machines; in other words, he gave the boys manual training. He continued this work for several years at Milwaukee, Wis., both in schools and in shops. At the end of that time he took a position as engineer for the Stearns Coal & Lumber Co. and the Kentucky & Tennessee Ry., at Stearns, Ky. After building for these companies the first motor-driven sawmill in the United States and the first tipple entirely of concrete to use shaker screens, he resigned to organize the Associated Engineering Co. for the purpose of giving exclusive attention to the building of surface equipment for coal mines.

Mr. Petersen has given special attention to handling coal on the surface and has secured a list of patents covering the bottom-dumping cars, adjustable screens, a movable loading boom, an automatic tipping and closing device for the bottom-dumping cars, a box-car loader and a spiral block coal loader, all of which are destined to reduce the cost and improve the quality of prepared coal.

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Powder Magazines

A dugout in the side of a hill is often considered a good place in which to store explosives. This, however, is a mistake, and such a magazine is ultimately an expensive one, because the efficiency of the explosive, on account of its moisture-absorbing properties, falls off very rapidly when the powder is stored underground. Powder magazines should be constructed, and for this a good material is brick. Stone or concrete or similar materials—which in the event of an explosion would be converted into projectiles and would do damage to surrounding property—should not be used. Brick is pulverized into dust by a dynamite explosion and does no harm.

Powder magazines should have bullet-proof doors, and where this is not feasible the doorways should be protected by a screen or barricade. It is advisable to surround the entire magazine with a similar barrier. It requires 11 in. of sand to stop a bullet fired at ordinary range from a modern high-power rifle using smokeless powder, such as is occasionally used now by hunters.

As has often been suggested before, to sink the entire building behind a heavy earthen parapet is the safest method. Then anything which can be converted into a projectile by an explosion must travel with a high trajectory in order to do any damage, which is much safer for the surroundings than if the magazine were in point-blank range.—From *Engineering News*.

The Purchase of Coal

By Morgan B. Smith

SYNOPSIS—Some factors which ought to be considered by the consumer when purchasing coal.

In connection with the purchase of coal two questions arise, both of which may seem odd but which nevertheless bring forward intensely practical answers. The first is, *Why* does the consumer purchase coal? and the second, *How* does the consumer purchase coal? The first question may be answered by the simple statement that the coal is bought for heating purposes. This answer is ready and straight to the point; but how about the second question—can this be answered as readily as the first? Unless the purchaser has been through the mill thoroughly he will state that he buys coal from his dealer at so much per ton, plus freight charges, and then puts it in storage in field or bunkers or perhaps burns it at once in the furnaces.

It is worth while to consider the answer to the second question. There is more involved in the purchase than mere tonnage. The purchaser himself admits that it is heating value which he desires. Therefore, he should look for heating value per ton of coal bought and also for nonheating properties in the coal.

Stop to consider, then, some of the factors to which the consumer ought to give attention when purchasing coal for his plant. In the first place, he is forced by current practice to buy "tons of coal," regardless of the true value to him, unless he is in a position to insist upon "heating value per ton of coal."

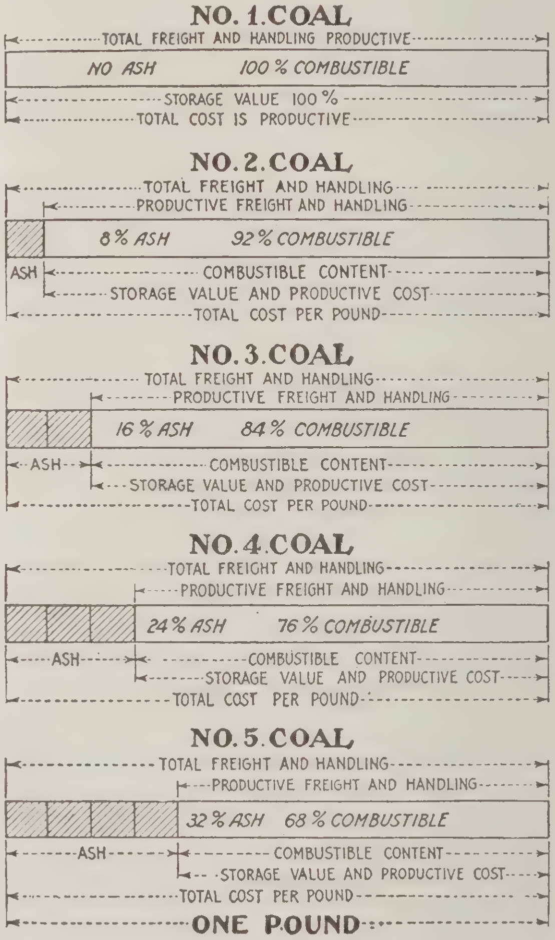
What does this mean to the consumer? It means that he is paying for mere weight of coal, for freight on mere tons, for handling at the plant of mere tons, for crushing mere weight, for storage of weight only, for burning weight only and for handling ashes—all based upon mere avoirdupois rather than upon heat value. Is this common sense or good judgment? Hardly.

Supposing that he is in a position to insist upon heating value in every ton of coal which he purchases, and to make his insistence strong by means of the proper tests on all coal received at the plant. What then? The purchase of coal then becomes a matter, not of mere tons, but of heat units per ton or per pound, a measure of the coal's real value.

When the purchaser has reached this position regarding coal, he can then go ahead and by comparative tests select the coal best suited to his plant equipment. That coal which is by its characteristics best adapted to the conditions of the plant and the load is the highest grade usable, regardless of cost.

It is customary to state the heat value of coal in terms of heat units per unit of weight, generally stated as British thermal units per pound (B.t.u. per lb.) based on the sample dried at 105 deg. C. for one hour. Unless the exact characteristics of the coal are known, a pound of it may have diverse meanings to the buyer. To make this clear, the accompanying diagram has been made to illustrate graphically how "one pound of coal" may have great significance when all costs and efficiency in the plant are considered.

Assume the intial cost at the mines to be the same for each of the five coals shown. How much of the total cost is productive? Only that portion represented by the heat content of the coal purchased. How much of the total cost is loss? The difference between the total cost and the productive cost. The content of fixed carbon and volatile matter is a measure of the productive cost, whereas the ash content is the nonproductive cost. Which is wanted, heat value or ash?


NO. 1.COAL
TOTAL FREIGHT AND HANDLING PRODUCTIVE
NO ASH
100% COMBUSTIBLE
STORAGE VALUE 100%
TOTAL COST IS PRODUCTIVE
NO. 2.COAL
TOTAL FREIGHT AND HANDLING
PRODUCTIVE FREIGHT AND HANDLING
8% ASH
92% COMBUSTIBLE
ASH
COMBUSTIBLE CONTENT
STORAGE VALUE AND PRODUCTIVE COST
TOTAL COST PER POUND
NO. 3.COAL
TOTAL FREIGHT AND HANDLING
PRODUCTIVE FREIGHT AND HANDLING
16% ASH
84% COMBUSTIBLE
ASH
COMBUSTIBLE CONTENT
STORAGE VALUE AND PRODUCTIVE COST
TOTAL COST PER POUND
NO. 4.COAL
TOTAL FREIGHT AND HANDLING
PRODUCTIVE FREIGHT AND HANDLING
24% ASH
76% COMBUSTIBLE
ASH
COMBUSTIBLE CONTENT
STORAGE VALUE AND PRODUCTIVE COST
TOTAL COST PER POUND
NO. 5.COAL
TOTAL FREIGHT AND HANDLING
PRODUCTIVE FREIGHT AND HANDLING
32% ASH
68% COMBUSTIBLE
ASH
COMBUSTIBLE CONTENT
STORAGE VALUE AND PRODUCTIVE COST
TOTAL COST PER POUND
ONE POUND

Diverse Meanings of One Pound of Coal to Consumer

No. 1 coal is a purely hypothetical coal, not found in nature, but shown here for the sake of comparison only. Coals Nos. 2 to 5 are representative of coals on the market and show a common range of characteristics. Which of these coals will give the best results in cost and efficiency in the plant, from mines to bunkers and ultimately to the ash dump? Does storage value mean anything when, through strikes at the mines or stoppage of transportation by floods, the plant is threatened with a shutdown? If so, which of the four coals would it be preferable to have the bunkers or field filled with in such emergency?

The cost does not stop with the original price per ton plus freight, for handling, crushing, storing charges on the coal and also handling of the resultant ash must still be covered. It is generally conceded that coal high in ash and sulphur is harder on all handling apparatus than a coal of lower ash and sulphur content. The costs for upkeep of apparatus will then be in proportion to the wear and tear upon such equipment. In the furnaces evolution of heat is the desired output and will vary directly with the heat content of the coal used. The higher the heat value, the greater the amount of heat liberated, all other conditions being similar. Finally there are the charges for handling the ashes produced.

In general, it may be said that the higher the quality of coal which the plant will handle economically, the lower will be the cost and the greater the efficiency of the plant. It is not necessary that the dealer be held to a strict specification of properties of the coal purchased, although it is wise for the purchaser to acquaint himself with such characteristics and for his own satisfaction formulate a specified analysis. He will find that daily tests on all coal received at the plant, or possibly weekly averages, will afford him valuable data, and if he sends copies of all such tests to his dealer, he will find himself possessed of powerful ammunition with which to convince the dealer that it is to his interests, as well as those of the purchaser, to furnish the coal desired. Such an arrangement tends toward mutual satisfaction since it places both parties to the contract on an equitable footing.

The tests which should be made regularly are those to determine the heat value per pound of coal as fired, ash content as fired and percentage of sulphur. These tests give all the required data. Other tests may be made, often of value to the consumer, such as the determination of fixed carbon and volatile matter. Moisture must always be determined in order to calculate the coal to the condition "as fired" or net weight of coal burned. These are simple tests, and the apparatus is not expensive when the results are considered. By all means adopt the oxygen-bomb type of calorimeter for determining the heat value of coal. Other calorimeters are at best only approximate in their results, although cheaper in first cost.

The purpose has been to point out the real meaning of "coal" to the purchaser and consumer and to emphasize the fact that only by knowing the fuel can the user reach that degree of standardization in his fuel purchase and combustion which has been the real factor in producing the high efficiency of the modern power plant. It is a fact that uniform fuel means uniform and economical operation in the plant.

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Extracts from a Superintendent's Diary

Today we had an unusual visitor, an authoress who is touring the entire country in search of material for her next book—a short, rather stout, middle-aged woman, with kindly eyes and a captivating smile. She carried no letters of introduction and needed none.

In recalling the interview I had with her, I realize that she was an interviewer of the highest ability. Even while explaining to me her mission in our camp, she did not monopolize the conversation, but encouraged me to do a good deal of talking; and I managed to tell her that I also aspired to literary distinction, and as an initial step several years back I began an elaborate diary, which I have religiously continued to this day.

My confession pleased her very much. She was not in search of adventures, but rather of intimate pen pictures, covering all trades and industries; and she felt sure that any one who philosophized over his lifework with enough seriousness to make diary entries would be able to recall many gripping scenes—that is the way she put it.

She had met many big men connected with various industries, but almost without exception they could talk interestingly only when allowed to suggest that the industry with which they happened to be connected was the keystone to all industry.

Getting personal, she assured me that, had she omitted to forewarn me, I would have seized the first opportunity to explain that if all coal mines were suddenly blown up or rendered useless, all industry on the face of the globe would be paralyzed; how could ships travel, trains move and factories operate then? "And with a very little encouragement," she continued, "the picture of the coal-mining industry that you might suggest for me would become so magnificent that I might feel that little else in the world really counted."

"Even at that," I replied, "I might not be overrating as much as you suspect."

Foolish man! That was exactly the reply she most desired; she admitted as much when she was taking leave. Experience had taught her that men hold nothing back once they find themselves on the defensive, and in recalling what followed, her method seems almost uncanny. If she publishes all that I told her, my diary to date will have been published. But I have some consolation in the fact that she was made to realize that the terrible coal baron gets credit for many things that properly belong to others.

I happened to relate a little adventure staged in a New York tenement during the past winter. A college friend of mine who had given up a business career to enter social-settlement work had induced me to make a trip with him through some New York tenements, hoping that I might absorb a proper feeling for the "down and outs" of this world, as he expressed it.

The day was extremely cold, and in all of the rooms where we gained admittance the occupants seemed to be mostly occupied in trying to keep warm by huddling around small stoves or grates in which burned a few precious coals.

The climax was reached when we entered a room where a mother was weeping over a child lying stiff in death, frozen because the few lumps of coal, bought with the mother's last pennies, proved to be mostly slate and bone.

"What a reflection on the coal-mining industry," said my friend.

I didn't let it rest there. My friend knows now, and the authoress realizes also, that the average coal-mine owner has about as much control over the prices and practices of the coal peddlers in distant cities as does a cow over the milk peddler who sells water for milk.

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Some Cause for Complaint

The following was found at a certain mine on the bulletin board where machine-runners mark up their troubles:

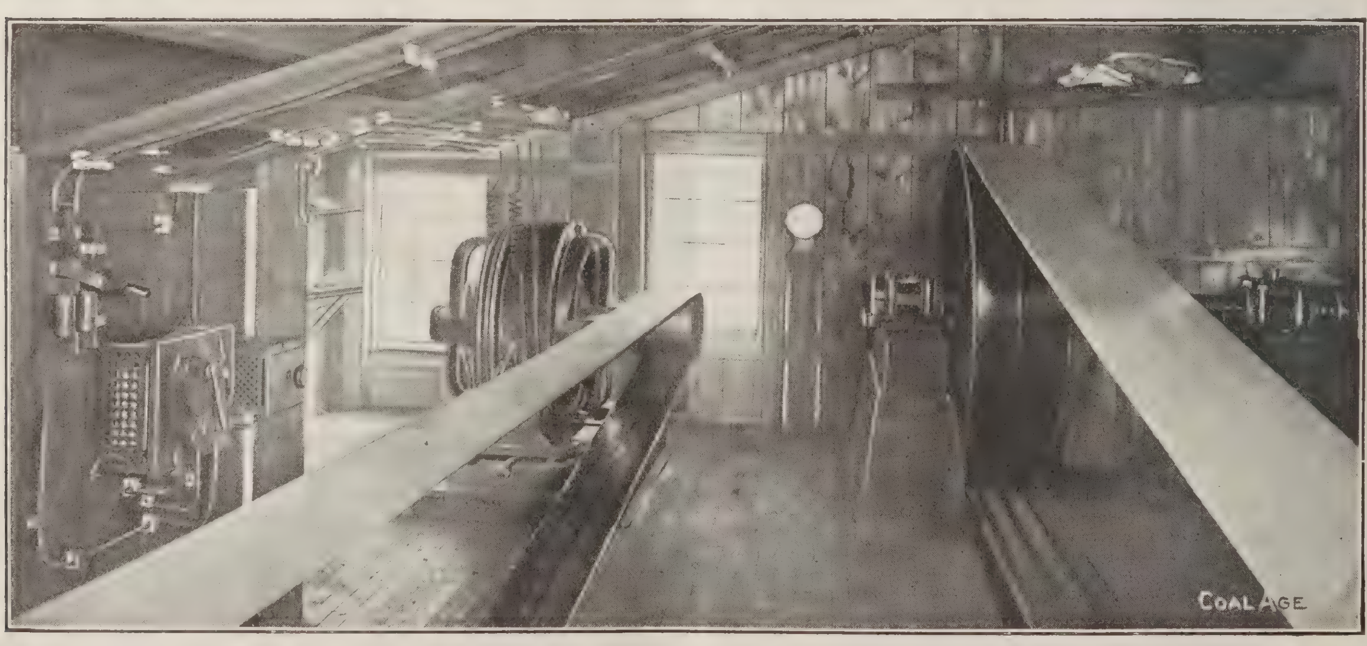
"No. 4 Masheen awl Shot tu hel. Chain brok. fix the dam thing. it brok twist Last nite. needs new rear staff leaves for resisting box. amatoor smokes like heltoo. Power bad. lots of short circles. this is the masheen with self compeller truck. Wer outa oil tu."

Snapshots in Coal Mining

THIS TREE DROPPED INTO A MINE AT NANTICOKE, PENN., AND SLID DOWN THE PITCH 500 FT. THE COAL SEAM HERE IS 20 FT. THICK, SO SOME IDEA OF THE TREE'S SIZE CAN BE FORMED

COKE OVENS OF CHATTANOOGA COAL & IRON CO., DUNLAP, PENN.

CATSBURG COAL TIPPLE, MONONGAHELA, PENN.



75-HP., 220-VOLT SHUNT-WOUND MOTOR DRIVING 18-FT. DOWNCAST FAN THROUGH COUNTERSHAFTING, NORTH FRANKLIN COLLIERY, TREVORTON, PENN.

Development of a Circuit Controller

By A. R. Anderson*

SYNOPSIS—The primary conception of a circuit-breaker is that it should interrupt the circuit whenever the amount of current becomes excessive. This article describes an instrument which not only performs the function of a circuit-breaker, but closes the circuit as soon as conditions have again become normal.

In practically all systems involving the generation and utilization of power there are to be found protective devices of some kind. The original conception of such a contrivance seems to have been that it should protect the apparatus from abnormal conditions in the nature of overloads. But there is another element in a system involving the generation and utilization of power which needs protection, and the abuse of which may prove quite as costly as the abuse of apparatus. This element is service.

Referring specifically to electrical systems using protective devices in the form of circuit-breakers, it is quite as important that the service be resumed promptly upon the disappearance of abnormal conditions as that it be interrupted upon their appearance. Were abnormal conditions to come about comparatively slowly it would be possible for an operator to sense them and interrupt the circuit before damage could be done. But generally these conditions occur so quickly that it is absolutely necessary to provide automatic means, quicker than the human eye or hand, for interrupting the circuit.

This function of a protective device therefore has always been evident. The other function of responding instantly to a return to normal conditions as well as a departure therefrom and thus protecting the service has been given comparatively little thought. Its importance has perhaps been overlooked because this function can be accomplished by hand.

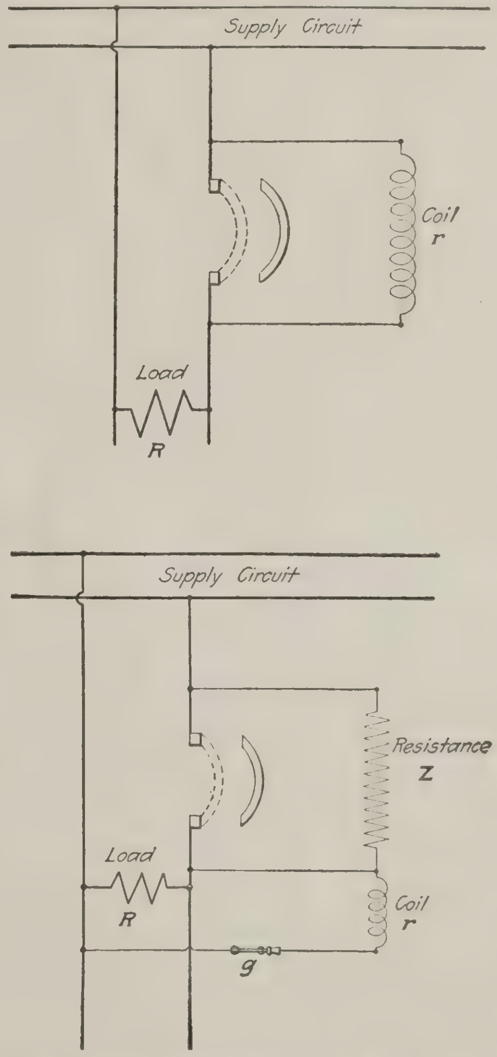
In large distribution systems with many generating units and much auxiliary apparatus tied together in a complete network, there are so many elements influencing the restoration to normal conditions after a circuit has been interrupted that it is hard to conceive of an apparatus that will supplant human intelligence in directing this restoration. But in simple direct-current distributing systems such as are used in practically all coal mines and in all feeder circuits taken directly from the main busbars the function of restoring service instantly upon the return of normal line conditions may be accomplished by the use of automatic circuit controllers.

The automatic circuit controller made by the Automatic Reclosing Circuit Breaker Co., Columbus, Ohio, is essentially a solenoid-operated circuit-breaker which is opened on overload by a plunger actuated by a coil in series with the load and tripping open the circuit which energizes the operating solenoid. After opening the circuit the operating solenoid cannot again be closed until a contact in the circuit is closed by the plunger of an auxiliary coil called a trip coil.

The operation of the plunger in the trip coil is dependent upon the load resistance. The plunger will therefore not operate until the resistance of the load has increased to a point where the value of current that will flow upon closing the breaker will not exceed full load. At any value of load resistance above this the breaker will close automatically, opening only on overload and staying open only so long as this overload condition remains.

A Brief History of the Development of the Controller

The electrical circuits of the automatic circuit controller may best be understood through a brief history of their development. The first idea for the operation of the trip coil which presented itself to E. C. Raney, the inventor of the automatic circuit controller, was to shunt the trip coil around the breaker when opened so that a certain "index" current would traverse this coil through the short-circuit or decreased load resistance to the other side of the line. The current through the trip coil would



Figs. 1 and 2. Successive Steps in the Development of the Apparatus hold the plunger up until a sufficient increase in the load resistance would decrease the index current, allowing the plunger to drop and close the circuit through the operating solenoid.

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*Electrical engineer, Columbus, Ohio.

The electrical circuits for such a device are shown in Fig. 1. The objections to this arrangement, however, are the high value of index current required for even a theoretically appreciable variation in it due to change in load resistance, the interference of voltage variation within commercial limits with the determination of a point of operation fixed with reference to the load resistance, and the erratic performance of an iron-core solenoid on decreasing current, the point of release depending on the previous degree of magnetization as well as the value of current flowing through the solenoid.

A concrete example will serve to illustrate difficulties with this arrangement. Assume a circuit supplied from a 250-volt, 150-kw. generator. The breaker in this circuit is set at 800 amp. The minimum value of load resistance R on which the breaker will stay closed is therefore $\frac{250}{800} = 0.312$ ohm. Suppose there are constant loads such as lights, etc., on the line to the amount of 100 amp. This is equivalent to a load resistance of 2.5 ohms, and when the breaker has opened, the load resistance cannot be expected to rise above this value to operate the trip coil which closes the circuit through the operating coil.

The trip coil must be sufficiently sensitive to respond to a variation in load resistance from a value of 0.312 ohm to a value between 0.312 ohm and 2.5 ohms. Let it be assumed that the resistance r of the trip coil is 10 ohms. Then when the overload occurs the resistance of the trip coil and load is $(r + R)$, or 10.312 ohms, and the current which flows with 250 volts at the generator is 24.2 amperes.

On this value of current the coil must not operate, but must hold until the value of current has dropped below it. The minimum value to which the current may drop is obtained when the load resistance increases to 2.5 ohms and is $\frac{250}{12.5} = 20$ amperes.

The maximum drop in current obtained by this means with constant voltage is only 17 per cent. and the practical difficulty of obtaining reliable operation of the trip coil with so small a variation in current is at once evident. Add to this the possibility of the line voltage varying this much, especially if the breaker is connected to a supply circuit at some distance from the power house and the considerable value of index current which must be handled and the difficulties connected with this arrangement for practical apparatus are apparent.

The Instrument Was More Sensitive with Increasing Currents

In experimenting with this type of circuit, however, it was noticed that the trip coil responded more readily and at a more definite point with an increasing than with a decreasing current. This led to the idea of connecting the load circuit and trip coil in parallel around the open breaker, using an auxiliary resistance to keep down the value of index current. This arrangement of circuits is shown in Fig. 2, where R is the load resistance, r the resistance of the trip coil, and Z is the auxiliary resistance.

The resistance of the trip coil r approximates R or that of the load, while the resistance Z is comparatively high. Attention is called to the fact that the trip coil having approximately the resistance of the load circuit may not be left connected in when the breaker is closed, as it would constitute practically a short-circuit across the line. Mechanical means are therefore provided for opening this circuit before the breaker closes.

Evidently with this arrangement the current through the trip coil with constant resistance r increases with an increase of the load resistance R. But this arrangement affords another advantage in point of sensibility and which is in reality the keynote to the practical success of this breaker.

An example will illustrate: The same generator and load conditions as above are assumed. In this arrangement, however, the resistance of the trip coil r is 1 ohm and the resistance Z is 125 ohms. With 250 volts on the line and load resistance of 0.312 ohm, the following currents are flowing after the breaker has opened: Through Z, 2 amp.; through R, 1.52 amp.; through r, 0.48 amp. After the load resistance has increased to 2.5 ohms, the following currents are flowing: Through Z, 1.99 amp.; through R, 0.57 amp.; through r, 1.42 amp.

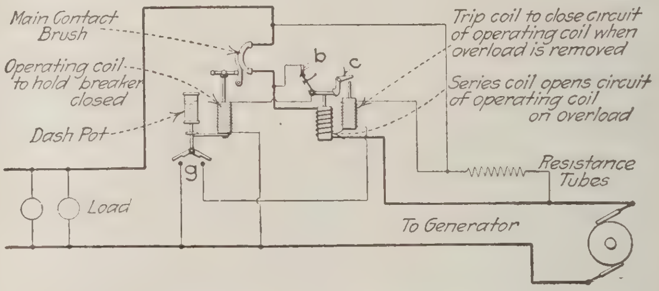
Main Contact Brush
Operating coil to hold breaker closed
Dash Pot
Load
g
b
c
Trip coil to close circuit of operating coil when overload is removed
Series coil opens circuit of operating coil on overload
Resistance Tubes
To Generator

FIG. 3. THEORETICAL DIAGRAM OF ELECTRICAL CIRCUITS

The increase of current through the trip coil has been 195 per cent., as compared to a decrease of only 17 per cent. in the previous arrangement, and the index current which the apparatus has to handle does not exceed 2 amp., as compared to over 24 amp. in the previous arrangement. This feature of the divided circuit is the very heart or rather brains of the machine, for it gives it the sensibility in responding to the changes in load resistance necessary to make its practical operation successful.

A complete theoretical diagram of the electrical circuits of a single controller is shown in Fig. 3. The main contact brush is moved to the closed position and held closed by the operating coil which is connected across the line through the contact b. When an overload occurs the plunger in the series coil rises and opens the contact at b, which is held open by the latch c. The breaker will close again only when the trip coil is energized sufficiently to raise its plunger and kick out the latch c.

The trip coil is connected around the breaker through the bridge g to the opposite side of the line. It is thus in parallel with the short-circuit and the combined current through the trip coil and short-circuit is kept down to about 2 amp. by the resistance tubes shown. The bridge is supported by the piston of a dash pot, which descends slowly at a predetermined rate, which may be adjusted from 1 to 40 sec. The trip coil cannot operate and cause the breaker to close until this bridge is down, no matter what the condition of the load circuit may be.

The object of introducing this time element is to allow sufficient time for motors to come to rest and starting-box levers to return to starting position before the breaker closes. After the bridge *g* is down the breaker will close, provided the overload condition of the line has disappeared; that is, provided the load resistance has increased above the full-load value, thereby diverting sufficient current through the trip coil to operate its plunger.

If, however, the load resistance is still below full-load value, enough of the index current to operate the trip coil will not traverse it and so the breaker will remain open. When the load resistance increases to the proper value the trip coil operates, the operating coil is energized, the plunger therein rises, raising at the same time the piston of the dash pot and lifting the bridge off the contacts at *g*, and finally closing the main contact brush. Thus it is seen how the trip-coil circuit is open before the main circuit through the breaker is closed and the possibility of the trip-coil circuit forming a short across the line precluded.

THIS BREAKER IS NOT ADAPTED TO GENERATORS IN PARALLEL

From the above considerations it may be easily seen that a breaker as described may not be used where the load side is supplied from sources of power other than through the breaker in question. In other words, a breaker as described may not be used in the circuits of generators operating in parallel and feeding into the same busbars or network without some modification.

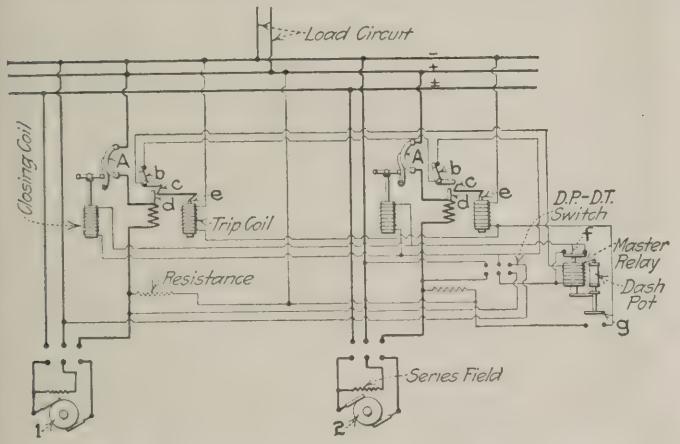

FIG. 4. ELECTRICAL CONNECTIONS FOR TWO GENERATORS IN PARALLEL

The modifications necessary in order to adapt the breaker to the circuits of generators operating in parallel have been worked out and the theoretical diagram of the electrical circuits of such an arrangement for two generators so operating and feeding into the same busbars is shown in Fig. 4. The modification consists essentially in removing the dash pot and bridge from the individual breaker, using only one dash pot for all the breakers and operating it by means of a master relay.

In this arrangement the contacts *b*, connected in series, are placed in the circuit of the master relay instead of that of the operating coil as in a single breaker, and the master relay at the point *f* controls the circuit through the operating coils of the breakers which are connected in parallel. The trip coils are also similarly connected and the circuit through them is closed by the single bridge *g*. Fig. 4 shows the breakers in the closed position.

In the case of an overload on either generator, one of the contacts at *b* is opened by the plunger *d* of the series coil in the same manner as in a single breaker. This opens the circuit through the master relay, the plunger of which drops and opens the contacts at *f*, thereby opening the circuit through all the operating coils and causing all the breakers to open.

After a certain time limit, depending upon the adjustment of the dash pot, the bridge *g* is closed and the trip coils will operate to release the latches *c*, provided the load resistance has increased to the proper value. When the latches are released, all open contacts at *b* are closed, throwing the master relay across the line, lifting the bridge *g* and closing the circuit through all the operating coils at *f*, thus closing all the breakers. Regardless of whether the overload occurs on one or all the generators, all the breakers open simultaneously and close simultaneously.

By means of a suitable switch, the master relay may be excited from either generator desired. Any generator and its circuit-breaker may be operated independently by opening the operating coil circuit and trip-coil circuit of the other breakers by means of switches provided for that purpose.

CONTROLLING THE DIRECT-CURRENT CIRCUITS

Automatic circuit controllers fulfill the four functions necessary for the complete control of direct-current circuits with reference to overload conditions:

1. They interrupt the current quickly in case of short-circuit or overload.
2. They permit of a certain time to elapse after the circuit is opened before it is again closed, regardless of whether the short-circuit has disappeared or not. This protects motors and similar apparatus on the line.
3. They will not close the circuit while the short-circuit still exists.
4. They close the circuit instantly upon the removal of the short-circuit, after the time limit has expired.

Many fields of application for these breakers will suggest themselves. With increased use of purchased power, the automatic control of the direct-current side of motor-generator sets and rotary converters presents a large field where they may be profitably employed. Their use generally dispenses with the continuous services of an attendant at substations and avoids unnecessary delays incidental to closing a manually operated breaker. Their installation on branch circuits serves to localize troubles and avoid shutting down the entire system. About mines and mills especially installations of this kind possess marked economic advantages.

In general, automatic circuit controllers not only protect apparatus and service, thereby insuring maximum output and a minimum overhead expense per unit of production, but also present the opportunity of reducing operating cost.

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Electrical resistance varies greatly with different metals, and is in general less for a pure metal than for any of its alloys. Its value in every case depends upon the length of the wire, its cross-sectional area, and the nature or chemical composition of the metal, all of which vary with temperature. Increasing or decreasing the length of any conductor will increase or decrease the resistance in direct proportion. Increasing or decreasing the cross-sectional area will inversely affect resistance; that is, as the section of the conductor increases, the resistance becomes proportionately less and vice versa.

Indiana Coal Operators Seek Aid in Washington

The communications below indicate steps being taken by the bituminous coal men of Indiana, who are endeavoring to find a way out of their present unsatisfactory business conditions. Mr. Callbreath, secretary of the American Mining Congress, acted for the operators in the matter of getting President Wilson's attention. The exchange of letters and the statement of the operators follow:

Hon. Woodrow Wilson, President of the United States,
White House, Washington, D. C.

My dear Mr. President: At the request of a committee of Indiana coal operators, who were unable to present this to you personally because of your absence from the city on Tuesday, I beg to present to you a statement concerning the bituminous coal mining industry.

This committee consisted of Messrs. Carl Scholz, president of the Consolidated Indiana Coal Co.; Walter S. Bogle, of W. S. Bogle & Co.; John T. Connery, president of the Miami Coal Mining Co.; J. C. Kolsem, of the Jackson Hill Coal & Coke Co.; Hugh Shirkie, of the Shirkie Coal Co., and Morton L. Gould, of the Gould Coal Washing & Mining Co.

Will you permit me first to present a few general statements concerning the bituminous coal-mining industry at large as a preliminary to the more concise reference to the Indiana situation?

First, more than 500,000 workmen engaged in the bituminous coal industry are necessarily idle more than 100 days each year.

Second, more than $900,000,000 of the capital engaged in the bituminous coal industry is idle more than 100 days each year.

Third, approximately 200,000,000 tons of the nation's fuel supply is being wasted each year.

Fourth, about 100,000 acres of coal lands are being exhausted each year, while with proper conservation 65,000 acres could be made to furnish the fuel now used by the nation.

For the last five years the average selling price of bituminous coal at the mine has approximated $1.12 per ton, while the cost of labor and supplies for each ton produced has approximated 96c., leaving but 16c. per ton to pay for the mine, the depreciation of machinery, selling charges, overhead expenses and the risk which always exists of a mine disaster through which the whole capital involved in the enterprise might be destroyed.

The Indiana committee presented this matter to the Federal Trade Commission, believing it had authority to permit such coöperation between the operators as would enable them to partly relieve this situation. I attach hereto a condensation of the statement made to the Federal Trade Commission. The commission expressed full sympathy and its desire to lend any possible assistance, but stated that under the law it had no authority to take any affirmative action in the premises.

The same statements were presented to the Department of Justice, able to punish in case the proposed plan of coöperation to stop the waste should in any way transgress the law, but that department was unable to give guiding advice.

The Indiana operators believe that this enormous waste of the nation's fuel supply is of sufficient public importance to justify an appeal to you as the President of the nation to lend a helping hand through such agencies as may be available. Respectfully submitted,

J. F. Callbreath,
Secretary.

Statement of the Indiana Operators

The Indiana bituminous coal operators find themselves suffering from overproduction and intense, unrestrained competition, with the result that a number of the operators have been forced into the hands of receivers, and a large number of the balance are suffering seriously from the situation.

The condition affects the laborer equally with the operator, because of intermittent work. During the year 1914 they secured only 148 working-days. The result is the entire absence of conservation. On the contrary, it promotes a waste of coal in the ground because it requires the cheapest and easiest method of getting coal out, to meet the price at which it has to be sold. On a conservative estimate not more than 50 per cent. of the coal is recovered.

This means that in the United States as a whole upward of 200,000,000 tons of coal are wasted each year.

There are 114 companies in the State of Indiana producing 16,000,000 tons of coal each year—a little over 2 per cent. of the total production in the United States—and in the largest market they do not control over 16 per cent. of the tonnage of that market.

In order to hold this position, they are obliged to maintain something like 300 selling offices and 900 salesmen. The expenses in the mines are increased by the necessity of maintaining an organization that can produce the limit of the mine's capacity on 24 hr. notice.

They are competing within the boundary of their own state with the nonunion States of Kentucky and West Virginia, and the union-employee States of Ohio, Pennsylvania and Illinois. Outside of their own state they are competing with Kentucky, West Virginia, Ohio, Pennsylvania, Illinois and Iowa.

The situation is such that it is impossible for them to advance their prices, and the only method left open to them to maintain their standing in the trade is to reduce their expenses, which can only be accomplished by coöperation among them.

The tentative plan which meets with their approval consists of a single selling agency, which would decrease the selling cost several cents per ton and would enable them to standardize the business; and by intelligent distribution of orders, establishing of storage facilities for fine coal—for which there is an erratic demand—they could increase the present earnings fully 10c. per ton without in any way disturbing the present price.

The representatives of the labor element of the industry have repeatedly urged such a movement in public investigations of conditions by several of the states.

The operations of the Indiana coal-producing industry are confined to about five states and do not extend over the entire country. It is a fact that two of the large companies in other states produce and market a greater amount of coal than is produced and marketed in the State of Indiana.

We do not believe that it is the intention of the law or of the Government to force an industry into bankruptcy. On the contrary, when such a condition arises, the sentiment of the people at large is, and that of the law and the Government should be, to allow the industry involved to adopt such reasonable methods as to avoid bankruptcy and to maintain its position in the commercial world.

It is with that idea in view that they have presented the situation in detail to the Federal Trade Commission, together with a plan which they propose to inaugurate to in a measure protect themselves. The position taken by the Indiana operators is that they prefer bankruptcy to a criminal prosecution for violation of the law.

President Wilson's Reply

The White House, Washington
April 26, 1915.

My dear Mr. Callbreath: I have your letter of Apr. 22. I am sincerely sorry that it was not possible for me to see your committee personally on Tuesday last.

You may be sure that I will consult with my associates here and that, if there is any possible way in which we can help in the situation which you unfold, we shall be glad to do so. Cordially and sincerely yours,

Woodrow Wilson.

Mr. J. F. Callbreath, Secretary, American Mining Congress, Washington, D. C.

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Problems of an Electrically Operated Coal Mine

By H. W. Smith*

SYNOPSIS—An explanation of why some mines show such excessive production costs. The author ran an interesting test which indicated plainly just how great were the power losses.

The writer while connected with the commercial department of a large central station operating in West Virginia, which was organized solely for the purpose of supplying power to collieries, invariably encountered mines being supplied with electrical power from a plant located at such a distance as to make economic operation prohibitive because of excessive line losses, thus greatly curtailing the output.

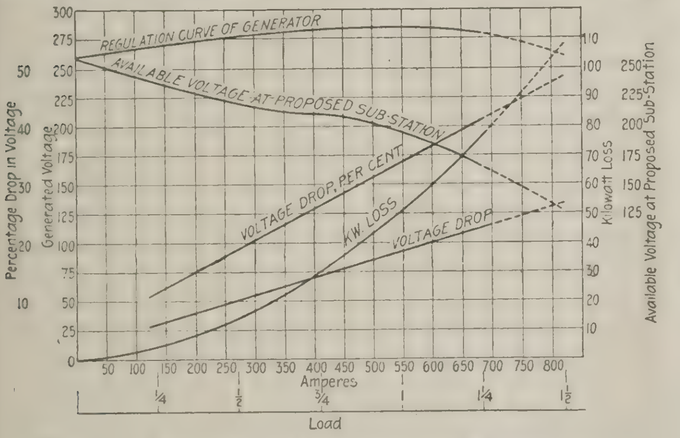

Fig. 1. Showing Graphically the Results of "Short-Circuit" Test

In the majority of cases conditions could be somewhat improved providing a reasonable amount of attention was given to the installation and maintenance of proper rails and bonds. But how much consideration does the average operator give this seemingly unimportant detail? What does he care so long as the wheels of his mining machines and locomotives turn and another armature does not burn out before sufficient time has elapsed to have the last one repaired. It never once occurs to him to ask, How much more coal could I run per day or what would be the annual saving in repairs for my motors and coal cutters if the power back at the face was from 50 to 75 volts stronger? If he did consider such matters, we would find greatly improved conditions throughout our coal fields.

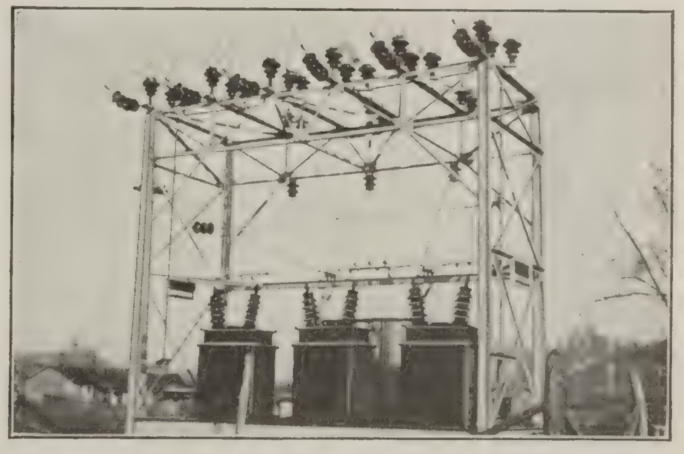

Fig. 2. Type of High-Voltage Substation Used Exclusively by the Power Company. Westinghouse Outdoor Transformers Are Shown

As the resistance of steel rails found in and around the average mine, providing suitable bonding is maintained, is only 12 times that of a corresponding cross-section of copper, it can be seen that the conductivity of the return should be as good if not better than the positive line, thus making it entirely unnecessary to run a copper circuit in parallel with the return, as is found in many cases.

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*Engineer, Westinghouse Electric & Mfg. Co., Pittsburgh, Penn.

An Interesting Test

In order to illustrate by actual figures the losses that occur when a mine is operated from a source of power transmitted from beyond its zone of economic distribution, a description of a "short circuit" test conducted upon the power plant and transmission lines of a prospective customer is given. This test takes its name from the fact that a connection, or short circuit, is made between the feeders and return at some predetermined point on the transmission system. Low voltage is applied to the line at the point of supply and gradually increased, readings being taken of current in the line and the applied voltage, at various loads corresponding to those obtained under normal operating conditions.

The coal company selected affords a typical example of the conditions endured by the average operator.

By referring to Fig. 5 it will be seen that the positive circuit consists of two 0000 wires, one of which serves as a trolley from the drum-house to the point of short circuit, a distance of 2600 ft. At this point the tram and positive line divide, one running to mine "A" and the other to mine "B," the difference in elevation of the two seams being approximately 100 ft. The negative side, or "return," consists of 2600 ft. of 45-lb. rails, 1000 ft. of 30-lb. rails on an incline and 200 ft. of double 0000 copper wire extending from the end of the incline to the power house.

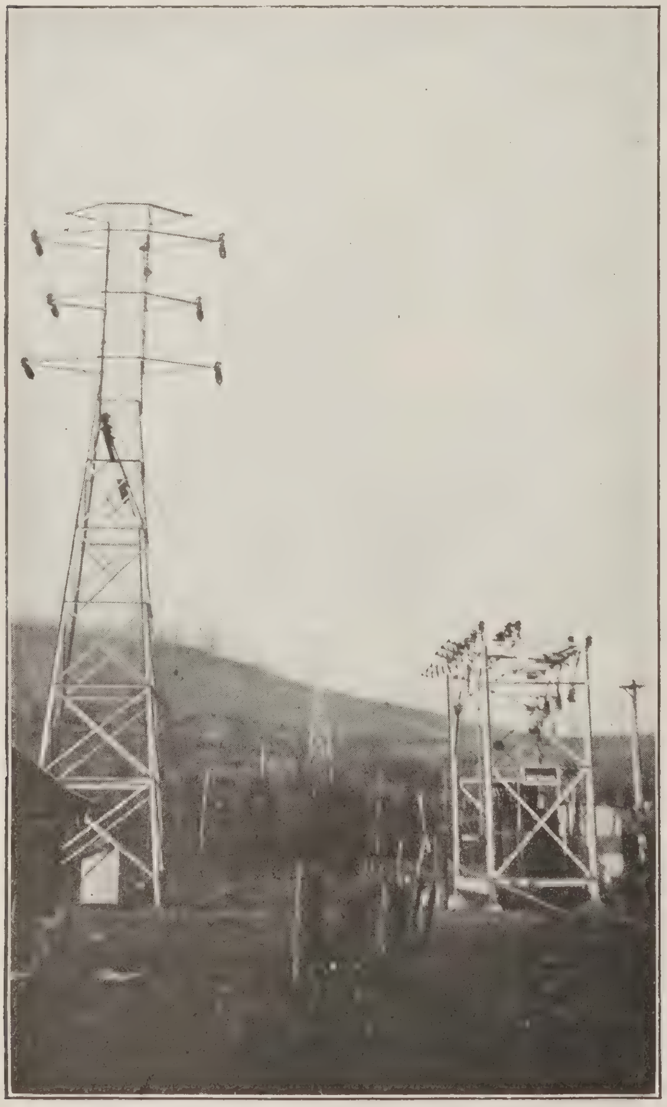

Fig. 3. Take-off Tower and High-Voltage Substation

The generating equipment consisted of one 150-kw., 260-285-volt, 550-r.p.m. direct-current generator belted to a simple 225-hp. engine. The odd voltage is due to a set of specially wound shunt field coils, replacing a former set burnt out by maintaining a higher voltage than that for which the machine was originally designed.

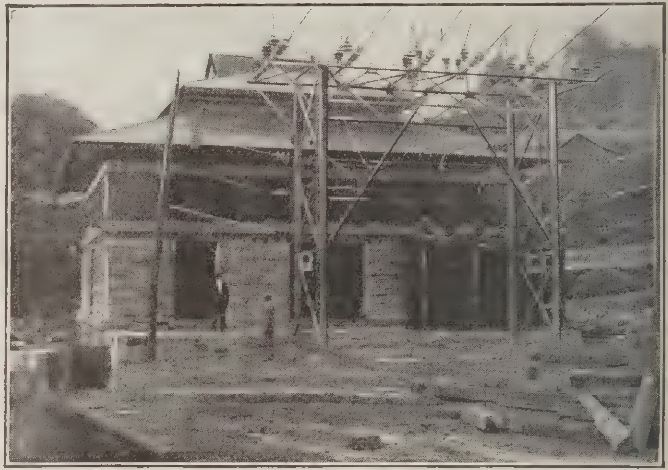

Fig. 4. Customer's Substation with Power Company's High-Voltage Outdoor Substation Adjoining

In order to secure the most accurate results, all readings were taken on portable instruments located in the power house and known to be correct. By means of the field rheostat and by gradually increasing the speed of the engine, the load was slowly built up, readings being taken simultaneously upon both ammeter and voltmeter at one-quarter, one-half, three-quarters, full and one and one-quarter loads. The voltmeter reading represents the actual loss in voltage in the line when operating under normal conditions and at a corresponding load. In order to eliminate any errors due to incorrect reading of meters, all readings were carefully checked. A complete analysis of results so obtained is as follows:

RESULTS OF TEST

Load	Amp.	Voltage Drop	Percentage Voltage Drop	Kw. Loss in Trans.	Available Voltage at Proposed Substa.
¼	137	30.5	11.2	4.2	238.5
½	274	51.5	18.8	14.1	220.5
¾	411	72.0	26.6	29.5	211.0
1	546	94.0	34.0	51.3	191.0
1¼	683	112.0	40.7	76.4	167.0
1½*	820	133.0	48.5	109.0	127.0

*Calculated.

The above results are shown graphically in Fig. 1. As figures speak for themselves, it does not seem necessary to devote any space to a discussion covering the results, other than calling attention to the high losses that occur between half-load and one and one-quarter load, the limits between which a mine load is constantly fluctuating.

By again referring to the sketch, it will be seen that mine "A," with a maximum motor haulage of 3000 ft., is located at an additional distance of 875 ft., while mine "B," with a corresponding haulage of 900 ft., is located 1050 ft. from the site of the proposed substation.

This location was agreed upon as the most advantageous site for a substation by both the superintendent and myself, after carefully considering grades, future development and local conditions. One of the principal factors covered by the so-called local conditions is the attendant, who in this case, as well as in numerous others, would be the blacksmith. The necessary attention consists of starting and stopping, pouring a little oil in the bearing about once a month and occasionally putting in the circuit breaker. By means of a simple attachment on the switchboard an electric gong is sounded upon the opening of the breaker and continues until it is closed.

Upon the completion of the test and in order to study the voltage conditions back in the mine, an offer was made to measure the voltage at different points throughout the two mines under different load conditions. To this the superintendent replied, "I know that my power is 'rotten,' but as to just how bad it is, that is something I'm better off not knowing."

One Reason for Excessive Costs

How true the above is! If conditions existed generally, as found in some mines working under similar conditions where the voltage ranges from 180 to 200 volts, on a 250-275-volt system, the decreased output and excessive costs at certain plants would be easily explained.

In order to give one an idea of the substantial line construction and high class of workmanship found throughout the 140 mi. of transmission lines, Figs. 2, 3 and 4 are given.

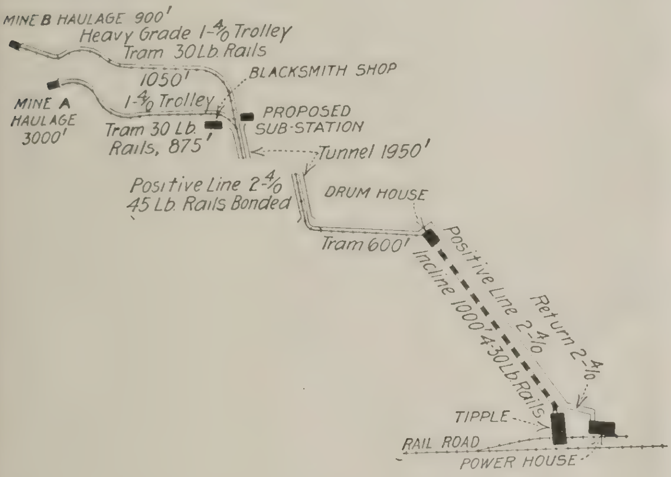

FIG. 5. SKETCH SHOWING LOCATION OF MINES IN RELATION TO POWER HOUSE

Fig. 2 shows the standard type of high-voltage, out-of-door substation used exclusively by the power company before referred to. The galvanized iron meter house can be seen in the rear. This particular substation serves two customers, power being stepped down from 44,000 to 2200 volts.

Fig. 3 shows a take-off tower, with one of the regular type in the distance, also the two overhead ground-wires. Special attention is called to the double-power circuits, the lines being so sectionalized as to permit the cutting out of sections for repairs. Immediately in the rear of the first tower will be seen one of the numerous telephone booths distributed at frequent intervals along the lines. Each patrolman is required to make his report upon arriving at a telephone. In this way the dispatcher not only receives a complete report of the entire system every four days, but keeps in constant communication with each man out on the lines.

If it were not for the electrical apparatus both inside and out, Fig. 4 could well be taken for a public building, because of its attractive appearance and tile floor, rather than a substation supplying power to a coal mine.

The power company's entire electrical equipment, including the two 10,000-kv.-a. turbo-generator sets, was furnished by the Westinghouse Electric & Mfg. Co. This is also true in regard to the greater portion of the customer's apparatus. With very few exceptions the motor-generator set was chosen by the customer in preference to the rotary converter to change his alternating current into direct, owing to its special adaptability to this particular class of service.

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The Labor Situation

SYNOPSIS—In eastern Ohio a spirit to compromise on "dead work" in return for a concession on the mining rate seems about to close the long dispute between capital and labor. In Colorado John R. Lawson is convicted of the murder of a deputy sheriff.

The conference of operators and miners' representatives at Cleveland, Ohio, appeared to make some progress in the settlement of the eastern Ohio strike. Both sides appeared willing to make concessions, and the chances for settlement are the best in months.

Saturday, May 1, was occupied in discussing the width of rooms and the cost of work in slopes. Other points were the price of "dead work," rules governing the right of operators to employ and discharge workmen, the "handling" of dirty coal and the right of aggrieved employees to appeal to the grievance committee. The operators seek to include in the wage agreement a clause binding the miners to use care so as to load only clean coal.

Miners Ready to Concede Everything but the Mining Rate

In fact throughout the week no vital disagreements appeared. It seems well understood that the operators are prepared to sign an agreement giving the miners 47c. per ton for machine-mined run-of-mine coal provided the latter will make such concessions in "dead work," day labor and conservation of coal as will equalize the cost of producing coal in the eastern Ohio section with the cost in the region mining under the Pittsburgh scale. There the rate is only 44.61c. per ton for the machine-mined run-of-mine coal.

In the meantime the Gallagher amendment to the Green anti-screen law is not legally dead. Though it was defeated in the House, after being passed in the Senate, a motion was made to reconsider it, and the vote on that motion has been postponed from time to time. This keeps the amendment alive to a certain extent. Eastern Ohio operators are making a strong effort to secure the passage of the amendment, but there is not much hope that it will receive reconsideration from the House.

John R. Lawson Convicted

John R. Lawson, member of the International Executive Board of the United Mine Workers of America, was found guilty of murder in the first degree in connection with the shooting at Ludlow, Colo., of John Nimmo, a deputy sheriff. The murder occurred on Oct. 25, 1913. Lawson was sentenced to life-imprisonment at hard labor in the Colorado penitentiary. The jury had the power to order a sentence of death or life-imprisonment and apparently debated long on this choice, for the verdict was not given till May 3, whereas the jury retired to consider a verdict on May 1.

The attorneys for the defense are given 30 days to file a motion for a new trial, and Lawson is released temporarily in charge of his counsel. The murder occurred before the state constabulary had charge of the situation and while the Ludlow section house was under the command of K. E. Linderfelt. Early in the afternoon of Oct. 25, 1913, a fight occurred between the strikers and the deputies, and firing continued till the evening. During the battle Nimmo was shot through the leg and bled to death.

It is not alleged that Lawson fired the shot. He is said to have been in charge of the camp at the time and to have directed the battle. It is for those who have read the evidence to attempt to discuss the verdict, but it is clear that feeling is raised to a high degree.

The United Mine Workers' attorney, Horace N. Hawkins, declares that "Rockefeller's lawyers worked up the evidence against Lawson, and Rockefeller's detective testified in the case to secure conviction," as if such aid to the prosecution was to be condemned. If somebody had tried to loot Hawkins' house and had killed those who tried to defend it, would not Hawkins endeavor to aid the prosecution and might he not employ detectives to discover who the offenders were? Could any court refuse to consider any such relevant and competent evidence as he might present?

Frank P. Walsh, chairman of the Federal Commission on Industrial Relations, has made a further attack on the Rockefellers. He declares that John D. Rockefeller, Jr., is merely the mouthpiece of his father, who is really responsible for the situation in Colorado. The other charges he has made he has not seen fit to substantiate.

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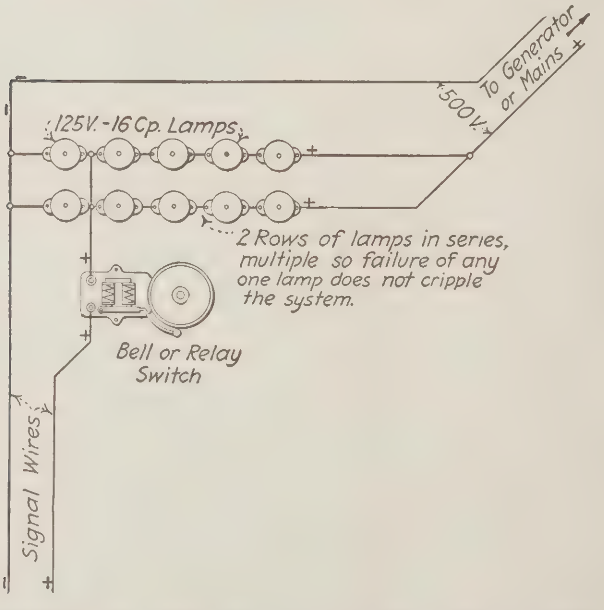
Signal Wires in Mines

By A. A. Le Roy*

In many of the electrically equipped mines using 250- and 500-volt direct-current for operating various machines, it is customary and practically necessary to use this voltage on signal lines, hoist roads, etc.; and where this high voltage is so carried dangerous electrical shocks may be received.

The accompanying sketch shows a method of reducing the voltage on such signal lines and of eliminating danger from shock. It consists of two parallel series of five 125-volt, 16-cp. lamps, with the signal line connecting between the first and second lamp on the negative side of the circuit. It is important that the connection be made between the lamps on the negative side, so that where grounded systems are used the negative and ground will be of the same potential.


To Generator or Mains
-
+
500V.
125V.-16 Cp. Lamps
+
+
2 Rows of lamps in series, multiple so failure of any one lamp does not cripple the system.
+
+
Bell or Relay Switch
Signal Wires
+

Method of Reducing Voltage on Signal Lines

A Bell or Relay Is Placed in Series

In series with the line connecting between the lamps should be a bell or relay switch, which when the rapper is put across or the signal wires short-circuited causes the current to flow through the bell or relay switch to the negative side, and the lamps between the signal-line connection and negative will darken. At the same time the lamps between the signal-line connection and positive side will brighten, thus sending the current through the bell or relay switch, causing the bell to ring or, if a relay switch is used, causing it to make connection with separate signal circuit. This system reduces the voltage to 80 volts on the bell line.

In case 250-volt direct-current is used, two parallel series of three 125-volt, 16-cp. lamps should be used.

As will be noted from the sketch, the signal wires are shunted around the two lamps next to the negative side of the series. As the human body has more resistance than these two lamps, the current will flow through the lamps; and a very small amount, if any, will flow through the human body in case it comes in contact with the signal lines, thus eliminating the danger from electrical shocks.

This system is now in use in the coal mines of the Utah Fuel Co. in Utah and Colorado and has proved satisfactory.

COMING MEETINGS

International Railway Fuel Association will hold its annual meeting at Chicago, May 17-20. Secretary, C. G. Hall, 922 McCormick Bldg., Chicago, Ill.

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

The American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 W. 39th St., New York City.

The Kentucky Mining Institute will hold its summer meeting at Pineville, Ky., May 14 and 15, 1915. Secretary-treasurer, Ivan P. Tashof, Lexington, Ky.

The American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, inclusive at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

The Illinois Mining Institute will hold its next meeting at Danville, Ill., May 27-29, 1915. The officers of the Institute are: President, J. W. Starks, Georgetown, Ill.; first vice-president, William Burton, Herrin, Ill.; second vice-president, Fred C. Pfahler, Belleville, Ill.; secretary and treasurer, Martin Bolt, Springfield, Ill.

The Coal Operators of West Virginia under the auspices of the Norfolk & Western operators, in conjunction with the U. S. Bureau of Mines and the Huntington Chamber of Commerce, will hold a state-wide first-aid and mine-rescue field meet and contest in Huntington, W. Va., May 14, 1915.

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April Output of Anthracite

After three months of comparatively low production owing to the warm weather of the latter part of the winter, the output of anthracite was so large last month that the record for April shipments will probably be beaten. In April of last year shipments of anthracite were 6,072,164 tons, and the record for the month was made in April, 1910, when 6,224,396 tons were shipped.

The big increase in production is partly owing to the April discounts of 50c. a ton on the domestic sizes of anthracite and partly to the opening of the Lake trade. The unusually warm weather up to the first of April also enabled the retail dealers to allow their stock to run low so that they could take advantage of the discounts, which make a difference of over 9 per cent.

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*General master mechanic, Utah Fuel Co., Salt Lake City, Utah.

New Apparatus and Equipment

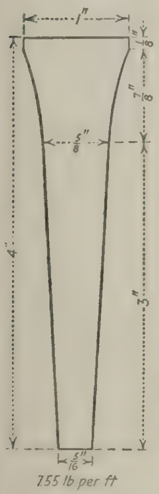
Believing that one of the greatest services that a journal such as Coal Age *can render its readers is to acquaint them with new and improved equipment which may be employed directly or indirectly to the benefit of the coal-producing industry, this department is inaugurated. For the present it will appear in the second and fourth issues of each month. We shall therefore be glad to receive from builders, manufacturers or dealers brief descriptions of new or improved pieces of apparatus in which they are interested, the use of which will tend toward better results in or the economic development of the fuel industry or any of its numerous ramifications.*

⁂

A New Heavy Screen Bar

For many years the largest screen bar in general use has been the diamond top bar, which is 2¼ in. deep; and while there were a few inquiries for larger bars, the demand was not great enough to justify the production of a larger section and manufacturers and operators at considerable expense built up bars to suit their requirements. Keen competition in the coal industry has, however, necessitated more careful preparation of coal, especially in the larger sizes, and this has resulted in a demand for a larger screen bar.

The Phillips Mine & Mill Supply Co. is now in position to furnish from stock, in maximum lengths of 18 ft. 6 in., a screen bar 4 in. deep, 1 in. wide across the top and $\frac{5}{16}$ in. thick at the bottom and weighing 7.55 lb. per ft. The accompanying drawing shows a cross-section of the bar.



Phillips Screen Bar

This is an ideal bar for screens with wide spaces, as its depth of 4 in. allows enough of the screen bars to extend above the top of the bearers or supporting beams so that the corners of large lumps will not catch at the bearers and clog the screen. In fact, this bar has been so calculated that a spacing of 6 in. can be safely accommodated without having to make provision for additional clearance in the bearers.

Another good feature is that if the notches in the bearing bars are spaced 1 in. between centers, the width of 1 in. across the top of the screen bar makes it possible to vary the spacing of the screen by inches. The new bar is interchangeable with the diamond top bar and can be used in the same notches, since the shank of the new bar has the same taper and is the same thickness at the bottom as the diamond bar.

The heavy shank, as well as the shape of the head, insures the stiffness and rigidity of the bar, while the curvature from the head to the shank will enable the screenings to get away quickly and not wedge between **bars.**

It is believed that when this bar becomes known it will be very popular, since the need for a bar of this sort has long existed.

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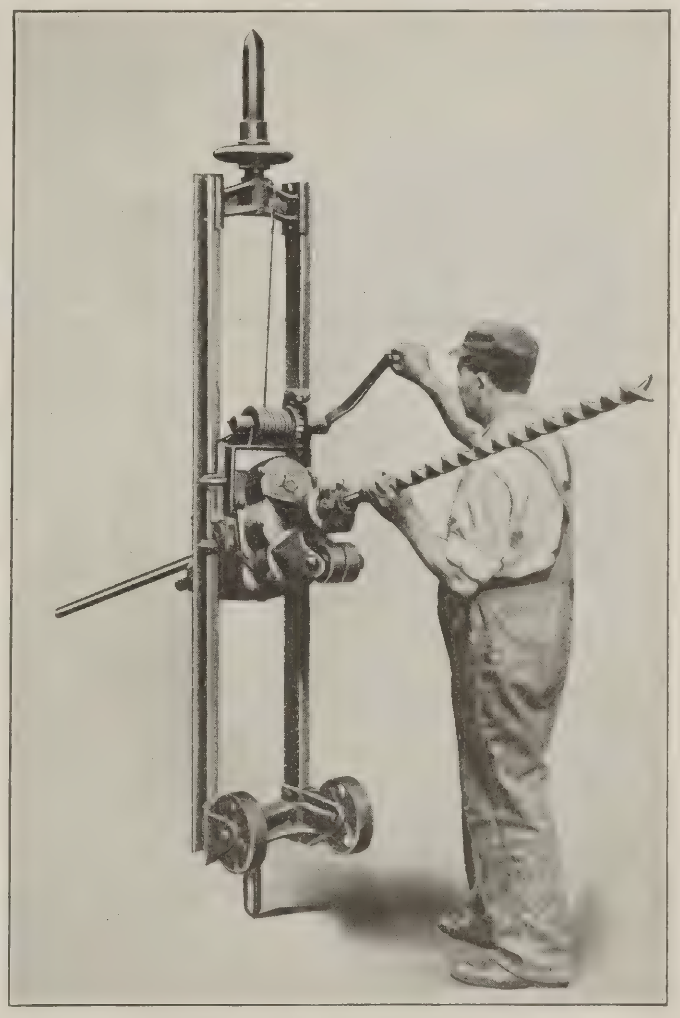
A New One-Man Drill

The accompanying illustration shows a new type of powerful coal drill recently developed and placed on the market by the Jeffrey Mfg. Co.

The motor and drill mechanism proper are mounted on trunnions in a carriage, which may be raised or lowered in a vertical channel-iron frame by means of a ⅜-in. steel rope. One end of this rope is fastened to the top yoke of the frame and the other end to a drum on the carriage. This drum is rotated by a handle, as shown, to wind up the rope and to raise the carriage. A ratchet and pawl are provided on the drum to prevent the carriage from dropping when the handle is released.



New Type Jeffrey Drill

When it is desired to move the drill from one place to another, the carriage carrying the motor and mechanism is lowered to the bottom of the frame and the drill rolled along on the wheels provided on the bottom cross-yoke, in a manner similar to an ordinary hand freight truck.

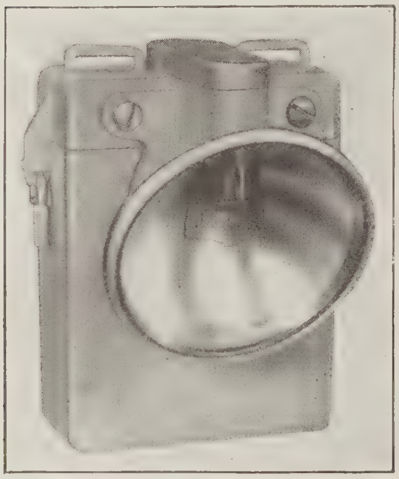
The motor of this drill is rated at 3 hp. The total weight of the drill is approximately 300 lb., while it is made sufficiently rugged and powerful to drill through any material against which the auger will stand up.

With the means employed on this drill for raising and lowering and with the wheels provided for moving it from place to place, only one man is required to move, set up, adjust and operate the machine.

The Wico Mule Lamp

It is fast being recognized that an electric lantern for mules is of equal if not greater importance than for men. The money lost through death of a mule resulting from the sudden extinguishing of a torch will pay for the cost of operation of a considerable electric equipment, and since such accidents are altogether too frequent in some mines, the electric mule lamp has received an appreciative welcome.

Electric mule lamps present a special problem in themselves. The first requisite is dependable strength. For that reason, the lamp housing of the Wico mule lamp has been made even stronger than the case which protects the battery and supports the housing. It is machined from cast aluminum with a cowl projecting far enough beyond the front glass to protect it from injury. All connections from the battery to the lamp are inclosed in aluminum so that the entire oufit presents a strong, light equipment free from fragile projections or complicated mechanism of any kind.



Wico Lamp for Mules

The lamp housing is attached to the cover part of the battery case, and when the battery is to be taken out for charging the cover is unlocked and unhinged from the case, disconnecting the electric circuit through strong spiral spring contacts.

It is said that mules that have worn electric lanterns refuse to budge when they are required to work without them. However that may be, no complaint has been heard of the new burden.

Influencing Employees against Unionism

By A. L. H. Street*

The law enacted by the Kansas Legislature in 1903, making it a misdemeanor to require an employee, as a condition to employment or retention in employment, to agree to refrain from joining, or to withdraw from, a labor union, is declared by the United States Supreme Court to be unconstitutional, in the case of Coppage vs. Kansas, 35 Supreme Court Reporter 240. As stated by Justice Day in his dissenting opinion, the importance of the decision is emphasized by the fact that statutes like the Kansas law have been passed in California, Colorado, Connecticut, Indiana, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oklahoma, Oregon, Pennsylvania, Porto Rico and Wisconsin.

Holding that the right of an employer to refuse to employ union men is a correlative of the right of labor unions to exclude from their membership men who work with nonunion employees, the Supreme Court says:

"When a man is called upon to agree not to become or remain a member of the union while working for a particular employer, he is in effect only asked to deal openly and frankly with his employer, so as not to retain the employment upon terms to which the latter is not willing to agree. And the liberty of making contracts does not include a liberty to procure employment from an unwilling employer, or without a fair understanding. Nor may the employer be foreclosed by legislation from exercising the same freedom of choice that is the right of the employee.

"To ask a man to agree, in advance, to refrain from affiliation with the union while retaining a certain position of employment is not to ask him to give up any part of his constitutional freedom. He is free to decline the employment on those terms, just as the employer may decline to offer employment on any other; for 'it takes two to make a bargain.'"

Recent Legal Decisions

Operation of New Jersey Compensation Act—The New Jersey Compensation Act does not authorize an award for death of an employee of a coal-mining company who was killed while walking along a railroad track as a trespasser, another passageway having been provided by the mining company for the employee's use. (New Jersey Supreme Court, Siemientkowski vs. Berwind-White Coal Mining Co., 98 Atlantic Reporter 909.)

Accident Resulting from Fall from Mine Roof—When suit is brought to recover for injury to, or death of, a miner caused by a portion of a mine roof falling at his place of work, it is no defense that he negligently failed to examine the roof, in the absence of any showing that an examination made with ordinary diligence would have disclosed the danger resulting in the accident. (Alabama Supreme Court, Henderson vs. Tennessee Coal, Iron & R.R. Co., 67 Southern Reporter 414.)

Duty to Warn Employee—Excessiveness of Damages—An employee at work at a coal dock, oiling hoisting appliances, is entitled to recover for injury sustained by him through starting of the machinery without notice to him, his peril being known to the employees in charge of the machinery. Eleven thousand dollars is not excessive recovery for personal injury to a man who has been able previously to earn from $60 to $90 who is permanently incapacitated for heavy work, and who sustained a compound fracture of a leg, resulting in infection and sloughing away of muscles. (Minnesota Supreme Court; Arveson vs. Boston Coal, Dock & Wharf Co.; 150 Northwestern Reporter, 727.)

Pollution of Streams in Mining Operations—A downstream dairyman through whose farm a stream runs is entitled to recover against a coal company for pollution of the stream, rendering the water unfit for domestic and agricultural purposes, caused by discharge of water from the company's coal-washing plant. (Washington Supreme Court, Packwood vs. Mendota Coal & Coke Co., 146 Pacific Reporter 163.) The court cites a decision of the West Virginia Court of Appeals wherein a coal and coke company was held liable in damages for polluting a stream by casting refuse from the company's mine and coke ovens into the river, thereby impairing the waters for the use of a farmer owning lands down stream.

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Editorials

Reciprocating Engine or Turbine?

Among coal-mine operators the reliability of any piece of equipment is a consideration second in importance only to its safety. The daily tonnage produced has a direct and powerful influence on the cost sheet. Any interruption to service sends the costs per ton skyrocketing. Consequently the savings effected by the efficiency of any prime mover for a month may be totally eclipsed by the losses incurred through an hour's shutdown if such a shutdown demoralizes the organization and results in the loss of a day's output.

The reciprocating engine with simple valve gear, either the old "D" slide valve or the piston type, has met with much favor on account of its general reliability. The same has been true to a scarcely less degree of the corliss engine. This latter has heavy, slow-moving parts and takes up a considerable floor space. Its economy is good, and it possesses the ability to carry its load every day and all day without excessive attention or repair bills. This has in no small degree accounted for its popularity as a prime mover in coal-mine power plants.

All reciprocating engines are, however, open to many objections. The piston must be lubricated. For this purpose oil is introduced into the cylinder with the steam. This oil may be used once and only once, while if the exhaust is to be condensed or used in a feed-water heater the oil must be filtered out from the condensate before it goes to the boilers.

In any reciprocating engine there is a reversal of stresses upon the various parts, and an uneven torque is exerted upon the shaft. This reversal of stresses affects the piston, piston-rod crosshead, wrist-pin, connecting-rod and the bearings at each end, the crank-pin, crank and even the main shaft bearings and bearing pedestals. Thus at each revolution the piston-rod is placed first in compression, then in tension; the wrist-pin is subjected to a shearing stress, first on one side and then the other. These stresses are communicated from one link or element to another until the anchor bolts are at last reached and the earth absorbs the stresses through the foundation.

These difficulties are not due to malice aforethought on the part of the designer. On the other hand, much gray matter and many a sleepless night, to say nothing of large amounts of time and money, have been expended to avoid them or minimize their ill effects. They are, however, inherent in the idea of securing power by means of reciprocation or oscillation under the action of a fluid under pressure, and while their ill effects may be palliated, reduced, minimized they can never be wholly avoided. The fact that some reciprocating engines are at least reasonably reliable stands as a monument not to the excellence of the fundamental idea which they embody, but to the care, ingenuity and good judgment of the builder in his selection and distribution of the materials commercially available.

In marked contrast to the complicated mechanism of the ordinary steam engine is the simplicity of the steam turbine. Here there are no oscillating parts, no reversal of stresses, no internal lubrication, no uneven torque. The force of the steam is applied within a container, continuously and tangentially to the circumference of the revolving element. The torque is thus uniform; and no flywheel—which of course calls for a larger shaft and heavier bearings than would otherwise be necessary—is required.

It is unnecessary to introduce oil into the steam fed to a turbine, since the rotor does not touch the stationary element. The only lubrication necessary is that for the main bearings, and this presents only a simple problem in comparison with that of reciprocating parts. In a turbine the oil may be used, cooled, filtered and used again almost *ad infinitum.*

With customary conservativeness the coal-producing industry as a whole has shied at installing turbines in places where reciprocating engines had long been employed with reasonable dependability. Even today, after several plants have demonstrated clearly a reliability in excess of that secured with reciprocating engines, there are to be found many men who still doggedly pin their faith to the older and more complicated, although possibly the more generally understood, machine.

Coal Handling and Transportation Problems

The cost of coal on the railroad car depends largely on the expenditure of labor in handling and transporting it in and around the mine. In this country it is in the anthracite region that this cost is the highest. Undoubtedly this is partly due to the irregularity of the coal beds, to the more finical cleaning and sizing and to the closer supervision which the dangers of anthracite-mine work entail.

The purpose of this editorial is to compare the operating efficiencies in the various mining sections. In this connection it must be remembered that anthracite is always sold in its natural condition, and the number of men engaged on the outside is not increased as that of the bituminous-coal regions often is by expenditures for labor in coking or even in the saving of byproducts. These are in truth manufacturing, not mining, processes, and the men employed in them should not be considered in enumerating the men engaged in producing the coal or in considering the relative efficiency of mining methods in various parts of the country.

It must be carefully kept in mind that the outside employees in the anthracite region would make a better showing, both relative and actual, if we were to eliminate in the estimation of that and other fields the number of men engaged solely in the cleaning and sizing of coal. The anthracite region of Pennsylvania supplies statistical information in which "slate pickers" are segregated, and we are informed that under this caption are included all employees inside the breaker, such as jig-tenders, platemen, etc. The reports from the bituminous regions of Pennsylvania, West Virginia and Illinois do not give any enumeration of workmen engaged in cleaning and sizing, though there are many men so employed, some being actually on picking tables and others trimmers on cars.

Lest too much weight should be placed on the cost of breaker work, a quotient has been obtained by dividing the whole tonnage, 91,626,964 tons, by the number of men and boys employed on the outside, excluding those working within breakers and listed as slate pickers. The divisor is thus reduced from 46,643 employees to 37,522. The quotient to which we have referred is 2442 tons per year, or 10.09 tons per day, a figure so low that it seems hard to explain. And yet in comparing this figure with the larger figures of the bituminous region, it must be borne in mind that the latter have not been "doctored" by the omission of cleaners and sizers in making the estimation.

TONNAGE PER EMPLOYEE IN PENNSYLVANIA, WEST VIRGINIA AND ILLINOIS

	Employees	Per Cent.	Tons per Employee per Year	Tons per Employee per Working Day
Penn. anthracite, 1913*:				
Miners	78,319	44.67	1136†	4.69
Other inside employees	50,348	28.72	1768†	7.31
Outside employees‡	46,643	26.61	1964§	8.12
Total	175,310	100.00	523	2.16

* All mines reporting. † Based on all tonnage except that from culm-banks. The whole tonnage was 91,626,964 in 1913, 2,619,785 being from mines and strippings, leaving 89,007,179 tons obtained from culm-banks. ‡ This includes 9121 slate pickers, men and boys, or 5.20 per cent., cleaning 10,046 tons per employee per year, or 41.51 tons per working day. § Based on the full tonnage; namely, 91,626,964 tons.

	Employees	Per Cent.	Tons per Employee per Year	Tons per Employee per Working Day
Penn. bituminous, 1913*:				
Miners	122,932	64.73	1407	5.61
Other inside employees	33,342	17.56	5188	20.67
Outside employees†	33,635	17.71	5142	20.49
Total	189,909	100.00	911‡	3.63

* All mines reporting. † This includes 10,122 coke employees, or 5.33 per cent., coking 37,381,029 tons, or 3693 tons per employee. Without these men, who are really engaged in manufacturing, there would be only 23,513 outside employees, or 12.38 per cent., the production being 7356 tons for each such employee per year, or 29.31 tons per working day. ‡ Excluding coke-workers, this figure would be 962.

	Employees	Per Cent.	Tons per Employee per Year	Tons per Employee per Working Day
West Virginia report of 1912*:				
Miners	43,581	62.60	1531	6.84
Other inside employees	13,277	19.07	5026	22.44
Outside employees†	12,758	18.33	5231	23.35
Total	69,616	100.00	959	4.28

*All mines reporting. † This includes 2297 coke employees, or 3.30 per cent., coking 3,310,250 tons, or 1441 tons per employee. Without these men there would be only 10,461 outside employees, or 15.03 per cent., the production being 6379 tons per year, or 28.48 tons per working day for each such employee.

	Employees	Per Cent.	Tons per Employee per Year	Tons per Employee per Working Day
Illinois report of 1913*:				
Miners	53,588	69.73	1129	6.31
Other inside employees	16,718	21.75	3619	20.22
Outside employees	6,549	8.52	9240	51.62
Total	76,855	100.00	787	4.40

*Shipping mines only.

But there is another vitiating principle in making comparisons to which attention must be drawn. In the anthracite region there are many strippings, and the men engaged in this work would find their appropriate classification in our tables, not as outside men, but as miners. Unfortunately, the tonnage of strippings and the men employed at such open-cut work have not been segregated in the mine reports, except in Illinois, and there the stripping work is of almost negligible importance. In the year ending June 30, 1913, about 152 men at seven strippings in Illinois mined 137,448 tons.

Another difference between anthracite and bituminous conditions makes a comparison of the work of inside men somewhat unfair. In the anthracite region there is much labor expended in reworking old breasts, especially in the Lansford district. In some cases possibly there are advantages in this work, making it more profitable than first mining, but in nearly every case second mining of this description is far more expensive than work in undisturbed coal.

Perhaps there are no sections in the Union with more efficient outside handling systems than those found in western Pennsylvania and Illinois. In the former the economy largely arises from the largeness of the operations. In the latter it finds its source possibly in the fact that the mines are mostly shafts and that the preparation of the coal is limited to careful sizing. The fact that much tramming which is outside, or tipple, work in the case of a drift is inside, or caging, work in case of a shaft, also accounts for the lower productivity of Illinois inside hands. The gain secured on the surface is a loss below.

On the other hand in western and central Pennsylvania the coal instead of being tipped by self-dumping cages is dumped on a tipple, which takes more surface hands though less men are needed below. The long haulages common to drift mines in that section are also a cause of wastage of labor, though they probably more than pay for themselves by the saving in shaft sinking and other first cost. In many cases there are long gravity planes which need the services of many men. Moreover, picking tables are somewhat numerous in central Pennsylvania.

The necessity that shotfiring in Illinois should be performed by men specially employed for that purpose increases the number of men engaged in underground work. In many cases these men are supplemented by fire hunters whose business it is to see that the shots have not ignited the coal and to extinguish an incipient blaze if such be found.

It will be noted that, excluding coke workers, the production per outside employee in the bituminous regions of Pennsylvania is 29.31 tons per day; in Illinois, where the coke ovens are away from the mines and are therefore not considered in the state report of the mining industry, the production is 51.62 tons per day for each outside workman.

The showing for this latter state (Illinois) is truly remarkable and we are informed by one of the largest operating concerns that it is not obtained by excluding men in official position from the enumeration, but represents a real economy in mine labor. Irregular operation may, and frequently does, help to increase the tonnage of coal mined per miner in any working day, but it does not give any aid to the management in increasing efficiency in other labor; for when places are vacated by the removal of workmen who become discontented at the frequent idlenesses, the transportation problems are made difficult and the outside men are often prevented from being supplied with the tonnage for which the operation was designed.

Some sections suffer from old-time regulations. In the Blossburg section of Pennsylvania, for instance, it was and perhaps still is customary to have boys at all switches, though in other regions the mule-drivers throw their own switch levers without any measurable waste of time. In many small mines overcasts are still unknown and door-boys are employed by the dozen. In fact, sometimes a strike of the door tenders and switchboys to secure what they consider due recognition in the union or for some other reason has shut down the mines.

We have calculated the preceding figures with the idea of showing the relative efficiency of the several sections of the country. Under miners we have included in the anthracite region both miners and laborers. In the bituminous regions we have classed under that head miners, machine runners, loaders and scrapers.

It will be noticed that these figures conflict with some we published in our editorial on "Efficiency" on Mar. 27. In fact, the Pennsylvania bituminous production for 1913 was placed at 1009 per employee. Here we have it only 911, and excluding coke workers it is 962. But the reason for this discrepancy is that the figures given are from the state reports, and they are not exactly on the same basis as those from the federal sources. The definition of employee in the state reports varies much, and in West Virginia the estimate entirely excludes superintendents, mine foremen, firebosses and clerks. The federal estimate is based on all coal produced whether the mines ship coal by railroad or boat or in farm wagons. The state reports are usually entirely incomplete as to occupations in "nonshipping" mines and in some cases overlook them altogether.

It is extremely hard to tell how many men a mine has averaged in its employment during any month or year, and several men with all the facts in detail before them might make widely different reports. Thus one man might take the number of men employed in December; another might average the men on the roll during the various fortnights. A third might look further and realize that he had more men on his payroll than were working on any particular day. Some men came to the mine during the fortnight, yet did not mine coal every day during that period; others left before the fortnight was over; and the number of men on the roll might well be 5 per cent. higher than that of the men actually in the employ of the company at any one time.

Moreover, some will not work on working-days. Sometimes 50 per cent. will be idle, so that the diligent inquirer will try to ascertain how many actual workers were at the mine on each day and then he will begin to approach another problem. Many men, he will find, only sent out one car, and he will at once suspect that the man was absent and that the car filled was loaded the day before and so should be credited to that day. Or perhaps it was loaded by the man's "buddy," and it would therefore be clearly a mistake to include this man on the working force of the day.

Thus the figures of the report will depend partly on the degree of anxiety of the clerk to make a complete report and partly on his understanding or misapprehension of the information wanted. If he is seeking to know how much is produced by working men on working-days he throws out men who do not work. If he desires to make a census of the force under employment on the average working-day he includes these men until the last day or last but one on which they are credited with tonnage.

But admitting these uncertainties, we note that the inside men, other than miners, and the outside employees of the anthracite region produce barely one-third as much per man as the bituminous mines, though the miners are able to produce almost an equal amount of coal. It will be seen that the coke workers of West Virginia produce barely half as much per man as like employees in Pennsylvania. This may be owing partly to discontinuous work. But it is also due, doubtless, to the lack of Belgian or byproduct ovens and to the absence of coke drawing, quenching and loading machinery.

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Lesson from the Layland Explosion

According to the coroner's verdict the deaths in the Layland mine on Mar. 17 resulted from a "blown-through" shot. John Marcunnic, a foreign miner, doubtless without the least idea of the damage he was liable to cause, drilled a hole a foot too deep into a narrow pillar of coal between two entries. As a result the powder blew a hole through the pillar instead of breaking down the coal, and it acted in a manner precisely similar to the explosions so repeatedly and clearly illustrated by the United States Bureau of Mines at the experimental mine, Bruceton, Penn.

A blown-through shot is like one which blows out; it has an equal power to raise and ignite coal dust. It is almost impossible to prevent an overestimate of the thickness of a pillar and to avoid therefore the drilling of a hole which may be so long as to constitute an element of danger. The only assurance is to keep the mine so damp or so well dusted with powdered rock that an explosion is impossible and to regard a blowout or blown-through shot not as *the* cause but as only *one* of a train of causes in a mine explosion.

⁂

Money vs. Reputation

Some men make money at a sacrifice of reputation; others increase reputation at a money expense. Moral and ethical standards condemn the former and commend the latter. If, however, we can enlarge our earnings and add to our reputation at one and the same time, it must follow that such effort is wisely expended.

Applied to yourself, Mr. Coal-Mining Man, the foregoing discourse means—write an article for COAL AGE. One man last year added $800 to his income by contributing to this paper, practically all the work being done in spare minutes. Everyone is not as adept at grinding out worth-while articles as the particular individual referred to, but any man, educated or uneducated, who has good common sense, practical experience and fair observation can get together mining facts that are of interest and value to others in the industry.

Our forewords each week have undoubtedly attracted your attention; try your hand at writing something for this display page. It may be highly technical, intensely practical or embody some helpful philosophy of a more human order. If you can get a single worthy thought across, your effort will be a success. This will net you all the way from $5 for a rough idea to $20 for a finished foreword.

Then there are a hundred other subjects directly bearing on coal mining, at least one of which will appeal to your taste and come within your experience. Study several recent copies of COAL AGE, pick your subject and get busy. Your pocketbook won't suffer, and above all, your friends will know you are still above ground.

Sociological Department

Staging Mine Fatalities at Mining Camps

The H. C. Frick Coke Co. is introducing a new feature in its campaign of education to promote safety. A meeting was held on Apr. 1 in the basement of the Presbyterian church at Leisenring No. 2, Fayette County, Penn. The purpose was to demonstrate ocularly how accidents could be avoided. After a speech by Superintendent R. K. Warnock, who presided, a demonstration was given on a raised platform showing a "fall in the drawing of pillars" being made in an improper manner. The posts were pulled and the men caught under the fall of roof. This operation was then repeated in the proper manner, the men being uninjured.

Elmer Fox gave a lecture on the use and care of the safety lamp, showing how safety lamps become defective and the danger of using such a lamp with a cracked chimney. He ended with a demonstration in which he ignited gas by manipulating a lamp carelessly.

The mine foreman, William Cowie, then showed the men the danger of not obeying the orders of the boss in the setting of posts. This was done by ordering William Brodrick to set a post in a room neck. The man failed to do so, and the rock fell, breaking his back. Ernest Dodgson then exhibited first-aid work after an accident.

Songs in both English and Slavish were sung, and the Munroe Mandolin Club gave several selections. The last number was an address by I. G. Roby, one of the state inspectors of mines.

A Whole County Takes Up Gardening

C. L. Clayton, a demonstrator of Louisville, Ky., who several years ago organized the Louisville Garden Club, has been sent by J. W. Newman, the Kentucky Commissioner of Agriculture, to Bell County, southeastern Kentucky, to direct the coal miners in the planting of 1000 gardens. Dr. J. F. Foley, who is health officer for Bell County, has been instrumental in securing Mr. Clayton's services.

These gardens range in size up to an acre apiece and are supplied by the coal operators. Lectures are being given, and films, illustrating garden work, are shown at the several motion-picture houses. Pamphlets are circulated, and the Federal Department of Agriculture has promised to send a female instructor to the county to show the wives of the miners how the surplus vegetables grown in the summer may be preserved for winter use.

It appears that large quantities of potatoes are being shipped into Bell County for the miners' consumption. These could just as well be grown in the miners' own gardens. Bell County is an active mining center, having among its large interests the Continental Coal Corporation with headquarters at Pineville.

Idle Apparatus

The anthracite operators of Pennsylvania are devoutly thankful that much rescue apparatus maintained by them at great expense remains idle. A case in point is that of the Lehigh Valley Coal Co., which equipped several fire cars for underground use in the mines over two years ago. These cars carry an electric pump which can deliver 300 gal. of water a minute, two large 30-gal. chemical extinguishers, a number of smaller-size ones, axes, buckets and complete first-aid outfits. The cars can be taken anywhere in the mines where track is laid.

At about the same time the Lehigh Valley Coal Co. elaborately equipped a railroad car for rescue work on the surface. This is fitted with operating tables, surgical instruments, lockers, water-coolers, first-aid supplies, stretchers, rubber and woolen blankets, Draeger oxygen helmets and pulmotors. It has had to be moved only once from its home station at Hazleton.

Rescue outfits are kept at central points at all the collieries in the region, and much care is expended to keep everything in working order and ready for instant use. Like the fire-fighting apparatus on a transatlantic liner, it may not be needed for a dozen years, or possibly never, but it has to be ready at all times. The prompt action of the local first-aid and rescue squads has had much to do with the lack of necessity for using these precautions.

Improved Milk Supply

In Whitley County, southeastern Kentucky, the Stearns Coal & Lumber Co. has just purchased a thoroughbred registered Shorthorn bull of milking strain and will use him for service at the recently established mining camps. It is the purpose of the company to improve the grade of the stock owned by employees and farmers in the section.

The United States Coal & Oil Co., at Holden, Logan County, W. Va., has just completed at a cost of $6500 a model dairy barn for supplying its men with pure milk. At Colver, Ellsworth, Heilwood and Morea Colliery, all in Pennsylvania, similar institutions may be found.

* * *

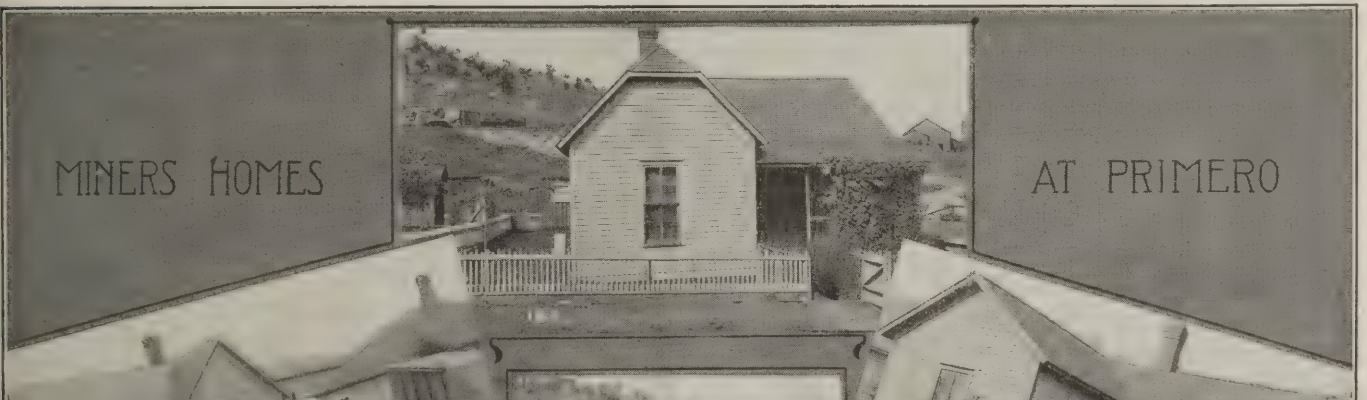
A six-team baseball league is being organized to play a summer schedule in the West Virginia-Virginia field. All salaries are to be guaranteed, and a high standard of baseball will be maintained. D. B. Sayers, chief engineer of the Stonega Coal & Coke Co., Big Stone Gap, Va., is looking for several players.

* * *

The coal operators of the Pocahontas, Tug River and Thacker districts of West Virginia, comprising what is known as the Norfolk & Western Ry. field, the Huntington, W. Va., Chamber of Commerce and the United States Bureau of Mines will hold a first-aid and mine rescue meet at Huntington, May 14, commencing at 9:30 a.m. with rescue events selected from six specified problems. In the afternoon first-aid events will be chosen out of 21 selected problems. The American Mine Safety Association and the American Red Cross will also offer prizes. The West Virginia Medical Society will be present at the meet. This will make it the more easy to secure judges. Invitations to the meet have been sent out by H. D. Smith, of Elkhorn, W. Va.

Living Conditions at the Colorado Fuel & Iron Co.'s Mines

Scene in the Grounds of the C. F. & I. Co. Hospital at Minnequa Near Pueblo, Colo., Showing the Lawn, the Steel-Works Band and the Recreation Hall for Convalescents



Primero Is a Coal-Mining Village of the Colorado Fuel & Iron Co., in the Trinidad District, Las Animas County, Colo.

Discussion By Readers

Efficiency in American Mining

I have been much interested in reading the editorial entitled "Efficiency," Coal Age, Mar. 27, p. 547. Having had a considerable knowledge and experience of mining conditions in Europe and America, I may be qualified to comment on some of the statements made in the article to which I refer.

In the first place, I must disagree with the statement that "The foreign mine expert, on his arrival in America, travels around the mines here and in Canada and goes away saying that there is nothing to see." In some respects it is true that he is "disappointed" when he views the surface equipment of many of our mines. Our surface plants are often laid out in such a manner that the foreigner gets an impression that the topworks have been erected without a plan. In many instances, the workshops are widely separated, requiring that pieces of machinery and other material be carried from one shop to another, entailing loss of time and labor. The supply yards for timber and other material are frequently so located that the daily supply of props, cap-pieces, rails and other material required in the mine is made laborious and expensive.

When, however, the foreign visitor goes underground, his eyes open wide and he examines with increased interest the methods of transportation, wide track-gages and mine cars of large capacity. On his return he never ceases to talk about what he has seen underground in American mines and to advocate the adoption at home of many of these features. As a matter of fact, in regard to transportation both on the surface and underground, American mining is far in advance of that in other countries. Again, the output per man in American mines and American tonnage sheets never fail to attract the attention and excite the admiration of mining men from other countries who visit our mines.

However, the foreign visitor is likely to look further than this. He is much interested in the balance sheet, and here it must be acknowledged that American mining has nothing of which to be proud. Permit me to say, then, that when articles are published comparing the production of coal per man in different countries, such as that which appears on p. 548 of the issue of Coal Age to which I have referred, it would be of interest, especially to the foreigner, to give in the same connection the dividends these operations are paying on their common stock. The comparison would help coal operators in this country to realize, to use a common phrase, that they are still "holding the baby."

A careful study of this subject has convinced me that the returns on capital invested in bituminous coal mining are smaller in America than in any other part of the world. The lesson to be learned by these reflections is that if the European mine owner can have a magnificent mine building, palatial bathhouses and offices, garden villages and parked areas, and can still pay his workmen adequate compensation for injuries, extract all his coal, observe strict and burdensome laws in respect to the mining of the coal and yet show a low fatal-accident rate while paying 10 or 20 per cent. on his common stock—surely, that is "efficiency."

I am convinced that it is the firm desire of Coal Age to improve coal-mining conditions in this country, and if, as is true, numerous coal-mining companies here are tottering on the brink of bankruptcy owing to the ridiculously low selling prices of coal, the question that is of the first importance is, "How are conditions existing here to be improved?"

Samuel Dean.

Delagua, Colo.

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Improved Fireboss System

I was pleased to see that the recent discussion on "Mining Laws, Legislation and Mine Regulations" drew frequent attention to the work of the fireboss and his being obliged to cover too large a territory, making it impossible for him to complete the examination properly within the time required.

In the mine where I am employed there has been a recent change in this regard. Under the old system it was customary for the fireboss to enter the mine at 3 a.m., make his examination of the working-places and report on the outside at 6 a.m., in order not to delay the men entering the mine in the morning. The fireboss was then on hand to receive any instructions from the mine foreman and to give whatever instructions were necessary to the miners as they entered the mine for work. Having done this, he would proceed to make his second examination while the men were at work. When making his second examination he would give special attention to the safety of every working-place in the section of the mine in his charge. He would examine all falls and abandoned places and see that the ventilation, drainage, haulage roads and timbering were in good condition, so that there might be no delay in securing a regular output of coal from every place. Under this system each fireboss had from 50 to 100 men in his charge, while one or perhaps two shotfirers would be employed in each section to blast the coal and rock as required.

After much deliberation it was decided that in order to secure the greatest safety and economy of working it was necessary to change the entire system of inspection. A sufficient number of firebosses were therefore employed to divide each district of the mine and give each man the charge of only from 35 to 50 men, which was one-half the previous number, and make him perform the duties of both fireboss and shotfirer.

Under the new system the fireboss enters the mine at 4:30 a.m., examines his section of the mine, and reports outside at 6 a.m., as before. As under the old system, he still works nine hours a day, however. In his second examination he must perform the additional work of blasting the coal and rock as required, which was formerly done by the shotfirer. The new system gives general satisfaction, the only objection made being that, with the additional work of blasting, the fireboss has little time for examining the falls and abandoned places in the mine, in such a manner as he should.

The most important feature of this system is that each section of the mine is provided with a shanty, located at about the center of the section. It is made by building two tiled walls in a cut-through. Each shanty is about 20 ft. long, 12 ft. wide and 6 ft. high, whitewashed and electrically lighted. The place is fitted with shelves and equipped with a "first-aid" outfit, stretcher, blanket and fire extinguisher, besides a full kit of tools for general work—picks, shovels, axes, hatchets, saws, hammers, jacks, wrenches, etc. These tools are given out as required and returned to the shanty at the end of each shift. The place is kept securely locked by the fireboss, who is responsible for its contents.

At the end of each shift each fireboss fills out a printed report blank showing in detail the condition of the section of the mine in his charge. These reports are given to the mine foreman, who sends them to the office. In the working of the new system it is claimed that the additional labor of shotfiring urges the fireboss to make constant endeavor to keep the coal moving. There is thus secured a more regular output and a reduction in the cost of production. In addition to his general instructions each fireboss is provided with a code of rules drawn by the management and a blueprint copy showing the ideal position of the drillholes in a working-face.

H. R. Kirkbride

Curtisville, Penn.

Recognition of Bravery

Letter No. 12—I read with much interest the discussion in Coal Age in reference to the recognition of bravery and heroic deeds performed by miners in time of mine disasters. The question has been raised as to who should be rightful competitors for such recognition, and what should be the nature of the award—whether it should be purely honorary or an attempt be made to compensate, in a measure, one who makes so generous a sacrifice without a thought of his own danger.

In Letter No. 7, Coal Age, Mar. 27, p. 550, John H. Dye asked the pertinent question: "Should such recognition be extended to men who are performing the duties for which they are paid and which is the recognized part of their service to the government, or should it apply only to the man who has left his working-place and generously given his service without thought of pay or reward?" In my opinion, all miners and others connected with mining and all who engage in rescue work should be considered as rightful competitors.

While it is unquestionably the duty of mine inspectors and employees of the Federal Bureau of Mines engaged in rescue work to take a leading part when they are present, since they are better trained and equipped for the work, the same duty devolves upon all to render every assistance in their power to save life in time of peril. As far as the miner is concerned, it cannot be expected that his work would be as effective as that of men trained and equipped for such work, but his act would be none the less brave and heroic, and the purpose is to recognize such bravery and heroism whether it be rendered by trapper boy, miner or government employee.

In Letter No. 1, Feb. 27, p. 383, "Bykem" asks: "Should the reward be entirely honorary in all instances or conditioned to suit the rescuer's own physical condition when that is permanently impaired?" He cites the classification made by the City of Chicago in recognition of similar heroic work on the part of its employees. In that classification three grades are mentioned—commendation, honorable mention and honorable mention with medal. Geo. S. Stewart, in Letter No. 5, Mar. 20, p. 513, thinks compensation should be extended in proportion to the sacrifice made.

I cannot believe that a monetary recognition for acts of bravery would accomplish the desired end, which should be to foster in men a spirit of doing for another what one would want that other to do for him under similar conditions of danger. I believe that a monetary compensation would have a tendency to invite acts of foolhardiness on the part of would-be rescuers more than if the recognition was to be entirely honorary. In coal mining it is a recognized duty incumbent on all miners to aid, as far as possible, in rescue work when the need arises.

Those were good words of "Flat Top Engineer," in Letter No. 3, Mar. 13, p. 471, where he describes the miner in time of peril as having but "one subconscious unformulated thought that, perhaps, a human life may be saved or a human service rendered"; and I would add that every true miner feels the rendering of that service is incumbent on him. When a mine disaster has occurred and miners are entombed, ventilation destroyed, the mine liberating explosive gas and on fire, surrounded by frantic mothers and weeping children pleading for the rescue of husbands and fathers, the fellow-miner with a heart full of human sympathy and with heroic courage forgets his own danger and enters the mine with but one thought and purpose. Why speak of pecuniary reward for such a man, when his reward is in the satisfaction of having made every possible effort to save the lives of fellow-workers?

As long as coal is mined disasters must occur that will call for the voluntary service of miners that will involve danger and peril. There will be acts of bravery and heroism that will merit recognition. Let this recognition be made in a way that will stimulate self-sacrifice for others. At present I can think of no better plan than the well-earned favorable mention in the columns of Coal Age, giving an account of the brave acts performed and the photograph of the one who sacrificed his own personal safety in the hope of saving another. This would acquaint thousands of miners with the story and inspire them with the spirit of doing for others what they would have others do for them under like conditions.

John Rose,
District Mine Inspector.

Dayton, Tenn.

Letter No. 13—The suggestion in regard to the recognition of heroism in coal mining, made in Coal Age, Jan. 16, p. 109, was a timely one and is deserving of the most earnest consideration on the part of every man connected in any way with the coal-mining industry. Almost every other trade or calling in which hardy men engage has some sort of provision for the suitable acknowledgment of courageous acts, particularly where the object is to save life.

Probably no other calling presents the same opportunity for the display of man's noblest attributes as coal mining, which fact is quite generally recognized. In common with most mining men, I favor the formation of a board, or commission, having for its object the careful consideration of this work in its relation to the mining of coal. The means and methods to be adopted would have to be worked out in actual practice. However, I would suggest a word or two regarding certain features that it might be well to bear in mind.

1. Care should be taken not to inaugurate a plan that would foster foolhardiness in rescue work.

2. A purely impulsive act, although heroic in its nature, should be given its rightful place; as such act naturally possesses less merit than a cool deliberate setting aside of any thought of one's own danger, in the reasonable hope of rendering assistance or saving another who is in peril.

3. The loss of life, or permanent injury by which the would-be rescuer is incapacitated for future work, would call for special consideration in any recognition accorded the act.

As is well known, the heroes of a mine are quite generally men of small income and dependent on their daily toil for the support of self and family. On this account I feel that the results to the one who makes the sacrifice and risks his own safety for that of another should receive due consideration. In this connection I may be pardoned for referring briefly to a personal experience that affords an illustration of the need of such consideration as I have mentioned.

It was at the time of the terrible Harwick disaster of Jan. 25, 1904, when 179 men lost their lives in an explosion that wrecked the mine. Cages, ropes, fans and every essential for the working of the mine were destroyed. It was before the day of the universal use of the oxygen helmet or breathing apparatus and the efficient mine-rescue organizations that have since been formed. Strong hopes were entertained by the men on the surface that some, at least, of their comrades below would be found alive and could be saved if brought out promptly to fresh air. Everything depended on prompt action, which is the case generally on such occasions. Even today, when rescue work is well organized, it frequently happens that the hope of rescue depends on the men who crowd the entrance of the mine immediately after the explosion.

In the present instance many of us in that crowd of willing volunteers had wives and families. It so happened that two of us lived very close to each other, and doubtless the same thought was uppermost in each of our minds: What would become of those at home should we lose our lives in the attempt to save those in the mine? Would the dear ones at home, as the result of our decision, have to pay the same costly price, or would a grateful government or community care for them as the soldier's widow and children are cared for today? In the full consciousness of the possible results we took the risk, but I ask in all earnestness, Would not our decision have been more easily made had this doubt that I have mentioned been removed from our minds?

What transpired that day below ground is a matter of record and need not be repeated here. Suffice it to say that my comrade, John Lyle, paid for his decision by the loss of his life, while I was spared. What might have been the terrible results to those dependent on him has often been in my thoughts, but a well-known philanthropist of the same nationality as Lyle rewarded the act of his countryman by assuming the care of his bereft family. I want to ask, Had my life been forfeited, as well it might have been but for the providence of God, what would it have availed my wife and family had they been presented with a medal and a bit of silk ribbon to console them for the loss of the breadwinner of the family?

In closing, permit me to say again that since, as almost invariably happens, the saving of the lives of those entombed in a mine by disaster depends on the prompt self-sacrificing work of those who crowd the top of the shaft immediately after the accident, any suitable recognition of the volunteer's service must consider the results to those who are bereft in the event of his death or who are left helpless if he is incapacitated for work. For the man who survives, a medal or other simple acknowledgment of his brave deed is very well and all that would be expected. But for the dependents of one whose life has been sacrificed in a reasonable attempt to save others something more practical should be devised. I believe that the suggestion made in Coal Age will yet take more concrete form and that the coal industry itself will see to it that a suitable and adequate provision is made to meet this exigency.

Sim. C. Reynolds.

Houston, Penn.

Mining Laws and Legislation

Letter No. 2—One of the most interesting and important points brought out in the recent discussion of mining laws was that referred to in Letter No. 41, Coal Age, Apr. 3, p. 613, and Letter No. 42, Apr. 10, p. 650, regarding the danger of working in a gaseous mine as compared with that in a mine having a bad roof.

Special emphasis was laid on the need of more frequent inspection in mines worked under a bad roof. Such frequent inspection is required by law in all gaseous mines, but is practically ignored in most mining laws, in respect to bad-roof conditions. Mr. Hogarth, in Letter No. 41, draws attention to the larger number of accidents that occur from falls of roof and coal than those due to the explosion of gas in mines, as shown by mining statistics.

I do not wish to be understood as being opposed to the frequent and thorough inspection of mine workings, but I feel that the benefits to be derived from such frequent inspection are often overestimated by its advocates. It must be remembered that inspection alone does not remove danger. A more frequent inspection *may* have the effect of promoting a false sense of security on the part of the miner. I have drawn attention to this fact in a previous letter on "Safety Hints," Coal Age, Apr. 3, p. 612.

The fact is well known that men working under a treacherous soapstone roof are continually on their guard, even when the roof appears safe. They realize by experience the importance of so doing. Under these conditions, a morning examination would be of no avail inasmuch as the danger is a constantly recurring one, and the watchful miner is his own best safeguard. Then, while advocating frequent inspection of mine workings, let us place equal emphasis on the necessity for stringent mining laws and legislation, in respect to such subjects as timbering, lighting and full compliance with the existing laws and mine regulations.

I have always been deeply impressed with the need of a more practical classification of coal mines. I have referred frequently to the fact that mines should be classified rather on a basis of being "nonhazardous," "hazardous" or "extrahazardous," without regard to what cause is responsible for the danger implied in such classification. The danger in any particular case may be due to the presence of gas, dust or bad-roof conditions. Such a classification would possess the decided advantage, however, that similar demands and burdens would be required in each case in proportion to the danger to be encountered in the operation of the mine.

The following citations from the Ohio mining laws (1914) may be of interest in this connection:

> Sec. 952. . . . He (the mine foreman) shall examine each working-place or have it examined by his assistant at least once each alternate day that persons are or should be at work therein and oftener when, in his judgment, the circumstances require.
>
> Sec. 953. He shall see that the working-place of each miner is kept supplied with props of approximate length, caps and other timbers necessary to securely prop the roof thereof. When he examines the working-place he shall observe the condition of the roof and timbering and instruct the workmen therein as to the proper method of timbering for the security of the roof.

These and other references in the law make the mine foreman responsible for such an inspection of each working-place as will make it safe for the men employed therein, without reference to the particular nature of the danger that may exist there.

GEORGE N. LANTZ.

New Straitsville, Ohio.

* * *

Rescue Work at Royalton, Ill.

Permit me to correct one statement made in your editorial entitled "Royalton, Ill., Rescue Work," COAL AGE, Apr. 24, p. 729. The second paragraph states, "No one was saved." This is incorrect, for the men wearing oxygen apparatus discovered a man, at about 4 o'clock in the afternoon, in room 25 off the second-north entry. He was reclining on his powder box, still alive. He was in a semidazed condition, but, on being carried to fresh air, revived sufficiently to be taken to his home and has since fully recovered.

With the exception of about five others, this man appeared to be the only man, in the area affected by the explosion, who was not instantly killed. The positions in which a few of the men were found indicated that they had not been killed by the direct force of the explosion, but had succumbed in their efforts to reach fresh air immediately after the explosion took place.

E. C. LEE.

Herrin, Ill.

* * *

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Influence of Coal Dust on Explosion—The fine dust of an inflammable coal when floating in the mine air may render the air explosive in the entire **absence of explosive gas.** Under such conditions, however, the ignition and explosion will only take place when the floating dust is acted upon by a flame of considerable volume and intensity.

When a **small percentage of methane** is present, insufficient of itself to make the air explosive, the presence of the dust floating in the air is more dangerous than when no gas is present. The dust-laden air is **more easily ignited** and the force of the resulting explosion is increased in proportion to the inflammability of the mixture.

The **purity, fineness, humidity** and **inflammability** of the dust are important factors in determining the character of the explosion, since these with oxygen are the chief elements that promote the rapidity of the combustion, which is the necessary condition of any explosion.

The suspended dust **feeds the flame** of an explosion that is started in a mine, and thus serves to propagate the blast and extend what would otherwise have proved only a local explosion. This **action is cumulative** in a dry and dusty mine. The dust lying on the roads and clinging to the sides and timbers of the passageways is blown into the air by the force of the rushing wind that precedes the explosive wave, producing what has well been called a **"pioneering cloud"** of dust that is itself highly explosive.

The **weight of fine bituminous coal dust** required to render normal air explosive has been variously estimated. Tests made at the Pittsburgh Experiment Station with dust from a 200-mesh sieve showed explosion took place in a density of 32 grms. per cu.m. (0.032 oz. per cu.ft.) or, say 1 lb. of dust in 500 cu.ft. of air. The Taffanel experiments (Liévin) gave explosion in 70 grms. per cu.m. (0.07 oz. per cu.ft.) or, say 1 lb. of dust in 230 cu.ft. of air. In one instance only, explosion occurred in 23 grms. per cu.m. (0.023 oz. per cu.ft.).

It is quite evident, as experiments also show, that conditions in respect to the **purity, humidity** and particularly the **inflammability** of the dust are so variable that the question of the density of the dust cloud has only an experimental value. The size of the workings, as determining the conservation of heat and pressure, will also modify the results in the mine.

Theoretically, since the atomic weights of carbon and oxygen are 12 and 16, respectively, 1 lb. of carbon will yield

$$\frac{12 + 16}{12} = \frac{28}{12} = 2\tfrac{1}{3} \text{ lb. carbon monoxide.}$$

But, carbon monoxide measures 13.5 cu.ft. per lb., at normal temperature and pressure. Hence, $2\frac{1}{3}$ lb. of the gas or the yield of 1 lb. of coal dust would form $2\frac{1}{3} \times 13.5 = 31.5$ cu.ft. Then, since the lower inflammable limit of carbon monoxide is when the mixture of gas and air contains 8.4 per cent., **inflammation** might be expected when the dust present was 1 lb. in $31.5 \div 0.084 = 375$ cu.ft. of air. Also, the lower explosive limit of the gas being when 16.5 per cent. of gas is present, **explosion** might be expected when there was 1 lb. of dust in $31.5 \div 0.165 = 190$ cu.ft. of air.

The Coal Age Pocket Book

Inflammability of Coal Dust—The inflammation of a dust cloud in mine workings, under like conditions, depends largely on the inflammable nature of the coal. The experiments at different testing stations have demonstrated that the **volatile combustible matter** contained in coal is a fair index of its susceptibility to inflammation when held in suspension as fine dust in the air.

Experiments performed with **anthracite dust** seem to indicate that the fine dust of that coal is not capable of propagating an explosion in a mine, under ordinary mining conditions. This fact points significantly to the conclusion previously stated that the volatile combustible matter in a coal is an important index of its explosibility. It is not asserted or claimed that anthracite dust cannot be exploded under favorable conditions. However, the conditions that would cause anthracite dust floating in the air to explode are not liable to occur in ordinary mining practice.

Influence of Shale or Stone Dust—Shale or other soft rock of the coal formations have been ground to a fine powder for use in mines and, in this form, have been sprinkled on the roads in a manner to form **stone-dust zones,** or distributed on shelves hung across and overhead in the entries to form so-called **stone-dust "barriers."**

The purpose of these dust zones and barriers is to **arrest the progress** of an explosion should one occur in the mine. Their use, however, has not been attended with **unvarying success,** which is due in part to the different conditions of temperature, humidity, air space or volume of mine workings available for expansion, inflammability of the gas- and dust-laden air and the initial intensity of the explosion; also, in part to the limited extent or adequacy of the dust zone or barrier as compared with the strength developed by the explosion.

Notwithstanding the **apparent failure** of these means for preventing the spread of an explosion in a mine in many observed instances, there is no question but that finely powdered shale or stone dust blown into the path of an explosive wave by the pioneering impulse, or suspended in the air with the inflammable coal dust has a most decided effect and **reduces explosive conditions.**

The **action of incombustible dust** suspended in an otherwise explosive atmosphere to allay the explosiveness of the mixture or reduce the violence of the blast should ignition and explosion occur is **wholly physical.** The incombustible particles disseminated through a dust-laden atmosphere separate more widely the inflammable particles of coal dust and dilute the air necessary for combustion. In other words, the percentage of inflammable matter in the mixture is reduced and the **liability to inflame** diminished in the same proportion.

Also, by its **absorption of heat,** the incombustible matter lessens the heat available for ignition and decreases the heat energy developed when ignition has taken place. The action is entirely similar to that of the inert nitrogen of air depleted of its oxygen, or to the extinctive effect of carbon dioxide when present in firedamp mixtures, both of which conditions act to diminish the explosibility of gaseous mixtures.

Inquiries of General Interest

Coal Deposits of South America

Can you give me any information in regard to the coal-mining districts of South America, stating where these are located?

JOHN S. WILLIAMS.

Cumberland, B. C., Can.

The Executive Committee of the Twelfth International Geological Congress selected for its chief subject of discussion, "The Coal Resources of the World," and in response to a specially prepared circular sent to the directors of the geological surveys and mining bureaus throughout the world they received valuable reports on the coal resources in the several countries of the globe. Later a summary of these reports was published in three volumes. The following information is taken from the first of these volumes:

The coal formations of Colombia are largely Cretaceous, although there are small areas of coal-bearing rocks in the Paleozoic formation. The probable reserve is estimated at 27 billion tons of bituminous coal.

The report states that in Venezuela bituminous coal is mined on a small scale at Naricual, near Barcelona, and at Coro, 12 or 15 mi. from the seaport of La Vela. The Naricual coal area extends from the River Querecual on the south to the mountain chain of Naricual on the north. This area is estimated to contain 200,000 sq.mi. and is underlaid with several seams of coal varying from 3 to 9 ft. in thickness.

There are no coal mines in operation in Ecuador, although considerable deposits of coal have been found in several places. Samples of this coal examined in the United States and England have been pronounced of excellent quality, but the lack of transportation facilities has prevented the development of the deposits.

Coal is one of the abundant natural products of Peru, where it is found in 15 principal belts or seams, which contain a probable reserve of 1,000,000,000 tons of commercial coal. The deposits have not been developed to any extent.

Coal in thin seams is known to cover a large area in southern Brazil. These seams, however, are split by numerous partings. The coal also contains a high percentage of ash and sulphur. The measures belong to the upper Carboniferous and Triassic formations. These deposits also extend into Argentina, where the reserve is estimated at about 5,000,000 tons of bituminous coal.

The coal seams of Bolivia are found embedded in thick strata of sandstone that resemble the millstone grit. These seams are thin, and although the coal has a fair calorific value, it contains many impurities.

Little is known of the coal deposits of Uruguay. There are no outcropping seams in this republic, although some coal has been reported recently in borings made near the northern border.

The coals of Chile probably all belong to the Tertiary, although some may be Cretaceous. In the neighborhood of Quiriquina Island there is an estimated coal area of about 60,000 sq.mi., which is largely submarine. The coal in this area is mostly lignite, the seams ranging from 1 ft. to 2 ft. 7 in. in thickness. The best coal, however, is found in the vicinity of Santa Maria Island, where three seams, aggregating a thickness of 9 ft. 9 in., underlie an area of about 700,000 sq.mi. This coal burns with a smoky flame and contains from 50 to 60 per cent. of fixed carbon, the ash varying from 2 to 11 per cent. Lignites of inferior quality occur at many points in southern Chile, while anthracitic coal of probably Mesozoic age, having a conchoidal fracture, metallic luster and burning without flame, is found at various points in the Andes.

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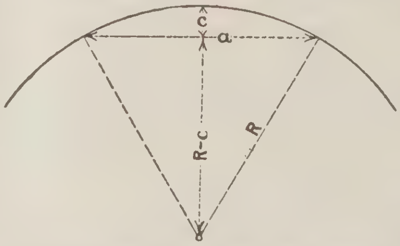
Geometry of the Circle

Kindly publish in the inquiry department of COAL AGE the correct formula for finding the radius of a circle when the chord and the middle ordinate are given, as indicated in the accompanying figure, where a is the chord and c the middle ordinate.



CHORD AND MIDDLE ORDINATE OF CIRCLE

The formula I have, as taken from a textbook, is

$$R = \frac{c}{2} + \frac{a^2}{Bc}$$

I want to ask what is meant by Bc, which does not appear in the figure.

STUDENT.

Brier Hill, Penn.

The formula as given above is incorrect and probably contains typographical errors that make it unintelligible. The correct rule for finding the radius of the arc of a circle when the chord and the middle ordinate are given, is as follows:

RULE—*Divide the sum of the squares of the half-chord and the middle ordinate by twice the middle ordinate.*

Expressed as a formula, this rule is

$$R = \frac{(\frac{1}{2}\,a)^2 + c^2}{2\,c}$$

This formula is developed from the rule for finding the hypotenuse of a right triangle whose sides are known. In this case, the hypotenuse is the radius of the circle, and the two sides are the half-chord and the radius less the middle ordinate.

The operation is as follows:

$$R^2 = (\tfrac{1}{2}\,a)^2 + (R - c)^2$$
$$R^2 = (\tfrac{1}{2}\,a)^2 + R^2 - 2\,Rc + c^2$$
$$2\,Rc = (\tfrac{1}{2}\,a)^2 + c^2$$
$$R = \frac{(\frac{1}{2}\,a)^2 + c^2}{2\,c}$$

This formula is particularly useful in surveying, for calculating the required degree of curve.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—What are the dangers incident to dry and dusty mines, and how would you guard against them? Answer fully.

Ans.—The danger that exists in a dry and dusty mine is that a possible blownout or windy shot will throw a quantity of the dust into the air. This would probably be ignited by the flame of the shot and a local explosion result. If any gas is present the danger is much increased. The fine dust thrown into the air by the ordinary operations in the mine will be suspended in the air current and the explosive condition of the mine much increased.

In order to avoid as far as possible the danger of the ignition of dust in a mine, it is necessary to avoid all accumulations of fine dust on the roadways and fine coal and slack at the working-face. It is necessary for this purpose to use dust-proof cars for hauling the coal in the mine and to load out the fine coal and slack regularly at the face. It is also necessary to establish an efficient spraying or watering system throughout the mine.

Where blasting is performed, every precaution should be taken to prevent the occurrence of a windy or blownout shot. The working-face and the sides, roof and floor should be sprinkled thoroughly before a shot is fired. All shots should be inspected, charged and fired by authorized shotfirers, who should condemn any shot that is deemed unsafe. It is important to use efficient means for the humidification of the mine air. This is best accomplished by heating the intake air previous to discharging steam into the current as it passes into the mine. This humidification of the air prevents, to a large extent, the drying out of the mine owing to the absorption of moisture by the current.

Ques.—A large percentage of mine accidents is caused by miners persisting in loading coal where the roof is unsafe. What rule would you adopt to prevent this condition and reduce the number of accidents?

Ans.—Rules are without avail unless rigidly enforced, and the enforcement of mine rules requires a close inspection and suitable penalties for any violation of the same. In order to avoid as far as possible accidents of this nature, every working place should be inspected by a competent person before the workmen are allowed to enter the mine. Every miner should also be required to examine his own roof immediately upon entering the place and before proceeding to load coal or do other work. If timber is needed he should be required to set the posts at once, and if the necessary timber is not on hand he should not be allowed to work in the place until he has secured the same and complied with the regulations. Every miner should be compelled to keep on hand two or three extra posts ready for immediate use when needed. All orders for timber should be promptly delivered at the points where they are required for use. When a room or chamber is "working," it should be closely watched, and if considered dangerous the men should be made to stay out until the roof again became quiet.

Ques.—In working a dusty mine, where marsh gas is given off and firedamp generated, what steps would you take to guard against accidents from explosions?

Ans.—The mine should be opened on the triple-entry system or the main entries should be driven four abreast. The center entry or entries should be made the main intake and the flanking entries the main-return airways for their respective sides of the mine. The mine should be divided into separate ventilation districts and should be worked exclusively with safety lamps. All accumulations of dust should be avoided. The working places and the roads and passageways should be cleaned regularly. An effective spraying system should be installed throughout the mine. Means should be adopted to humidify the intake air, which should first be heated by allowing it to pass over a system of steam pipes, so that it will absorb a larger quantity of water than would otherwise be possible.

Shotfirers should be employed to prepare and fire all shots except those that are in their opinion unsafe, and these should be condemned. Strict regulations should be enforced in regard to the use of safety lamps, and no one should be entrusted with the use of a lamp until he fully understands how it should be handled and under what conditions it is *unsafe*. At the end of each shift, all lamps should be returned to the lamphouse, where they should be cleaned, examined and put in readiness for use the next day, by a competent person in charge.

Ques.—What would be the cost of pumping 1000 gal. of water per min. to a height of 1000 ft., using a centrifugal pump driven by an electric motor, assuming the motor has an efficiency of 90 per cent. and the pump an efficiency of 72 per cent? The cost of the current is 1c. per kw.-hr.

Ans.—The first step is to calculate the size of the column pipe required for a velocity of, say 400 ft. per min., and from this find the frictional head, for the given quantity of discharge. The diameter of column pipe, for a velocity of about 400 ft. per min., is,

$$d = 0.25 \sqrt{G} = 0.25 \sqrt{1000} = say\ 8\ in.$$

The friction head due to a flow of 1000 gal. per min. through this pipe is

$$h_1 = \frac{f l G^2}{8 d^5} = \frac{0.01 \times 1000 \times 1000^2}{8 \times 8^5} = 38\ ft.$$

The actual head being 1000 ft., the total head against which this pump must operate is 1000 + 38 = 1038 ft.

Now, assuming that 1 gal. of water weighs $8\frac{1}{3}$ lb., and taking the efficiency of the pump as 72 per cent., and that of the motor as 90 per cent., since 1 hp. = 0.746 kw., the input of the motor is

$$Kw. = \frac{1000 \times 8\frac{1}{3} \times 1038}{0.90 \times 0.72 \times 33{,}000} \times 0.746 = say\ 300\ kw.$$

At a cost of 1c. per kw.-hr., the cost, in this case, will be $3 per hr.

Coal and Coke News

Harrisburg, Penn.

Anthracite mine workers are behind the bill introduced in the Senate on Apr. 28, by Senator Beidleman, which calls for the election by the people of 21 assistant mine inspectors.

The bill provides that there shall be 5 assistant mine inspectors in Lackawanna County, 6 in Luzerne; Carbon, 1; Schuylkill, 4; Northumberland, 2; Columbia, 1; Dauphin, 1, and the counties of Susquehanna, Wayne and Sullivan, a separate district, 1.

A salary of $2000 per year is provided for each assistant. The work of the assistants would be confined entirely to seeing that the mine laws relative to ventilation are obeyed and that particular attention be paid to the circulation of air at working faces where men are employed.

If the bill becomes a law, the judges of the several Courts of Common Pleas in the anthracite region would name the first set of assistant mine inspectors. In November their successors would be elected for terms of four years. Any mine employee, aged 30, and with 10 years' actual experience in and about the mines, 5 years, at least, of which were spent in cutting coal at the face of breast, chamber, etc., would be eligible for the assistant inspectorship.

To encourage the further development of the mineral resources of the state, a bill, which is thought to be backed by the administration has been introduced by Senator McGee. The bill provides that the Secretary of Internal Affairs on application to him made to issue his warrant for not exceeding in quantity 100 acres to any one person, any coal or other minerals under the rivers of the state.

That from and after the issuing of said warrant the right to dig or mine coal, iron, limestone, etc. . . . shall vest and be in the party in whose favor the said warrant or warrants shall issue. Provided, That he shall exercise the said right, as not in any way to interfere with the free navigation of any river or with the rights of any person or persons holding property on the banks thereof. Provided also, That nothing contained in this act shall authorize any person to undermine the bed of any river, the navigation of which has been improved by the Commonwealth, within one hundred yards from any dam or lock necessary to said improvement without the consent of the Secretary of Internal Affairs, and nothing contained in this proviso shall in any way be construed to affect any rights now vested under existing laws. And provided also, That the Commonwealth shall have the right after 20 years from this date to revoke any such warrant or grant on payment to the party, his heirs or assigns, holding the same, the original purchase money and the original costs of his works, engines, et cetera, such power of revocation only to be in force where there is any improvement made.

That the person or persons so holding said warrant or warrants, his heirs or assigns, shall and may at any time within 10 years from the date of the same have and receive a patent for the said land under the seal of the Commonwealth in the proper form granting them, their heirs and assigns, all the right, title and interest of the Commonwealth and the right to dig and mine iron, coal, limestone, sand and gravel, fire clay or any other mineral on his or their property, paying into the treasury of the Commonwealth the price of $100 per acre and the usual fees with interest from the date of said warrant subject to the restrictions contained in the 2nd section of the Act. And provided, That nothing in this Act shall prevent or be a bar to any indictment for any nuisance or injury done by any person or persons, so exercising said rights to any public or private property or for any impediment to the full and free use of any of the said rivers.

A Hearing Was Granted

The House Committee on Mines and Mining recently granted a hearing to the operators and mine workers on the Catlin Bill No. 160. Roger Devers represented the miners and James P. Torrey the operators.

Principally, the contest was on an amendment proposed by the operators to postpone the date when the bill will become effective until next January, to make it operative at the same time with the compensation bills.

Several amendments were agreed upon, one to define the term of miner, to include everybody working in the mine, another to eliminate the provision that the mine foreman must have 5 years' experience in cutting coal, and a third that legal representatives of injured families may have the right of inquisition at a coroner's inquest. The bill was referred to a sub-committee, comprising Representatives Milliron, Armstrong; West, Cambria, and Jones, Susquehanna. Two of the committee representing bituminous counties and the other a farming district.

The Anthracite Coal Tax Is Held Constitutional

Judge Kunkle, of the Dauphin County Court (sitting in Harrisburg), on Apr. 30, filed opinions upholding the constitutionality of the anthracite coal tax act of 1911, and directing judgment for the Commonwealth in the appeals of the Alden Coal Co., and Plymouth Coal Co., operating in Luzerne County and the St. Clair Coal Co., operating in Schuylkill County, from the settlement of taxes made by the Auditor General and State Treasurer. The actions involve approximately $5,000,000 in tax and it is understood that appeals to the Supreme Court will be filed within a few days.

The main opinion is in the Alden Coal Co. case, and the judge says in the course of the opinion, "We are of the opinion that the classification of anthracite coal for taxation is a legitimate one and that the taxation of such coal as distinguished from all other kinds of coal is not a violation of the constitutional provisions referred to."

The court holds that the title of the act is not defective and that it gives proper notice of what the statute contains and that the act does not contain more than one subject. While in some respects the act is declared to be crudely drawn an examination leaves no doubt of legislative intention. The court holds that the act is not local or special legislation and that it does not purport to legislate for one particular locality. Anthracite coal may be found in other counties in the future, says the court, and if the act referred to all coal the same objection might be raised to it because the coal is not found in many counties of Pennsylvania at all. The act is declared to be a statute to raise revenue for the state and does not regulate the affairs of any county or municipal division.

On the objection that it imposes double taxation because the coal companies pay a state tax on capital stock the court says the power of the Legislature to impose double taxation is "well settled."

In any event the coal might be shipped out of the state limits before the period of appraisement and the producers thus avoid payment of a double tax because if it was not owned it could not be included in property taxable for state purposes. That it would not be a uniform tax because the amount returned would relieve municipalities from some burden of taxation, by saying that the citizens will still be subject to local and state taxation and that the relief is not prohibited.

On the plea that the act is confiscatory the court says, "If the purpose for which the tax is levied is a public one there is no doubt as to the power of the Legislature to impose the tax. The statute does not present the case where the property of one is taken and applied to the use and benefit of another, but presents the case where the property is taxed by the Commonwealth and the revenues thus raised are distributed where, in the judgment of the Legislature, it seems right and proper." The court holds that the purpose of the taxation being a public one, the Legislature had the power to levy and distribute it.

The court says that it is unable to see how the act conflicts with the Federal Constitution. The coal becomes subject to tax when prepared for market or before it is started out of the state.

In passing on the last objection of the list filed the court says that if there is any valid objection to the sufficiency of the appropriation clause "its defects are open to remedy by the Legislature and without it the rest of the act can stand."

At present there is pending in the Legislature a bill to provide a new anthracite tax of 2½%, ad valorem, with requirement of an equal distribution of the tax between the state and the municipalities producing anthracite coal. The act upheld distributed 50 per cent. of the tax among counties producing the coal. The proposed act before the Legislature, specifically states that the money received by the state is to be used for highway purposes.

Conference on Compensation

Mine workers are awaiting with considerable interest the conference to be held between the Governor and 26 senators on the compensation acts now pending in the Senate. The members of the lower house are watching what the senators do as the action of the Senate must be approved by the House.

One of the points that is disturbing some of the senators is the provision of the bill which deprives the employer of his common law defenses in case he does not choose to "voluntarily" accept the provisions of the workmen's compensation acts. The common law defense includes the "contributory negligence," "fellow servant" and similar pleas. It appears some apprehension has been manifested among operators and manufacturers in regard to this provision, and the senators have been hearing from employers "back home." A number of other points will be brought up in the conference.

It is said the Senate may not undertake to act finally on the compensation bills. Some amendments are almost certain to be made following the conference with the Governor, and this would necessitate reprinting one or more bills, which would defer the possibility of action for several days. It is even stated around the capitol that a public hearing may be held on the bill during the week of May 10, which would accord with the report that the Senate leaders are in favor of holding off final adjournment until after May 13.

PENNSYLVANIA

Anthracite

Mahanoy City—Possibly the first cash penalty since the Conciliation Board of the anthracite region was created in 1902 was decreed on Apr. 30, when ex-Judge George Gray, of Wilmington, Del., umpire of the peace body, ruled that the Lehigh Valley Coal Co. must pay Joseph Levancavage, of Buck Mountain colliery, $75 for his unjust discharge. Levancavage was dismissed by the mine foreman because he insisted he had not been paid the proper yardage. The company discovered Levancavage was right. Levancavage asked for three months' pay for the time he was idle.

Mauch Chunk—Officials of the Lehigh Coal & Navigation Co. have employed skilled woodmen to patrol Broad Mountain, between Beaver Meadow and here, in an effort to check the forest fires that threaten to devastate enormous supplies of timber.

Hazleton—John A. Moffitt, of Washington, D. C., and James A. Steese, of Harrisburg, representing, respectively, the Federal and State Departments of Labor, are to act as mediators in the settlement of the strike of the 200 stripping hands of Contractor James Duggan. The men quit some time ago because, as they claimed, a certain number of the employees were not paid in full for their work in March. The management denied the charge, and declared that all the men had received every cent due them. As neither side would yield, it was agreed to have outsiders adjust the dispute.

Sunbury—Judge Frederick B. Moser, of the Northumberland County Court, on Apr. 26 refused a new trial in the case of John Rodel, of Shamokin, who recovered $4000 damages from the Philadelphia & Reading Coal & Iron Co. for the loss of a leg which he suffered when kicked by a mule. The plaintiff alleged that without his knowledge he was given a vicious mule while at work at the North Franklin colliery, and that the mule without warning kicked with much force, throwing him over a pile of ties and under a trip of cars, which cut off his right leg. The coal company denied negligence and contended that it had no way of telling that the mule was gentle.

Ashley—Twelve hundred men and boys were thrown out of work at the Maxwell No. 20 colliery of the Lehigh & Wilkes-Barre Coal Co. on Saturday, May 1, when 100 "door boys and patchers" decided to strike in order to play baseball. The action was taken when Burgess J. K. Fenner, of the borough, notified the boys that Sunday baseball would be prohibited. The boys replied that they would keep the colliery idle every Saturday to play ball if the order is enforced. The colliery officials were unable to effect a settlement.

Nesquehoning—In one day recently 1703 loaded cars were dumped into the Lehigh Coal & Navigation Co.'s breaker here, breaking the former record of 1625 cars.

Duryea—A. B. Brown has filed suit against the Delaware, Lackawanna & Western R.R. Co. and asks damages of $2000. He charges that the coal company is pumping sulphur water from the Halstead colliery and permitting it to flow onto his land, destroying its value as a building plot.

Bituminous

Washington—Carmine Cicci has brought suit against the Diamond Coal & Coke Co., asking $8400 damages alleged to be due for the unlawful mining of coal from under his tract of land, and for surface damage incurred as a result of these mining operations. The sum of $2400 is asked for the coal removed, while the balance, or $6000, is claimed as damages to real estate and buildings.

Connellsville—Production of the Connellsville coke region is approximately 300,000 tons per week, while the demand is slowly increasing. Furnace coke is, however, standing still while the merchant business is growing steadily.

Latrobe—Marcus W. Saxman, head of the Latrobe-Connellsville Coke Co., has disposed of his holdings to capitalists allied with the Keystone Coal & Coke Co. The main offices of the firm will be moved to Greensburg. Edward Soppitt, general superintendent of the company will continue as the active field manager while the engineers and other officers will make the Latrobe offices their headquarters.

The big fan house at the Latrobe-Connellsville mine of the Latrobe-Connellsville Coal & Coke Co. located near Superior No. 2 was recently destroyed by fire entailing a loss of about $5000. A repair shop located nearby was also destroyed. It is believed that the fire originated in an over heated bearing, while the flames had gained such headway before discovery that there was no chance of saving the building. Plans for a new fan house are now being prepared, and the structure will be erected at once.

Uniontown—The Orient Coke Co. recently fired 250 ovens, this number being approximately 60 per cent. of the entire installation. It is expected that increases in the number of operating ovens will be made from time to time until full capacity is attained.

WEST VIRGINIA

Williamson—The Pond Creek Coal Co. is advertising for men, and all its mines will be run on full time shortly. This firm is one of the largest coal operators in this immediate vicinity.

Welch—The jury in the coroner's inquest held to determine how and by what means three men met death in the Davy-Pocahontas coal mine explosion a few days ago, returned a verdict that the men were killed through disobeying the mine foreman's instructions. These instructions were not to enter the mine until it had been ventilated and the fan started.

Huntington—At a recent meeting of the mines and mining committee of the local Chamber of Commerce, additional plans were agreed upon in connection with the safety and mine rescue meet to be held at League Park, May 14. Arrangements for an elaborate pageant preceding the demonstration were formulated and minor details discussed.

More than 300 men it is estimated either have already or will shortly leave Huntington and surrounding territory for Kentucky to work in the mines of the Consolidation Coal Co. It is said that over a thousand men are needed for these mines. Of the 12 mines owned by this firm on Elkhorn River, six are now running and four more will be started immediately, while the scarcity of labor is all that is preventing the opening of the remaining operations.

The West Virginia Coal Association recently perfected its organization by vesting all governing power in an executive committee of which W. D. Ord of Langraff, W. Va., is chairman, and A. H. Land, of Barbourville, secretary.

Fairmont—New orders for several hundred thousand tons of coal have been received by the Consolidation Coal Co. for delivery to the lakes as soon as possible. This means that the local firm will not only work the mines already in operation, but put other plants in commission. The new orders assure that activity in the mining industry of the Fairmont region will be better this summer than for many years in the past. The outlook is therefore bright.

Wheeling—Heretofore all shipments of coal from this section have been consigned west of Wheeling. The opening of the Lake trade a short time ago started coal moving in that direction. Recently, however, a new market has been secured on the Atlantic seaboard, and a few days ago the Baltimore & Ohio R.R. carried the first consignment of Marshall County coal to Baltimore.

KENTUCKY

Whitesburg—The Elk Horn Mining Corporation is preparing to resume its operations at Haymond after six months of idleness. More coal is said to be going out of this section over the Lexington & Eastern than ever before.

Barbourville—Second hearing of the case of Elijah Young's administrators against the North Jellico Coal Co., of Louisville, resulted in a change from the first verdict of $12,000 damages to a finding for the defendant, the second trial having been granted at the request of the plaintiff. Suit was for $25,000, Young having been killed while in the defendant's employ. He was seated on a plank between two cars, it is alleged, when the accident occurred, and the jury decided that his death was due to his own negligence, not to that of the company.

Middlesboro—Coal operations in Middlesboro have shown more activity recently than for some time. The Wasioto & Black Mountain R.R. and the Straight Creek lines have been loading out over 300 cars a day, it is said. An extra freight train has been run on the Louisville & Nashville lately to take care of the increased business toward Corbin.

Pineville—The fourth annual meeting of the Kentucky Mining Institute will be held at Pineville, Friday and Saturday, May 14 and 15. In connection with this meeting there will be a state-wide first-aid meet. The committee in charge is endeavoring to make this meet the largest and most attractive ever held in this state and invites teams to participate. Valuable prizes have been offered, among which are included various sums in cash aggregating $100, mining lamps, wearing apparel and groceries. It is probable the American Mine Safety Association will offer medals to teams having the highest average.

OHIO

New Straitsville—The Troy mine near New Straitsville, which has been burning since the strike of 1884, has communicated the flames to the Jones Bros. mine, which started to burn last week. The Jones shaft will have to be abandoned and the property loss will be large.

Columbus—The joint resolution offered in the Ohio Senate by Senator Vorheis, empowering the Ohio Utilities Commission to investigate the question of freight rates on coal shipments in intrastate traffic, has been killed. Senator Vorheis at first desired the passage of a law regulating rates, but when it was defeated he substituted the joint resolution which met a similar fate.

Coshocton—Quite a few mines in the Coshocton field were opened last week after an idleness of more than a year. Two forces of men have been placed at work at the Warwick mine to get it in shape for operation. The three mines of the Barnes company are all in operation. Other mines are also working.

Martins Ferry—The Pittsburgh Standard Coal Co. has closed the contract for the sale of a large tract of coal with a mile of frontage along the Panhandle division of the Pennsylvania R.R. near Burgettstown, Penn. The purchasers have formed the Bertha Coal Co., while the land purchased is one of the few important tracts not worked in Washington county. It is expected that within a short time the newly organized company will close the deal.

INDIANA

Lafayette—The Chamber of Commerce has filed a protest with the Interstate Commerce Commission against the proposed increase in freight rates on shipments of Kentucky coal to Indiana points. The proposed increase is 9c. a ton. The increase does not apply to West Virginia coal, and the new rate is therefore regarded as a discrimination in favor of the West Virginia product.

Indianapolis—Notice that more than $6,000,000 due on bonds must be paid by the Dering Coal Co. or else the Indiana property of the company will be sold at auction May 21, at Terre Haute, Ind., has been filed with the clerk of the United States District Court at Indianapolis. The company has property in Sullivan, Vigo and Vermillion counties. The decree issued was entered in the suit brought by the Continental & Commercial Trust & Savings Bank of Chicago against the coal company, the plaintiff holding a mortgage securing a bond issue for $4,664,000, interest payments defaulted since Apr. 1, 1909, amounting to $1,559,294, and receiver's certificates issued amounting to $91,373.

ILLINOIS

Chicago—The first steps toward the reorganization of the Dering Coal Co., said to own the largest tract of coal land in the country, were taken May 1, when Attorney Levy Maer on behalf of the Continental & Commercial National Bank of Chicago, and Kuhn, Loeb & Co., of New York, bought stocks and bonds to the face value of $7,000,000 at auction for $681,500.

Princeton—On petition of J. H. Walsh, trustee, Judge A. Davis recently appointed Albert Whitehead, of Canton, Ill., receiver for the La Salle-Hennepin Coal Co. This is a friendly law suit to keep the affairs of the company in their present condition until a plan can be perfected to dispose of the property and pay the debt. It is considered quite possible that the mine may be reopened in the near future.

Springfield—There appears to be a well founded rumor to the effect that several thousand acres of coal land south of Springfield, located along the Chicago & Alton R.R., will be opened up during the coming summer. According to the report, a total of 6500 acres will be available during the next few months.

Lewistown—Robert Nahm is sinking a new coal shaft south of the Evans hill in East Lewistown. It is believed that this mine will be operated electrically, and that due to a favorable location it will be a financial success.

IOWA

Albia—The governor recently reappointed the following inspectors for four years beginning July 4, 1915: W. E. Holland, of Albia, first district; R. T. Rhys, Ottumwa, second district, and Edward Sweeney, of Des Moines, in the third district. At the session of the legislature just closed, a bill was passed changing the time of the biennial report from the fiscal year, June 30, to the calendar year, Dec. 31. The next report will be made for 18 months, ending Dec. 31, 1915, after which these reports will be made every two years.

COLORADO

Pueblo—The mine of the Colorado Central Coal & Mining Co., on which $300,000 in bonds is outstanding, was recently sold at auction for $15,000. The property was bid in by John H. Voorhees who represented the bondholders. The state mine inspector has refused to permit the mine to be opened until extensive repairs can be made. The company will be reorganized and funds raised to proceed with the operation.

Denver—An increase of 100,000 tons over the coal production of the state in February is shown by the March report of the state coal mine inspector's office. The total production of Colorado's coal mines for the period Jan. 1 to Apr. 1 of this year is given at 1,967,986 tons, or a decrease of 24,468 tons on the production of the corresponding period in 1914. The European war is held largely responsible for the drop in production. The March production was 678,868 tons with 11,735 men employed, while 10,580 men were employed in March, 1914. Six men were killed in the mines of the state during March.

MONTANA

Great Falls—Fire of an unknown origin recently destroyed most of the main buildings at the entrance of the coal mine of the Anaconda Copper Co., at Belt. Among these buildings were the tipple, store house, blacksmith shop, stable, and boiler house. The power house, fan house, carpenter shop and washhouse, were saved, but sustained damage. For the past two years this mine has been operated under lease by the D. W. Merkle Coal Co.

Laurel—The International Coal Co. in the Billings district is commencing the development of a new vein which promises to be one of the richest in Montana. President Talmage states that development will be rushed as fast as possible, and further announces that the coal being taken out shows as high a test as the best grades from West Virginia.

PERSONALS

M. A. Burriss, formerly connected with the Bunsen Coal Co., at Danville, Ill., has been transferred to the H. C. Frick Coke Co., with headquarters at Connellsville, Penn.

D. W. McClennan, traveling salesman for the Pittsburgh Coal Co., has been appointed sales manager of the Allegheny Coal Co., with office at Buffalo, to fill the vacancy caused by the resignation of B. W. Wistar.

James Wardlow, Sr., the mining teacher who conducted such a successful class for miners in Mt. Pleasant, Penn., last season, has reorganized his class. The class last season had 33 members, and it looks as if this year's will be much larger. Mr. Wardlow is doing a good work in this line.

A. P. Houston, of Ensley, Ala., has just received a patent on a novel type of conveyor for the joint purpose of conveying and screening coal, iron ore and like materials and to effect movement and screening of the material without excessive vibration common to present screens.

E. C. Lambert, mine inspector of the 12th District of West Virginia, has resigned. Mr. Lambert has been offered a position as superintendent of the Excelsior Pocahontas Coal Co. P. P. Kerr, assistant superintendent of the Thacker Fuel Co. of New Thacker, has been appointed successor to Mr. Lambert.

William E. Trautmann, of East St. Louis, Ill., has been named receiver for the Carterville Coal Co. This action was taken in the Federal Court, at Danville, Ill., by Judge S. M. Wright. To operate the plant involved, it will be necessary to obtain money for immediate use, either by making a loan or by issuing receiver's certificates.

W. B. Beals, who has been connected with the West Virginia-Pocahontas Coal Co. at Leckie, W. Va., for the past six years in the capacity of superintendent, has been promoted to manager of the Leckie Collieries Co., of Leckieville. William Smith, foreman of the West Virginia-Pocahontas plant, has been promoted to succeed Mr. Beals.

P. J. Rogers, for many years superintendent of the Pratt Coal Mine Division of the Tennessee Coal, Iron & R.R. Co., during most of which time convicts have been worked in some of the mines, is an applicant with strong supporters for the presidency of the State Convict Bureau. Mr. Rogers is regarded as being one of the best posted men in the state of Alabama on convict labor.

OBITUARY

Guy M. Dean, secretary of the Ohio & New River Coal Co., died in a hospital recently from the effect of a self inflicted bullet wound. Mr. Dean was a native of Owensboro, Ky., and was interested in coal operations in West Virginia and the West.

John E. Curran, 65 years old, state mine inspector of the 18th district of Pennsylvania, died in Pottsville May 1. He held the position of inspector since 1902, previous to which he was a mine foreman, having been the official head of several of the leading collieries in the vicinity of Pottsville. He started his career as a slate picker.

George W. Eliason, aged 52 years, a mine superintendent in the employ of the Byron Coal Co., died at Clarksburg, W. Va., recently from cancer. Mr. Eliason was one of the best known mine superintendents in this section of the country, having worked for a number of years for the Consolidation Coal Co., and later for the Byron Coal Co. He is survived by two sons, three daughters, two brothers and a sister.

William Johnson Eicher, 50 years old, well known in the Connellsville coke region, recently shot and killed himself, the body being discovered by Mrs. Eicher on her return from church. Mr. Eicher was an inventor and had filled numerous positions in and around the mines in the Connellsville region. Two years ago he was forced to give up the superintendency of the mines at Smithton on account of ill health. He is survived by a widow and four children.

Fred Ellwanger, sole survivor of the Marianna mine disaster of Nov. 28, 1908, died on Apr. 26 at the Washington Hospital, following several months' illness of diabetes. The deceased was aged about 46 years, and was born in Germany. Since his awful experience in the mine disaster six years ago he has not been the same man he was prior to that time. When Mr. Ellwanger was taken from the mine, more dead than alive, 42 pieces of slate and coal were extracted from his left side, where they had been blown by the explosion. His hair was burned off and a portion of one ear. The explosion occurred about 11 o'clock in the morning and it was late in the evening when he was rescued.

INDUSTRIAL NEWS

Denver, Colo.—The Denver branch office of the Sullivan Machinery Co. has been removed to Room 837, Equitable Bldg., instead of 1748 Broadway, as heretofore.

Columbus, Ohio—The offices of the Central West Coal Co. have been moved from the Columbus Savings & Trust Building to the 12th floor of the Brunson Building.

New York, N. Y.—The New York branch office of the Jeffrey Mfg. Co. has been removed from 77 Warren St., to 50 Dey St. George H. Mueller, assistant sales manager of the Jeffrey Mfg. Co., is manager of this office.

Youngstown, Ohio—Contracts totaling three million dollars for the construction of 200 by-product coke ovens at Struthers, were awarded Apr. 29 by the Youngstown Sheet & Tube Co. This firm plans extensions to cost five million dollars.

Philadelphia, Penn.—The Link-Belt Co. of Philadelphia has just received an order from the Maryland Coal Co. of Pennsylvania, St. Michaels' Penn., which is allied with the Berwind-White Coal Mining Co., for two 150-ft. centers, longwall coal conveyors.

Lewisburg, W. Va.—What is believed to be the last of the criminal prosecutions growing out of the Paint Creek coal strike was disposed of recently when L. F. Michael, a mine guard, was discharged because the state failed to presecute a charge of murder against him.

Columbus, Ohio—No bids were received for the property of the Starr-Hocking Coal Co. when it was offered for sale at public auction at the Franklin County Court House recently. The property was offered by Receiver C. E. Haskins. Authority has been secured from the court for another sale May 8.

Birmingham, Ala.—A temporary injunction was recently granted by Judge E. C. Crow of the Circuit Court to restrain T. B. Bowers, tax collector of Jefferson County, from attempting to enforce the payment by the Pratt Consolidated Coal Co. of the tax on solvent credits. It is alleged that this tax is illegal.

Havana, Ill.—J. M. Atwater is building one of the largest barges ever constructed in Havana. This boat is to be 26x60 ft., and can carry several carloads of coal or other tonnage. The side planks are of Oregon fir, 4 in. by 54 in. by 60 ft. These were shipped from Everett, Wash., on two special flat cars. This barge will be launched within a few weeks.

Fayetteville, W. Va.—The Spruce River Coal Co. operating a mine at Ramage on Little Coal River is now driving another mine on Horse Creek about 30 miles therefrom. This will be ready for operation the latter part of June. Other coal companies in the Coal River field are prospecting new mines, while others are seeking locations for expansion of their mining interests.

New Orleans, La.—A coal tipple, the only one in the New Orleans section, has been constructed at Port Chalmette, St. Bernard Parish, by the New Orleans Co. A recent test of the improvement proved it to be satisfactory in every respect. The tipple will make it possible to transfer coal from cars to barges at a greatly reduced cost. The chute is located on the lower side of Chalmette.

Trenton, N. J.—The Lehigh Coal & Navigation Co. was recently indicted in the United States Court on charges that in violation of the Interstate Commerce Act it accepted from the Central R.R. of New Jersey rebates on coal shipped from Hauto and Nesquehoning, Penn. There are thirty counts in the indictment and the defendent may be fined $20,000 on each count of which he is found guilty.

Birmingham, Ala.—It was recently announced that the steel construction for the benzol plant to be erected by the Tennessee Coal, Iron & R.R. Co. has been given to the American Bridge Co. This contract calls for several hundred tons of steel which will be made as rapidly as possible. There is a general impression that the plant will be ready for operation Sept. 1 next, and efforts in that direction will be made.

Lima, Ohio—For the first time in two years the local shops of the Cincinnati, Hamilton & Dayton R.R. Co., employing 400 men, have run on full time for an entire month, and prospects are that they will continue to do so for several months longer, as there is a large amount of equipment requiring repairs. Activity in the shops is reported to be the direct outcome of largely increased business for the road, the coal traffic to the Lakes being an important factor.

Pittsburgh, Penn—A total decrease of 1,570,893 tons of coal and coke took place in the tonnage hauled by the Pennsylvania R.R. on the lines east of Pittsburgh and Erie in March. Decreases in coke and both kinds of coal are shown for the month, as well as for the entire year thus far. The greatest falling off as compared with March, 1914, was that of bituminous coal. A total of 3,243,270 tons were hauled this year, being a decrease of 1,170,645 tons.

Washington, D. C.—The Interstate Commerce Commission recently entered a decision upon a rehearing of the petition of the Campbells Creek Coal Co., of West Virginia, holding that through rates and joint rates should be established for the transportation of coal from points on the line of the Campbells Creek R.R. to the interstate destinations mentioned in Kanawha & Michigan Ry. tariffs, and such joint rates should not exceed the main line or district rates now applied from points on the line to the Coal & Coke and the Kanawha & West Virginia railroads to the same destinations.

Baltimore, Md.—Approximately 197,794 tons of coal were exported from this port during the month of April. This exceeds the shipment during the banner month of September, 1914, when 128,761 tons were exported. Forty steamers and four schooners cleared this port foreign during the month of April. The value of the coal carried will probably reach $500,000. The exports were apportioned to the following countries in the quantities named: Italy 98,135 tons, Argentina, 55,997; Cuba, 15,401; Egypt, 8270; France, 7572; Costa Rica, 3528; Panama, 3145; Jamaica, 905; Venezuela, 950; Bahama, 80 tons.

Coal Trade Reviews

General Review

Anthracite buyers less responsive as the season advances and some accumulations are noted. Heavy increase in export shipments creates a better tone in the Eastern bituminous market. Situation at interior points continues dull and discouraging. Pessimistic outlook in the Lake trade.

The general tone of the anthracite market continues satisfactory and a large tonnage is moving, but it is nevertheless a fact that the trade is notably lacking in the usual rush that marks the opening period. There are instances where wholesalers are being hard pushed temporarily to place coal, while reports of concessions on the regular circular are noted on certain sizes. Dealers are cautious about accumulating excessive stocks and the trade is generally in a less receptive condition than at the opening period. Lake shipping is getting under way but the movement is light.

The heavy export shipments of bituminous have created a distinctly better feeling in the Eastern market. Operators are apparently so confident of a tremendous demand in this direction that they are notably less responsive to offers at the prevailing low prices and there is an optimistic trend to the situation though without any actual development of a constructive nature yet. The Atlantic Coast terminals are crowded with train loads of coal and with foreign transports.

The outlook for the late fall is much improved though consumers who have not yet covered their requirements continue buying in the open market as a rule; on the other hand it is probable they are already facing higher contract prices than could have been done the last two or three weeks. In fact were there any life to the prompt market at the moment the activity in export business would be sufficient to create a general upturn throughout the trade.

While a few agencies in the Pittsburgh district express very positive views of an improvement, it is clear that the exceedingly light shipments in the Lake trade continue to exert a very depressing influence. Operations are still heavily curtailed, in spite of which there is considerable coal on demurrage and the very cautious buyers are still relying on cheap fuel of this kind. The tonnage now moving in the Lake trade is practically negligible and there are scarcely any inquiries for the future.

The Ohio trade is still marking time pending further developments. It is reported that interior movement from the Upper Lake docks is congested, which will no doubt tend to delay any improvement at this end. The steam demand fails to show any improvement and the buyers are confining their purchases generally to the open market.

The Middle Western mining operations are restricted to an abnormally low basis, while the trade is distinctly dull and shows no indications of any change in either direction. Mine operations have been reduced to the minimum summer schedule, a great number having closed down entirely for repairs. The most encouraging factor in the current situation is a well defined tendency in all directions to maintain prices. The scarcity of screenings still prevails and this is the only grade in any active demand at all.

BUSINESS OPINIONS

Sentiment continues highly optimistic, but there are still restraining influences and unfavorable factors to be overcome.

Financial Chronicle—Definite or tangible evidence of benefits from war orders is as yet entirely lacking. In the meantime, unpleasant reminders are all the time coming to hand, making it plain that before the war orders appeared as a factor in affairs many properties were doing very poorly indeed and had uncommonly unsatisfactory income statements.

Boston News Bureau—The average business man as well as the industrial leader is convinced that business is well on the upgrade and that the second half-year will prove even more encouraging than the past quarter. Certainly the prospects of nearly all industries are uniformly brighter than at any time since 1909. New England, afflicted with tariff and railroad troubles, and for a long time a sore spot on the industrial body, is operating its cotton mills at 85% to 90% capacity, its woolen mills overtime and its machine tool factories at greater capacity than for many years.

Dun's—Each week strengthens confidence in a progressive revival of business activity, but the forward movement is, in many departments of trade, so slow, and there are so many cross influences at work, that some disappointment is felt that the advance is, on the whole, not more pronounced. That substantial progress is being made is clearly disclosed by the trade statistics and reports. Bank clearings are beginning to reveal small gains over last year, and while this favorable showing is a reflection largely of the effect of the recent speculative expansion upon the New York clearings, it is nevertheless an indication of the trend of business.

Bradstreet's—Business continues to gain in vitality, the rate of improvement being of the gradual but steadily spreading type, with trades and sections heretofore backward falling in line. Distributive trade, benefited by summer-like weather, has expanded; current shipments by jobbers of essential staples are quite satisfactory; confidence in the future, expressed at numerous points, is manifested in a strong disposition to place conservative orders for future delivery.

Iron and Steel—Pig iron buying has been light and no large transactions are recorded for finished products. The inquiry of the Pennsylvania R.R. for a large amount of equipment has not progressed any further than the tentative stages, and it seems as though this was more or less of a feeler. At the same time, it cannot be said that the market has moved backward, as operations of the leading interests are about at 70% normal. It has been denied, from authoritative quarters, that the United States Steel Corporation has any war orders and it is not believed that it will take any.

Engineering News—Every indication points to a period of prosperity for this country, the like of which has never been seen. Increased business is slowly being built on the foundation of unusual returns to agricultural interests. The self-denial of the last few months, following a period of personal retrenchment over a number of years, has resulted in the accumulation of a vast fund which is now awaiting investment. A large part of the increased business is due to the unbounded confidence of men of large affairs who are willing to risk their time and capital in new enterprises. The Construction News Department last week published more items of new construction than ever before in the history of the paper.

ATLANTIC SEABOARD

BOSTON

F.o.b. situation improved but New England trade still slack. Buyers as a rule not yet attracted but some sales are reported. Georges Creek bottoms loading Pocahontas and New River coal. Pennsylvania interests following the Eastern market closely. April prices being carried over on May shipments of anthracite in some quarters.

Bituminous—While there is no change in the demand for coal in New England, it is plain that price conditions at Hampton Roads are somewhat improved. There is enough faith in the export trade to make shippers less responsive to low offers, and minimum prices are up at least 5c. from a week ago. Manufacturing interests report a slight improvement also and it is possible we shall have much better fall conditions than have been looked for hitherto. A few new contracts have been closed lately but nothing over 25,000 tons is reported. Such tonnages are almost invariably placed with the shippers who had them last year. The consumers who did not contract early are for the most part keeping out of the market.

It is conceded there is a more optimistic feeling in the trade. The fact that Baltimore shippers have been obliged to put some of their coastwise transportation in for Hampton Roads loading is looked upon as significant. It not only increases New England clearances from Hampton Roads, but indicates at least the possibility, of diminished shipments here from Baltimore. Since a large tonnage has always come to this territory from the upper Chesapeake, the Hampton Roads agencies are naturally hopeful over the outlook.

The continued steamer congestion at Baltimore has the effect here of very much curtailing receipts of Georges Creek. If there were more life to the local market such a condition would have an effect on prices. As it is, stocks everywhere being so large, a cessation of shipments for a week or ten days would be hardly noticed.

The trade in the Pennsylvania grades continues without much change. A better movement is noticed from New York to Providence, and it is likely that 40c. freights are helping cut Cambria and Somerset coals in competition with Pocahontas and New River. The export demand for Georges Creek is tending also to increase the outlet for the more popular coals from Pennsylvania. From Philadelphia there has been a slight increase in shipments of these grades and factors there are likely to make a determined effort to place coal in new directions as the season advances.

Water Freights are still easy, the supply of barges and steamers being ample to meet current demands. There is more of a disposition now on the part of owners to make charters through the season, a few such arrangements having been put through within a week. Single trip rates remain at 75@80c., depending on the class of tonnage.

Anthracite—Many of the shippers are not only carrying over a fair supply of May orders but apparently deliveries on the April schedule are being extended. There is no snap to the trade and every wholesaler is pushing hard to place coal. Once the dealers take on what their storage will accommodate it will be several months before the market develops anything more than a hand-to-mouth demand.

Current quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.40@2.85	2.92@3.02	
New York*	2.40@2.95	2.70@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.70@2.80
Boston†				3.50@3.73
Providence†				3.53@3.73

* F.o.b. †On cars.

NEW YORK

More optimistic feeling in bituminous. Operators less aggressive over new business. Satisfactory situation in anthracite. Steam coals showing a tendency to drag.

Bituminous—The soft-coal market is in a healthier condition than a week ago. A stronger feeling of optimism prevails and the prospects for a rejuvenated market become more evident daily. There is plenty of coal on hand to meet any immediate demand. The low point in the bituminous market has apparently been reached and a steady progress is now anticipated. It will, however, be several weeks and perhaps months before operators will feel that conditions are what they should be.

Many large consumers who are not tied up to contracts are buying in the open market, claiming they are able to supply their wants cheaper. Very few contract inquiries are being received by the shippers. With the market becoming stronger, large consumers are likely to close contracts shortly, and in some cases it is probable they will pay more for their coal than they would have a few weeks ago. This is especially true of the higher grades. Operators are not as a rule pushing for new contracts. Some say they will not accept any new business for the coming fall and winter at the low prices that have prevailed.

Production is not being rushed, the mines working from three to four days a week and a few a trifle better. The export business is looking upward. Shipments to New England are increasing.

Local quotations on various grades are as follows:

	South Amboy	Port Reading	St. George	Upper Ports	Mine Price
Georges Creek	$3.00@3.10	$3.00@3.10	$3.00@3.10		$1.50@1.70
South Fork	2.90@3.05				1.35@1.50
Clearfield:					
Best	2.70@2.85	2.65@2.80			1.40
Medium	2.55@2.70	2.50@2.65		$2.75@2.80	1.15@1.25
Ordinary	2.45@2.55	2.40@2.50		2.60@2.70	1.00@1.10
Broad Top Mt.					1.15@1.50
Cambria County	2.75@2.90	2.75@2.90			1.15@1.40
Quemahoning		2.70@2.85	2.70@2.85		1.20@1.30
Latrobe	2.40@2.50				0.90@1.00
Greensburg	2.50@2.60				0.90@1.00
Westmoreland	2.75@3.00				1.15@1.25
West Virginia:					
Mine-run		2.30@2.55	2.30@2.55		0.90@1.00
Three-quarter		2.50@2.90	2.50@2.90		1.00@1.10
Western Md.		2.20@2.40	2.20@2.40		0.80@0.90

Anthracite—There is little to complain of in the hard-coal situation. The mines are working nearly full time; shippers are kept busy and the retail dealers are being pushed to fill all their orders. Prospects for a good summer are encouraging, although it is not expected the present pace will be maintained.

Reports from Canada and the West tell of good business and shipments on the Great Lakes are increasing. While the official tonnage figures for April are not now available it is evident from advance reports that there was a big increase in production. April business was good and the current month has opened up fair. But notwithstanding this better business some cutting of prices is being done, principally by individuals, some reports going so far as to say that shipments are being made on less than April prices.

Demand for the prepared sizes is about evenly divided. The steam coal situation remains practically unchanged. Pea coal continues in light demand with concessions being made to move tonnage. Some grades were quoted early in the week at $3. Buckwheat coals are moving slowly with little call for the poorer grades though the better qualities are finding a fair market. There is not an over-supply of the steam coals at the loading docks at present but they are beginning to accumulate.

Heavier shipments to Sound points are reported, as well as to points along the New England coast.

The anthracite market is now quotable on the following basis:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.65	$4.65	$4.70	$4.70
Egg	4.90	4.80@4.90	4.95	4.85@4.95
Stove	4.90	4.80@4.90	4.95	4.85@4.95
Chestnut	5.15	4.80@5.15	5.20	4.85@5.20
Pea	3.35@3.50	3.05@3.30	3.40	3.00@3.15
Buckwheat	2.50@2.75	2.40@2.55	2.55@2.80	2.30@2.60
Rice	2.00@2.25	2.00@2.10	2.05@2.30	2.05@2.15
Barley	1.75@2.00	1.50@1.90	1.80@2.05	1.65@1.90

PHILADELPHIA

Anthracite outlook less encouraging for May. Retail trade dull and many dealers have full stocks. Bituminous shows no indication of improvement, either in demand or prices.

Anthracite—The beginning of the month of May does not find the anthracite trade in the receptive condition that characterized it at the beginning of April. The retail trade has fallen off, and dealers are inclined to be chary about putting on additional supplies until they get rid of some of the coal they have in storage. Collections have been poor, and dealers are going slow in the matter of placing coal where they are not sure of a prompt return.

The present indications point to a dull summer, and both the wholesale and retail trade are likely to find rather hard sledding for the next three or four months. It is understood that quite a number of orders were carried over from April, and it is intimated that many of these will be filled at the April prices.

Broken size continues in good demand, mostly on contracts. Egg and stove are also holding strong, although the former size can probably be bought at less than the circular. Chestnut is developing weakness, and the inducement of stove prices is probably responsible for the moving of more than a little of this grade. All the small sizes are on the retired list for the spring and summer, and it is understood that on full mining, a large percentage of these grades will go into stock.

Tidewater prices as follows:

	Circular	Individuals
Broken	$4.35	$4.25
Egg	4.60	4.50@4.60
Stove	4.60	4.60
Chestnut	4.85	4.60@4.70

BALTIMORE

The record export movement the feature of the trade. Indications are that May will see the 200,000-ton mark passed. Domestic situation quiet and prices remain soft.

With a total of 193,293 tons of export coal recorded for the month of April, coal shippers here are looking forward to a still greater increase for the current month. All tidewater shipping terminals here are crowded with loaded coal cars and vessels, and it is expected that more than 200,000 tons will be shipped foreign from Baltimore during May. Last week more than 46,000 tons went out and there is every prospect that more than 50,000 tons will move each week of the present month.

The local situation is not favorable. While a good many of the best coals of West Virginia, Pennsylvania and Maryland are now under contract, the demand is rather slow and the spot market is still heavy.

West Virginia gas three-quarter has sold in some instances at 85@90c., but in other cases has been refused at less than $1. Slack is strong at 75c. Steam lump sells around 95c., and mine-run fuels at 80 to 85c. Best West Virginia coals sell at from $1.15 to $1.50. Pennsylvania low grade coals are offering at from 90c. to $1. High grade fuels are selling at the mines to the trade at $1.25 to $1.35. Some specialized coals of western Maryland and Pennsylvania have sold up to $1.60, but these are largely out of the open market.

HAMPTON ROADS

Movement for week shows up well. Export shipments particularly heavy. Dumpings for month of April, 1,192,020 tons.

The movement of coal in the foreign trade still continues large, the Italian ports alone having taken approximately 60,000 tons in the past week. The largest single cargo amounted to 9750 tons and went to Messina which port alone took about one-third of the coal going to Italy. The coastwise movement has been heaviest to Boston, Providence, Portland and other New England ports although some cargoes have been shipped south as far as Jacksonville, Fla. In addition to foreign and coastwise shipments considerable coal has been taken by the government for use of the Atlantic fleet.

While all of the export shipments have been Pocahontas or New River run-of-mine, some of the coal going coastwise has been nut and slack and high volatile. The demand for nut and slack appears to have improved somewhat but little inquiry is being made at present for the latter. Prices on the various grades of coal are holding up well and so far as can be learned the circular is well maintained.

During the month of April 1,192,020 tons of coal were shipped from Hampton Roads which compares with 1,063,719 tons for the same month last year. Of this quantity the Norfolk & Western moved 627,438 tons, the Chesapeake & Ohio Ry. 313,327 tons and the Virginian Ry. 251,255 tons. Both the Norfolk & Western and the Chesapeake & Ohio show a decided gain over their dumpings for the same month, last year while the figures of the Virginian Ry. are slightly less.

The following vessels sailed from Hampton Roads with cargoes of coal during the week Apr. 23 to 30, inclusive:

Norfolk	Destination	Tons
Laertis	Montevideo	5332*
Hermod	St. Thomas	4575
Albania	Brindisi	3164
Rosalia L.	Messina	9750
Aghios Gerasimos	Naples	4688
Finn	Canal Zone	6000
Antares	Vera Cruz	2700
Chiswick	Canal Zone	4800
Balgray	Genoa	5550
T. W. Dunn	Pernambuco	806
Van A. Broughton	Buenos Aires	3176
Ruth	Buenos Aires	4200
Grigorios	Civita	
Anghelatos	Vechnia	5573
Anna	Kingston	2000
H. G. Foss	Maranhan	1231
Heina	RiodeJaneiro	3949
Jas. T. Maxwell	Maranhan	840
Venus	Genoa	5629
Watermouth	Montevideo	5928
Anglo Parodi	Messina	5191
Frankrig	Barbados	2220
Italia	Messina	4327
Circe	Spezia	3875
N. M. Porcello	Bermuda	841
Benedict	Para	1250
Carlo	Cagliari	7139
Sallie C. Marvil	Pernambuco	1113
Newport News		
Corvovodo	RiodeJaneiro	3600
Knud II	Chaparra	3000
Edison Light	Havana	3868
Toiropinos	Naples	4500

*Also 200 tons of coke.

Note—Steamers are indicated by **bold face** type, all others being schooners.

Virginian Ry. dumpings for the week ended May 1 were 65,099 tons.

Dumpings of the N. & W. Ry. for the period Apr. 25 to 30 inclusive were 138,105 tons. The total dumpings for April amounted to 627,438 tons.

OCEAN FREIGHTS

Rapid increase in export shipping. Rates generally steady at former levels.

For some time past we have chartered one or two steamers per day for export coal. There is no question but that America's export coal trade is increasing very materially, and it is hoped that a large portion of this increase will be permanent. A number of coal companies here are endeavoring to develop their export business through London agents, and they may be able to sell a few cargoes in this way, but it is apparent that colliery owners here should work direct with consumers at the other end. The freight market is "marking time" to various destinations, but to South American ports the rates are easier (owing to the advancing rates on grain from the Plate) while to the Mediterranean quotations are a trifle firmer. Among the recent charters for export coal were two steamers from Virginia to Rio at $9.36; a steamer to Santos at $9.60; a steamer to Valencia, Spain, at $10.80; two steamers for West Coast of Italy at $10.80; two steamers for coke to Valparaiso or Callao; and a number of steamers for coal to Lower Plate ports at or about $9.12.

Ocean freights are now quotable on the following basis:

To	Rate	To	Rate
Havana	$2.25@2.50	Demerara	$5.50@6.00
Cardenas or Sagua	3.25@3.50	Bermuda	3.50@3.75
Cienfuegos	3.25@3.50	Vera Cruz	**3.50**
Port au Spain, Trinidad	3.75@4.00	Tampico	**3.50**
St. Lucia	3.50@3.75	Rio	**9.36**
St. Thomas	**3.25**	Montevideo	**9.06**
Barbados	3.75@4.00	Buenos Aires or La Plata	**9.12**
Kingston	3.00@3.25	Mediterranean*	**10.80**
Curacao	3.75@4.00	Spain**	9.60@10.44
Santiago	3.25@3.50	Valparaiso†	**6.72**
Guantanamo	3.25@3.50	Marseilles	9.60@10.44

Note—Rates noted in **bold face** type are only approximate.

* To a direct port not east of the West coast of Italy, Spain excluded.

† With 800 tons per day discharge.

W. W. Battie & Co.'s Coal Trade Freight Report.

**Spanish dues for account.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Colusa		Atlantic Range	Tiburon	3622	$6.50
Colusa		Atlantic Range	San Diego	5000 to 7500	7.00
Bonvilston	British	Philadelphia	River Plate	1815	9.36
Mathilde	Norwegian	Baltimore	Havana	1346	
Florence M. Belding		Philadelphia	Cienfuegos	493	
Eagle Wing		New York	Charleston	1076	
Wm. Booth		Philadelphia	Wiscasset	435	1.00
Samuel P. Bowers		Norfolk	San Juan, P.R.	526	
Maasdijk	Dutch	Atlantic Range	Rio Janeiro	2935	9.36
Bendew	British	Virginia	Valencia	2305	10.08
	Foreign	Baltimore	Virginia	6000	10.32
	Foreign	Virginia	Montevideo	5500	8.88
Ella M. Willey		Norfolk	Rio Janeiro	735	7.50
Fanny C. Bowen		Philadelphia	Mayport	892	0.95
Sophie H.	Dutch	Norfolk	River Plate	1864	9.36
Henrik Ibsen	Norwegian	Atlantic Range	Barcelona	2960	
Heighington	British	Atlantic Range	Barcelona	1827	9.12
Eliofilo	Italian	Philadelphia	Messina	2395	
Itasca		Philadelphia	New Orleans	989	
Alicia B. Crosby		Norfolk	Brazil	1016	
George E. Walcott		Norfolk	Para	1388	
Evelyn W. Hinkly		Norfolk	Azores	558	
J. Frank Seavey		Philadelphia	Summerside, P.E.I.	336	$1.85
Evanger	Norwegian	Baltimore	Nipe Bay	1326	
New Orleans		Philadelphia	New Orleans	1017	
Primus (bark)	Norwegian	Norfolk	Buenos Ayres	1019	
Dagny (bark)	Norwegian	Norfolk	Rio Janeiro	1034	
Ferm (bark)	Norwegian	Norfolk	Pernambuco	1898	

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

PITTSBURGH

Mine operations continue at about 50%, with hardly any contracting. Both contract and free coal are at low prices. Poor outlook in Lake trade.

The coal trade of the Pittsburgh district has experienced little if any improvement since last report. A little Lake coal is now moving but the movement is very small indeed for the beginning of May, and there is little prospect of anything like a normal business before the beginning of July. Scarcely any merchant coal is moving to the Lake trade, or is even being inquired about, the shipments being almost entirely by regular shippers who have their own sources of supply. From the present outlook it is possible that the whole season will pass without much coal being bought for Lake shipment.

Demand from manufacturers has shown no increase in the past week, and in some quarters there is even reported a slight decrease. The domestic demand is very small. Operations in the Pittsburgh district continue at about 50% of capacity, some mines operating at less than this rate and others being closed, while a few are working at close to capacity.

Prices continue as irregular as ever. There can scarcely be said to be a contract market, though $1.15 for mine-run is usually named as the objective point. This same figure, however, represents about what has been done in occasional transactions for ¾-in. Lake coal. For prompt lots last week's quotations are repeated, the figures being subject to shading upon occasion as formerly: Slack, 75@80c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous still quiet, but doing a little better, according to jobbers. Operators not so hopeful. Anthracite about normal.

Bituminous—The more sanguine members of the jobbing trade are positive that the demand is better than it was and though they admit that prices are about 10c. lower than a year ago, they are somewhat better than during the past month. The Canadian trade is about as dull as ever, and this injures Buffalo more than any other market could. Quite a good many shippers here depend on that trade very largely. As a rule the Canadians take the view that their factories will soon get war orders enough to keep them running. There is said to be a large amount of bituminous coal on car service; it does not appear to be in excess here, though there is always some. City jobbers are receiving letters from mine owners urging them to take coal which cannot be placed elsewhere. The general opinion is that there will be a slow increase in activity for a month or two and then something better. One difficulty is that not a few wise consumers are depending exclusively on demurrage coal and refuse to consider a purchase till it is offered to them below the regular market. No real improvement is possible under such conditions.

There is not enough new strength to the bituminous market to make any advance in prices likely right away. Quotations continue at: $2.70 for Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack, with $2.50 for smokeless.

Anthracite—The trade is quiet, but there is no complaint, as sales are never heavy at this time of the year. Some of the shipping agents state that there is a shortage of coal and there is apparently a better demand for it eastward than there is to the west. Lake shipments are rather light, being 99,000 tons for the week. Some of the companies report that they are merely taking care of their small customers at the minor Lake ports, as they still have a sufficient supply at the larger centers. Locally there is some price cutting in anthracite.

TOLEDO

Some movement of Lake coal but it is still light. Prices unchanged but weak.

There are some boats loading here but not much Lake coal is yet moving nor is it expected that there will be any really heavy shipping until June or July, because of the heavy stocks at the upper docks. The unsettled condition at the Ohio mines is also affecting the situation and very little hope is expressed here of an early settlement of the labor difficulties. The domestic trade has fallen off considerably and steam coal is not moving very freely. It is still early for the summer contracts on anthracite coal although it is expected that there will be the usual demand for summer delivery within the next two or three weeks. Prices are not holding very close to the list.

COLUMBUS

Dullness still characterizes the coal trade in Ohio. Some little activity is shown in Lake business. Steam market is dull.

Some slight stir is noted in the Lake trade but the season is slow in opening. Coal men generally are still playing a waiting game, hoping for something to turn up to inject activity in the market.

Retailers are only buying what they must have to piece out the season and consequently their orders are small. Most of the dealers have cleaned up fairly well and this is taken as an indication for good business when the stocking season arrives.

Steam trade is slow in every way. Manufacturing is not increasing to any extent and as a result fuel requirements are not large. A large part of the fuel for steam purposes is being purchased in the open market at the cheap prices which prevail; as a result contracting is a difficult matter at this time. Some railroads are using considerable coal.

Lake trade is showing some activity but it will be July 1 before it is in full blast. Some cargoes have moved from the Lower Lake ports to the Northwest. The docks of the Upper Lake ports are still congested and the interior movement is rather slow. Chartering of boats is now more active. With the opening of the Lake trade there is a softening in the prices for small sizes which is usual for this period.

Production in Ohio fields is still low. In the Hocking Valley the output is estimated at but 25% of normal and the Jackson field reports about the same output. In Massillon, Cambridge and Crooksville the output is not more than 35%. Pomeroy Bend reports about 40% of the average.

Some demand for anthracite is noted and prices are down some from the winter levels.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump..............	$1.45	$1.50	.....
Inch and a quarter............	1.30	1.35	$1.30
Three-quarter inch............	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run.....................	1.05	1.10	1.05
Nut, pea and slack............	0.70	0.70	0.65
Coarse slack..................	0.60	0.60	0.55

CINCINNATI

Business slow, but agencies continue optimistic. Domestic trade is behind the season. Steam demand better, but prices unsatisfactory. Producing conditions are good.

Both consumers and producers are of the opinion that business is going to improve and the feeling is mildly optimistic. However, the movement remains rather sluggish. Extremely warm weather has virtually cut off the domestic demand for immediate consumption, and the usual spring movement is slow getting under way. There is a large production of screenings and prices are rather unsatisfactory, being 10 or 15c., according to grade, below normal; but the expected improvement in the industrial situation is relied upon to remedy this in the near future.

LOUISVILLE, KY.

Move to prevent price cutting. Slack still short. Some shipments to the Lakes.

The mining companies are doing what they can to prevent price cutting which is reported here and there and groups of operators are holding meetings to try to control this practice. Some Kentucky coal is going to the Lake district, especially from the Big Sandy section and there is no change in the shortage as to steam coals. Prices are quoted at from $1.40 to $1.75 for block, $1.25 for egg and 50 to 70c. for nut and slack in the eastern field; there is no nut and slack on the market in the west, all that produced being absorbed on contracts. Money is free and this is helping stocking operations somewhat.

NEW ORLEANS

Trade quiet. Stock ships for Europe taking large tonnages.

There is no change over recent depressed conditions except on the river front, where trade shows some activity owing to an unusual number of vessels in port, most of them for war cargoes. An abnormal amount of coal is being taken aboard the stock ships, as a sort of ballast. There is no domestic demand. The steam consumption is slightly better.

COKE

CONNELLSVILLE

Better tone sentimentally but quotations unchanged. Production continues at close of 300,000 tons weekly.

The coke market continues to show an improved tone sentimentally, but there has been little activity and prices are not quotably higher though there does not seem to be much coke left at minimum prices. The Pittsburgh Steel Co. is rumored to have contracted with the Rainey interests for about 20,000 tons of coke a month, from July to June at $1.95. As this interest has the contract to June 30 the rumor is generally credited. Prices on coke are on a scale up, according to the period of delivery, and are still quotable as follows: Prompt furnace, $1.55@1.60; contract furnace to June 30, $1.60@1.65; contract furnace to Dec. 31, $1.75; prompt foundry, $2@2.35; contract foundry, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 24 at 299,493 tons, an increase of 1271 tons, and shipments at 294,995 tons, a decrease of 1349 tons.

Buffalo—There is not much improvement in the local demand, though there are reports of some stir in the Connellsville district. As a rule the trade does not credit the reports, positively as they are made by one or two leading shippers. There is an increase of iron activity here, but nothing significant can be made of it till it has continued for some time. The general feeling is better than it was. Quotations remain on the basis of $4.15 for best 72-hr. Connellsville foundry and $3.15 for stock coke.

Chicago—The market is very quiet for both furnace and foundry sizes with prices steady, but some domestic shipments have been sold at a sacrifice. Prices are as follows: By-product, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

MIDDLE WESTERN

GENERAL REVIEW

Market generally apathetic. Screenings in good demand. A uniform effort in all directions to maintain prices.

Dullness still characterizes the coal trade. Only a little tonnage is being absorbed by the country dealers, and contracting is sluggish. Several operators who have taken a good many contracts have stated that they will accept no more tonnage for shipment this season at prevailing prices, and there seems to be a reluctance on the part of some shippers to contract the higher grades at this time.

Mining in Indiana and Illinois is less brisk than for a number of years past. In Indiana and central Illinois a number of operators have closed down additional mines for the summer months, and state emphatically they will not be reopened until there is a better demand for coal.

The quantity of consignment coal now arriving in the Chicago market is negligible, and the few shipments received are sold without creating any disturbance. The general tendency to sustain prices is very noticeable in all grades and sizes of coal and is undoubtedly bearing fruit.

CHICAGO

Steam coals fairly steady but domestic market has practically suspended. Mines closing down. Low price Kentucky fuels a disturbing factor. Anthracite less active than anticipated.

The demand for steam coal from Franklin County mines has been steady. Screenings from this district are strong at favorable prices. Domestic sizes are inactive, but prices are maintained on such shipments as are made. Some Williamson County operators have been crushing lump coal for steam purposes. The demand for Saline County fuel has lessened as compared with other southern Illinois districts.

No change has occurred in the Indiana situation, and the demand is about on a parity with last week. It is said that the output of the Indiana mines for last year will be at least 250,000 tons less than in the year before. The demand for steam coal is better than on any other grade, and production of steam sizes about equals requirements at this time.

Springfield coal is flat. Several important operations are being closed down for the summer months.

Kentucky coals are spiritless, and several shipments have been sold here during the past week at unheard of mine prices in order to move the coal. The eastern Kentucky operators are not at all backward in meeting competition from splint coals, which has a disturbing tendency. Low prices have been made to move unsold splint coal in this market.

The smokeless situation is mixed. Some offerings have been made this week at very low prices, while other shippers are holding strong on future deliveries. No particular improvement has developed in the demand for smokeless coals during the past week. Some Maryland mine-run smokeless has been offered at a price of 70c. per ton at the mines without any takers.

Anthracite was less active during the closing days of the month than was expected, and orders thus far placed for May shipment are short of last year. The country dealers and city yards did comparatively little stocking in April.

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.35	$1.35	$1.35@1.50	$1.30@1.50	$1.35@1.50
4-in. lump..	....	....	1.35@1.45	....	....
Steam lump	....	....	1.25@1.35	1.20@1.30	....
2½-in. lump.	1.20@1.30	1.20@1.30	1.25@1.35	....	....
1¼-in. lump.	1.25	1.25	1.25@1.40	....	....
Mine-run...	1.10	1.00@1.05	1.00@1.20	1.00@1.10	....
Egg........	1.25@1.35	1.30@1.35	1.30@1.45	1.20@1.30	....
No.1washed	1.25	....	1.65	....	1.35@1.50
No.2washed	1.25	....	1.75	....	1.35@1.50
6x3-in. egg.	....	....	....	....	1.50
Nut.......	....	1.15@1.25	1.25@1.40	1.15@1.20	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.25@1.35		....	....	....
Screenings..	0.85@0.90	0.80	0.80@0.95	0.75@0.80	0.90

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.35	$1.30@1.40	$1.50@1.60	$1.50@1.60	1.40@1.60
1¼-in. lump.	1.15@1.25	1.25@1.35	....		....
Mine-run...	1.00@1.10	....	1.15@1.25	1.15@1.25	1.25
Egg........	1.20@1.35	1.00@1.10	1.50@1.60	1.50@1.60	....
Nut.......	....	....	1.30@1.40	....	....
Screenings..	0.75@0.85	....	....	....	....

Knox & Greene County 5-in. lump, $1.25@1.35; 3-in. lump, $1.10@1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.05. Screenings 80 to 90c.

ST. LOUIS

Screenings holding fairly active but otherwise the market is heavy. Mine operations much curtailed.

About the only coal moving is a small tonnage for the Terminal R.R. and a few other roads that are buying on the open market. Screenings are holding up fairly well, both Standard and Carterville at about 85c. for the former and 90c. for the latter; these sizes are liable to be still stronger during the next week or so. There is absolutely no domestic demand at all, and such sizes as are moving are going to manufacturing plants at steam prices. The past week has seen a fairly large amount of anthracite moving in. There is also a little smokeless, but the tonnage is extremely light.

The current month will probably show up better than April, but there is nothing to indicate that prices will be any higher. Mines in the Standard field are working about two days a week, and a great many of them have suspended operations indefinitely. In the Williamson-Franklin County field many operations have shut down for repairs, and others are working two and three days a week.

INDIANAPOLIS

Conditions generally unchanged but some mines report an improvement. No betterment in railroad or industrial demand. Screenings sell easily at good prices.

There's nothing in the weather or other influence to make much change in the mining conditions. Operators report that the demand from railroads and factories holds to a steady level. Mining companies are watching closely for signs of material improvement in factory requirements but there is nothing marked in this direction yet. The temperature in Indiana has been ranging from 50 to 90 deg. Screenings continue in good demand at 85c. to 90c., which is an unusually good price. Most of the mines are not averaging much above half time but there are some that report a better schedule the last two weeks than for a long time in the past.

KANSAS CITY, MO.

Market down to a summer basis and no change anticipated until late in the fall.

The wholesale demand has increased slightly due to increased operations of the factories and larger industries, but the prices still remain unchanged. Only a few retail yards have any coal on hand and most of them have gone out of business for the summer. There has been a light business in supplying coal to buildings but this practically amounts to nothing. No change in the price is now looked for until late in the summer months or early in the fall.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during March and the previous two months:

	January		February		March	
	1915	1914	1915	1914	1915	1914
Coal.......	2,293,406	2,917,834	1,906,210	2,385,243	2,094,607	3,173,972
Coke.......	221,395	274,955	232,111	265,380	257,099	356,164
Total....	2,514,801	3,192,789	2,138,321	2,650,623	2,351,706	3,530,136

FOREIGN MARKETS

GREAT BRITAIN

Still considerable uncertainty in the trade and prices high. Labor situation continues serious.

Apr. 23—There are still several very disturbing factors in the coal industry which are acting detrimentally. The threatened labor trouble in South Wales is causing considerable anxiety, while in that and other districts the shipping is difficult. Freights tend to become higher, and with many boats off the market buying is not so regular as it should be. In the Cardiff market this factor is causing a material easing in values of secondary and lower descriptions, while the same cause operates against forward business in the Newcastle market. Particulars of the Norwegian State Ry.'s contract show that about 33,000 tons have been bought, chiefly Newcastle district steams and Derbyshire coal. The price of the Derbyshire coal for shipment at Immingham is $6.48 to $6.60 f.o.b., and of best steam coals $7.44 per ton f.o.b.—"The Iron & Coal Trade Review."

May 5—Cable reports are to the effect that the exportation of coal and coke has been prohibited except to British possessions, protectorates and allied countries. There will be a committee appointed, however, to consider applications for exports to prohibited destinations.

Apr. 23—Market conditions are without improvement and the outlook for the remainder of the month is not vary satisfactory from the exporters' point of view. Tonnage arrivals are low and there are fears of pit stoppages in the near future. Quotations are approximately as follows:

Best Welsh steam.......	Nominal	Best Monmouthshires....	$7.80@8.04
Best seconds...........	Nominal	Seconds................	7.68@7.80
Seconds................	$7.92@8.40	Best Cardiff coals.......	5.16@5.28
Best dry coals..........	8.16@8.64	Cargo smalls...........	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is fairly active and rates show a further advance. Rates are approximately on the following basis:

Gibraltar.....	$4.80	Naples..........	$7.56	Las Palmas......	$5.28
Marseilles.....	8.69	Venice..........	9.60	St. Vincent.......	5.40
Algiers........	5.79	Alexandria.......	7.80	Rio de Janeiro....	7.20
Genoa.........	7.56	Port Said........	7.68	Monte Video.....	6.96
				River Plate......	7.20

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Financial Department

Northern Securities Co.

Pres. Jas. J. Hill reports, in part for the fiscal year ending Dec. 31, 1914, as follows:

There has been no change during the past fiscal year in the investments of the company. The net income is substantially the same as last year, the slight decrease shown being due to the payment last year of the U. S. income tax for 1913. The bills payable have been reduced $20,000 to $120,000 on Dec. 31, 1914. The directors have declared a dividend of 2% on the capital stock, payable on this date.

The regular dividend of 8% per annum has been received from the Chicago, Burlington & Quincy R.R. Co.

The Crow's Nest Pass Coal Co. has paid no dividend during the year upon its capital stock. The officers advise us that its operations during the earlier part of the year were on a satisfactory basis, but subsequently were reduced, owing to the general depression in business. Following the previous policy, the net earnings have been applied to the improvements and betterments and to the continued reduction of its floating debt.

RESULTS FOR CALENDAR YEARS

	1914	1913	1912
Dividends from C. B. & Q. RR. (reg. 8%)	$119,704	$119,704	$119,704
Dividends Crow's Nest Pass C.	....	....	....
Interest	....	....	34
Total receipts	$119,704	$119,704	$119,738
Deduct—taxes	4,461	3,477	3,477
Administration expenses	12,592	12,909	15,521
Interest on loans	4,795	4,918	5,615
Dividends	(2) 79,072	(2) 79,072	(2) 79,068
Total deductions	$100,920	$100,377	$103,681
Balance	sur $18,784	sur $19,327	sur $16,057

BALANCE SHEET DECEMBER 31

	1914	1913	Debits—	1914	1913
Organization exp	$85,048	$85,048	Capital stock	$3,954,000	$3,954,000
Investments	a6,599,975	6,599,954	Div. unclaimed	5	5
Cash	59,757	60,922	Bills payable	120,000	140,000
			U.S. income tax	72	......
			Surplus	b2,670,703	2,651,919
Total	$6,744,780	$6,745,924	Total	$6,744,780	$6,745,924

a The item of investments includes in 1914, 14,963 shares Chicago Burlington & Quincy R.R., valued at $2,858,788; 27,552 shares Crow's Nest Pass Coal Co., Ltd., $3,741,166 and $21 N. S. fractional scrip $22.

b Before deducting 2% dividend paid Jan. 10, 1915.

Note—For previous annual report of this company see Vol. 5, p. 390.

⁂

Lehigh & Wilkes-Barre Coal Co.

President Charles F. Huber reports under date of Sept. 24 as follows:

Results—From the surplus for the year, $3,343,478, dividends Nos. 9 and 10 were paid Dec. 22, 1913, and June 23, 1914 ($3.25 per share, or 6½%, each, making 13% for the year), aggregating $1,197,300, and leaving a balance from the year's operations of $2,146,178. Of this last amount there was appropriated for a new breaker, new general shops and supply store $500,000, and for sundry adjustments $42,977, making the balance carried to profit and loss $1,603,200.

Coal—We mined and shipped during the year 5,222,343 tons of coal, an increase of 34,122 tons, and 98,059 tons were purchased, a decrease of 443,499 tons over previous year. The tonnage of prepared sizes sold, including lump, equaled 65.93%, and of pea and smaller 34.07%.

Changes in Property Account—Surface land sold, etc. ($25,879), and depreciation of yards and wharves, marine equipment, colliery improvements and culm banks aggregated $156,720; less coal property purchased, etc., $36,068; net decrease, $120,651.

Sinking Fund for the Consolidated Loan—The amount on deposit was increased by payment June 1, 1914, of $460,000 and by $60,561 interest received from investments. Amount in fund June 1, 1914, $1,947,390, viz.: Invested in interest-bearing bonds, $1,945,974; cash, $1416.

Leases—The payments under coal leases for rentals in excess of coal mined during the current year amounted to $7786, which has been charged to operating expenses.

Improvements—The Buttonwood Colliery, acquired under purchase from the Parrish Coal Co., has been thoroughly rehabilitated and modernized, both as to outside and inside operation. The two collieries, Parrish and Buttonwood, have been connected by a tunnel and the output of Parrish will be handled through the Buttonwood breaker. The track between Inman and Buttonwood collieries has been completed and the output of Inman will also be taken to Buttonwood.

Development and improvement work has been carried on at all collieries to a large extent, so that the operations generally are in position to maintain output at a reasonable cost.

Plans are now under way for the construction of a new breaker and a general rehabilitation of the plant at Wanamie colliery. The present undersized breaker was erected in 1868.

Taxes—Taxes for the year have shown a further increase, and amounted to 20c. per ton of output. The appeals from time to time in the local courts are still pending, and no decision has yet been handed down in a case tried in January, 1913. In the interim, taxes have been paid under protest, in the hope that we may some time reach an equitable and definite basis of valuation on coal lands. In the matter of the so called tonnage tax, levied pursuant to Act of Assembly passed June 27, 1913,, appeals have been filed and no payment will be made until the validity of the Act has been finally passed upon by the courts.

TONNAGE, EARNINGS, EXPENSES, ETC.

Tonnage shipped—	1913-14	1912-13	1911-12	1910-11
From co.'s lands by co.	3,598.523	3,686,394	2,836,117	3,042,486
Leased lands by co.	1,390,418	1,361,521	1,087,109	1,104,545
Washeries by co.	233,402	140,306	62,198	137,411
Co.'s lands by tenants	756,974	884,998	844,888	967,933
Leased lands by tenants	13,522	103,372	161,001	115,024
Washeries by tenants	8,121	66,731	107,237	171,943
Total of all	6,000,961	6,243,321	5,098,552	5,539,345
Earnings—				
Coal sales	$17,930,990	$20,085,620	$18,271,001	$16,390,244
Coal mined by tenants	240,948	316,850	306,928	350,032
Miscellaneous	272,875	226,094	164,695	139,299
Total	$18,444,813	$20,628,564	$18,742,624	$16,879,575
Expenses—				
Mining coal and repairs	$8,260,921	$7,881,079	$6,450,714	$6,297,131
Colliery improvements	317,125	337,137	261,181	209,743
Royalty leased prop'ties	401,822	395,257	341,089	341,156
Coal purchased	142,060	1,246,470	1,691,392	1,756,014
Transp., yard and ag'y. exp.	3,828,542	4,451,284	3,885,289	3,876,863
General expenses	131,384	126,701	119,219	124,562
Taxes, state and local	1,018,340	691,706	689,535	631,887
Taxes, Federal	49,083	35,373	29,934	17,193
Insurance	20,484	19,781	16,386	16,180
Maintenance of prop'ty	3,952	7,676	28,058	.....
Val. of coal sold from stk.	Cr424,528	Cr172,732	1,469,465	152,657
Total	13,749,185	15,019,733	14,982,263	13,423,386
Net earnings	4,695,628	5,608,831	3,760,361	3,456,189
Deduct—				
Fixed interest on bonds	679,840	724,690	814,390	814,390
Depletion funds	672,311	461,090	460,000	460,000
Dividends (13%)	1,197,300	1,197,625	1,197,625	1,197,625
Total deductions	2,549,450	2,383,405	2,472,015	2,472,015
Surplus	2,146,178	3,225,426	1,288,346	984,174

CONDENSED BALANCE SHEET JUNE 30

Assets—	1914 $	1913 $	Liabilities—	1914 $	1913 $
Property and equip.	28,915,895	29,036,546	Capital stock	9,210,000	9,210,000
Advanced royalties for coal	1	1	Funded debt (see "Ry. & Ind." Sec.)	16,996,000	16,996,000
Cash	507,929	299,562	Depletion fund—coal lands	2,134,711	1,466,252
Cash for coup., etc.	12,265	6,531	Vouch. and payrolls	1,051,812	908,150
Bills and accts. rec.	2,237,661	5,393,640	Coup., etc., unpaid	13,665	10,006
Coal on hand	707,288	282,760	Int., mine rents, etc., not due	1,009,964	564,991
Land contracts not due	8,092	10,076	Reserve for—		
Insur., adv. payments	36,337	48,605	New collieries	1,597,682	1,781,408
Materials and supplies	428,502	407,116	Breaker and shops	500,000	......
Securities of companies owned	371,001	281,001	Land susp. acct.	11,860	14,810
Marketable securs.	5,539,616	372,596	Suspense accts.	79,145	59,015
Sinking fund	1,947,390	1,426,829	Sink. fund income	107,390	
Suspense accts.	398,733	240,648	Profit and loss	8,398,481	6,795,280
Total	41,110,710	37,805,912	Total	41,110,710	37,805,912

Note—For previous annual report of this company see Vol. 5, p. 230.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

+Indicates contracts regarding which official information has been receivrd.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
397	Board of Education	Lorain	Ohio	......	567 794
487	City Light & Water Plant	Reading	Ohio	2000b	665 794
501	City Government	Sullivan	Ill.	1200b	665
534	Booth Fisheries Co.	Chicago	Ill.		708
555	Board of Education	Bridgeport	Conn.	3500a	709
556	Board of Education	Grand Rapids	Mich.	3700	709
556	Board of Education	Grand Rapids	Mich.	3750	709
557	Highway Commission	Brockton	Mass.	3000ab	709
558	Board of Education	Hamilton	Ohio	2000b	794
559	Light & Water Dept.	Bremen	Ind.	2000	708
560	Board of Education	Auburn	N. Y.	900a	709
561	Board of Education	Racine	Wis.	2000	709
562	City Government	Clarksdale	Miss.	5500	709
565	Elec. Light & Water Wks.	Whitehall	Mich.	1000	709
609	Board of Education	Munhall	Penn.	b	795

a Indicates anthracite coal. b Indicates bituminous. c Coke.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

+No. 78—Detroit, Mich.—Bids on this contract (pp. 275, 398) will be received until 3 p.m., May 11, instead of Mar. 1, as previously announced. Bids are to cover fuel requirements of the Public Lighting Co., for the fiscal year ending June 30, 1916. Specifications may be obtained on application. Address Secy. F. T. Bowler, Public Lighting Co., 56 East Atwater St., Detroit, Mich.

+No. 448—Springfield, Mass.—Bids on this contract (p. 627), which provides for furnishing the Springfield Armory with its coal requirements during the fiscal year beginning July 1, will be received until 2 p.m., May 24 instead of Apr. 15 as previously announced. A bond for $3000 will be required of all bidders. Address Depot Quartermaster, Springfield Armory, Springfield, Mass.

+No. 542—Harvey, Ill.—This contract (p. 708), which provides for furnishing the fuel requirements of the Buda Co., will be made on 6x2-in. egg instead of lump coal, as previously noted. Address Pur. Agt. L. C. Curl, the Buda Co., Harvey, Ill.

+No. 548—Washington, D. C.—Bids received on this contract (p. 709), which provides for furnishing the District of Columbia with coal for the fiscal year beginning July 1 were as follows per gross ton: BITUMINOUS. James Chapman, 2000 tons of mine-run for delivery at Blue Plains, D. C., $3.78 (Jenner coal); 700 tons of mine-run for delivery at Industrial Home School and Tuberculosis Hospital, $3.88 (Jenner coal); 15,000 tons of mine-run, miscellaneous delivery, $3.45 (Jenner coal); 125 tons semibituminous (splint or lump) for delivery to Fire Department steamers, $5.64; 6000 tons of mine-run for delivery at District Pumping Plant, $3.25; same, delivered at contractors' yards, $3; 4800 tons of mine-run, delivered at Sewage Pumping Station, $3.35 (George's Creek coal). W. A. Smoot & Co., 6000 tons for delivery at the Workhouse, $3.27 (George's Creek coal); 1000 tons for use on tugboats, $3.27 (George's Creek coal); 4000 tons gas coal for same delivery, $3.38 (Fairmont). Enterprise Fuel Co., 6000 tons of mine-run for delivery at District Pumping Plant (or at the contractors' yards), $3.40 ("Quality" coal); 6000 tons of mine-run for delivery at the Workhouse, $3.23 ("Quality" coal); 1000 tons of same for use in tugboats, $3.33 ("Quality" coal); 4000 tons of gas coal for same delivery, $3.30 (Fairmont). Ward W. Griffith, 700 tons of mine-run coal for delivery at the Industrial Home School, $3.75 (Jenner coal). Commercial Coal Co., 15,000 tons of mine-run for miscellaneous delivery, $3.76 (White Oak New River coal, and $3.61 for Borman coal); 2500 tons for delivery at District Building, $3.49 (White Oak New River coal). John P. Agnew & Co., 6000 tons of mine-run coal for delivery at the Workhouse, $3.39 (New River coal); 1000 tons of same for use on tugboat, $3.36 (Orenda coal); 4000 tons of gas coal for same delivery, $3.37 (Fairmont or Mt. Carbon coal). Walter H. Marlow, 15,000 tons for miscellaneous delivery, $3.65 (Jenner coal); 6000 tons of mine-run for delivery at District Pumping Station (or at contractors' yards), $3.33; 2500 tons for delivery at District Buildings, $2.98 (Jenner coal); 4800 tons of mine-run for delivery at Sewage Pumping Stations, $3.53 (Jenner coal). ANTHRACITE. James Chapman, 650 tons of red ash stove, $7.38; 100 tons of white ash chestnut, $7.12; 5000 tons of white ash egg, $6.23; 1000 tons of white ash furnace, $5.94; 1400 tons of white ash stove, $6.98; 550 tons of white ash furnace, $6.23. Walter H. Marlow, 650 tons of red ash stove, $7.45; 100 tons of white ash chestnut, $7.10; 5000 tons of white ash chestnut, $6.24; 1000 tons of white ash furnace, $5.98; 1400 tons of white ash stove, $6.98; 550 tons of white ash furnace coal, $6.38. All anthracite bids submitted were for Philadelphia & Reading coal. Address Purchasing Officer, District of Columbia, Room 320 District Bldg., Washington, D. C.

+No. 558—Hamilton, Ohio—Bids on this contract (pp. 709, 794), which provides for furnishing the local Board of Education with its fuel requirements during the ensuing year, will be received until noon, May 19, instead of May 12, as previously announced. Address Clk. Charles F. Holdefer, Board of Education, Hamilton City School District, Hamilton, Ohio.

+No. 577—Davenport, Iowa—The Davenport Water Co. has already covered its coal requirements until Apr. 1, 1916 (p. 749) and will not again be in the market until that time. Address Davenport Water Co., Davenport, Iowa.

+No. 586—Utica, N. Y.—The bids on this contract (p. 749), which provides for furnishing the various city departments with coal, were as follows: Emil J. George, egg, $6.10@6.60; nut, $6.35@6.85. Clark-Davis Coal Co., stove, $6.10@6.60; nut, $6.35@6.85. Sang & Reusswig, pea, $5@5.25; buckwheat, $3.75. Address Secy. of the Bd. of Contract and Supply Walter W. Briggs, City Hall, Utica, N. Y.

+No. 638—Baltimore, Md.—The bids on this contract (p. 796), which provides for supplying the vessels in the United States Coast Guard are opened at the office of the collector at this port, and forwarded at once to the Coast Guard depot at Washington. Address Collector W. S. Ryan, Custom House, Baltimore, Md.

+No. 653—Toronto, Can.—Tenders on this contract (p. 709), which provides for furnishing the fuel requirements of the Canadian Pacific Bldg., have been called for and contracts may be let at any time. Address Canadian Pacific Ry.. King and Yonge Sts., Toronto, Can.

New Business

+No. 640—Fall River, Mass.—The City Government at this place will be in the market on June 1 for about 8000 tons of anthracite and bituminous coal. The current contract was closed at $6.80 per ton for the anthracite, and $4.50 for the bituminous. The call for bids is advertised and the purchase made through local dealers. Address Superintendent of Public Buildings, City Hall, Fall River, Mass.

+No. 641—Detroit, Mich.—The Board of Education at this place will receive bids until noon, May 7, for furnishing coal as follows: Anthracite, 400 tons; 2500 tons of large bituminous; for delivery at 20 different schools; 150 tons of large size semi-bituminous for delivery at one school; 23,000 tons of small size bituminous for delivery at 95 different schools. All the anthracite coal that can be received and stored must be delivered during July and August, and 75% of the bituminous coal must be delivered before Sept. 1. Bidders on the bituminous contract must furnish a certified check for $500 and the successful bidder will be required to furnish a bond for $10,000. Payments will be made on an analysis basis.

Specifications and proposal blanks may be had on application Address Secy. Charles A. Gadd, Board of Education, Detroit, Mich.

+ **No. 642—River Rouge, Mich.**—Sealed proposals will be received until 7 p.m., May 11, for furnishing about one car per week of West Virginia mine-run coal to the City Lighting Plant at this place. Bids should be made f.o.b. on cars at the Municipal Lighting Plant switch. All bids must be accompanied by a certified check for $200. Address Village Clk. Louis Laginess, River Rouge, Mich.

+**No. 643—Lansing, Mich.**—Bids will be received by the state Board of Education, until noon, May, 15, for furnishing approximately 5000 tons of coal, for the normal schools at Ypsilanti, Kalamazoo and Mt. Pleasant. Address Secy. Fred L. Keeler, State Board of Education, Lansing, Mich.

+**No. 644—Fort Hancock, N. J.**—Proposals will be issued about May 15 by the U. S. Army to supply the fuel requirements at this place for the ensuing year. The tonnages involved are as follows: 2000 tons of buckwheat No. 1, 1400 tons of pea, 200 tons of stove, 450 tons of broken and 200 tons of bituminous. Address Commanding Officer, Sandy Hook Proving Ground, Fort Hancock, N. J.

No. 645—Toronto, Can.—The Toronto University buildings here, will receive bids until May 15, for furnishing coal during the fiscal year. Bids are requested on 8000 tons of bituminous and 4000 tons of hard coal, for use in connection with the various buildings and faculties. The contract is usually closed at about $3.35 per ton delivered. Address, Supt. Graham Campbell, Toronto University, Toronto, Ont.

+**No. 646—Atlanta, Ga.**—The City Government at this place will be in the market some time during June for 2750 tons of coal. The current contract was let at $3.60 per ton. The call for bids is usually advertised. Address Pur. Agt. W. E. Chambers, City Hall, Atlanta, Ga.

+**No. 647—Worcester, Mass.**—The County Commissioners of this place will receive bids until 10:30 a.m., May 11, for coal as follows: On cars at Shrewsbury St. siding 600 tons of Georges Creek; in bins at Court House, 300 tons best quality of white ash egg (this order may be filled immediately); on cars at Oakdale, 100 tons of Georges Creek, and 30 tons of best quality white ash stove coal. All bids should be submitted on a gross ton basis. Address County Commissioners, Court House, Worcester, Mass.

No. 648—Toronto, Can.—St. Andrews College in this city is now in the market for a year's supply of coal and tenders will close about the middle of May. The annual consumption amounts to 400 tons of soft smokeless and 100 tons of anthracite, delivery to be made to premises. Address, Supt. C. Bruce Macdonald, St. Andrews College, Toronto, Ont., Can.

No. 649—New Orleans, La.—Bids will be received by the Lighthouse Inspector, New Orleans, La., until 2 p.m., May, 24, for furnishing bituminous coal delivered in vessels of the lighthouse service at Galveston, Tex. Address Lighthouse Inspector, New Orleans, La.

+**No. 650—Pittsburgh, Penn.**—The local Board of Eudcation will be in the market some time during May or June for its annual requirements of coal, aggregating about 14,000 tons. Deliveries are to be made by wagon. The requirements provide for 1¼-in. slack, 1¼-in. lump, mine-run, anthracite and smokeless, and prices on the current contract varied from $1.80 to $6 per ton. The call for bids is advertised. Address Supt. of Supplies C. M. McKee, Fulton Bldg., Pittsburgh, Penn.

No. 651—Toronto, Can.—The Canada Bread Co. expects to be into the market for 800 tons of hard and 600 tons of soft coal about the middle of the current month. The award is made on a competitive basis. Address Gen. Mgr. Canada Bread Co., Toronto, Ont., Can.

No. 652—Waverly, Iowa—The Kelly Canning Co. at this point is in the market for their coal requirements for the ensuing year. They prefer 6-in. lump, or smaller size, clean and free from soot and clinkers and from Southern Illinois mines. They use from two to four cars per month. Address Purchasing Agent, Kelly Canning Co., Waverly, Iowa.

No. 653—Toronto, Can.—The Canadian Pacific Ry. Building will ask for tenders early in the current month for furnishing the coal supply for the ensuing year. Bids will be asked for 3900 odd tons of slack to be delivered according to requirements. Address Building Supt. Canadian Pacific Ry., Toronto, Can.

+**No. 654—White Bear, Minn.**—Sealed proposals were received by the Local School Board until May 3, for furnishing 135 tons of Hocking mine-run coal and 35 tons of anthracite egg to be delivered at school buildings as required. Address Clk. J. A. Milner, Independent School Board, District No. 5, Washington School Bldg., White Bear, Minn.

+**No. 655—Minneapolis, Minn.**—The State Government is in the market for 110,000 tons of coal, delivery to be made at 16 institutions in various parts of the state. Address, State Board of Control, Capitol Building, St. Paul, Minn.

+**No. 656—Murphysboro, Ill.**—Murphysboro Water Works, Electric & Gas Light Co. will be in the market about the middle of the current month for their annual requirements of coal involving approximately 12,000 tons of screenings. Address Supt. W. O. Settle, Murphysboro Water Works, Electric & Gas Light Co., Murphysboro, Ill.

+**No. 657—Nashua, N. H.**—The City Government at this place will contract some time next month for their annual requirements of coal involving about 11,000 tons of broken and stove anthracite. The business is usually closed at about $8 per ton, and the call for bids is advertised. Address the Mayor, Nashua, N. H.

+**No. 658—Sheldon, Iowa**—The City Council will receive bids until 6 p.m., May 10, for furnishing the coal requirements during the ensuing year. Address City Clk. Scott Martin Sheldon, Iowa.

+**No. 659—Philadelphia, Penn.**—The Lighthouse Service at this place will receive sealed proposals until May 10 for furnishing their coal requirements for the fiscal year beginning June 30. Both anthracite and bituminous coal will be required. Blank proposals and particulars may be obtained on application. Address the Lighthouse Inspector, Philadelphia, Penn.

+**No. 660—Medford, Mass.**—Sealed proposals will be received until 9 a.m., May 11, for furnishing the coal requirements of the City Hall and Annex. Bids are to include cost of delivery in bins. Address City Messenger Edwin D. Curran, City Hall, Medford, Mass.

+**No. 661—Passaic, N. J.**—Bids are being received by the Board of Education at this place for furnishing the coal requirements to the Public School buildings during the next year. Specifications and lists of the approximate quantities required may be had on application. All bids must be accompanied by a suitable bond. Address Bus. Mgr. John F. Kelly, Board of Education, Passaic, N. J.

+**No. 662—Woodstock, Ill.**—The City Light & Water Plant at this place will be in the market some time next month for their annual requirements of coal involving about 8500 tons of Illinois bituminous. The call for bids is advertised, and the business usually goes at $2.55 per ton f.o.b. Woodstock. Address Engr. E. A. Reynolds, the City Electric Light & Water Plant, Woodstock, Ill.

+**No. 663—Nelsonville, Ohio**—The City Power Plant at this place will be in the market some time during next month for their annual requirements of coal involving about 5000 tons of mine-run. The business is usually let at $1.32. Address E. A. Mills, the City Power Plant, Nelsonville, Ohio.

+**No. 664—Washington, D. C.**—Sealed bids will be received until 10 a.m., May 15, for furnishing the U. S. Navy with coal during the fiscal year. beginning July 1, approximately as follows: SEMIBITUMINOUS. For delivery at the Brooklyn Navy Yard, 45,000 tons; for delivery at the Brookyln Navy Yard, or on board vessels at such time and such places as may be required, 50,000 tons; for deliveries of three different kinds at Philadelphia, 45,000 tons; same, 35,000 tons; for delivery at Baltimore or at Annapolis, Md., 7500 tons; for deliveries of various kinds at Baltimore, Md., or within the harbor limits, 75,000 tons; for delivery at the Navy Yard, Washington, D. C., 7500 tons; for delivery f.o.b. vessels or barges at either Hampton Roads or Philadelphia, 400,000 tons; for delivery f.o.b. cars at the Navy Yard, 7 miles from Charleston, S. C., 8000 tons; for delivery to the U. S. Navy in Charleston Harbor, 4000 tons; for delivery alongside wharf, Mattawoman Creek, Indianhead, Md., 25,000 tons. BITUMINOUS AND SEMIBITUMINOUS. For delivery at such times and in such quantities as may be required at the Naval Hospital, Chelsea, Mass., 2500 tons; for delivery at naval powder depot, Lake Denmark, Morris County, N. J., 1300 tons; for delivery on the grounds of the Naval Engineering Experiment Station, adjacent to Annapolis, Md., 1500 tons; for delivery to the Naval Academy, Annapolis, Md., 12,000 tons; for delivery to the Naval Hospital, Washington, D. C., 2500 tons; for delivery at the Navy Yard, Washington, D. C., 30,000 tons; for delivery at the Navy Yard, Norfolk (Portsmouth), Va., 15,000 tons; for delivery at the Naval Hospital, Norfolk, Va., 2500 tons; for delivery at the Naval Training Station, Great Lakes, Ill., 13,000 tons (an alternate bid f.o.b. mine is requested on this item); for delivery f.o.b. cars. Navy Yard, South Carolina (seven miles from Charleston), 10,000 tons; for delivery at West Annapolis siding, 1000 tons; for delivery at the Navy Yard, Pensacola (Warrenton), Fla., 3000 tons. A satisfactory guarantee or certified check for 25% of the full amount of the bid must accompany each proposal. The business will all be done on a specification basis, and payments will be made on an absolute heat unit basis. Address Paymaster Gen. of the Navy Samuel McGowan, Washington, D. C.

No. 665—Watseka, Ill.—The Iroquois Hospital at this point is in the market for its fuel requirements for the coming season. Address Trustee, Iroquois Hospital, Watseka, Ill.

✚No. 666—Albany, N. Y.—The Board of Contract and Supply at this place is advertising for bids for coal to supply the park house, city buildings, baths and board of education. Address the Bd. of Contract and Supply, Albany, N. Y.

✚No. 667—Worcester—The City Hospital at this place will receive bids until 2 p.m. May 10, for furnishing from 1600 to 2000 tons of bituminous and 100 tons of anthracite coal. The bituminous coal will be subjected to an evaporation test, and the anthracite is to be the best quality Lackawanna coal. All dealers submitting bids must furnish samples of two tons to be delivered as may be required. Quotations are to cover the cost of delivery in bins. Address Matthew J. Whittall, City Hospital, Worcester, Mass.

✚No. 668—New York, N. Y.—Sealed bids will be received until 10:30 a.m. May 11 by the Borough of Bronx for furnishing and delivering white ash, anthracite and Cumberland coal in quantities specified until Mar. 31, 1916. Blank forms for bids may be obtained upon application and specifications will be shown those interested. Security aggregating 30% of the total amount of the contract will be required. Address Pres. Douglass Matthewson, Crotona Park, 177th St. and Third Ave., New York City.

✚No. 669—Sleepy Eye, Minn.—The City Government at this place has requested bids for approximately 1000 tons of steam coal for use in the electric plant. Prices should be quoted f.o.b. Sleepy Eye. Bids were received up to 8 p.m. May 5, and the contract is to run for the fiscal year beginning May 10. Address Recorder, H. Peterson, City Council, Sleepy Eye, Minn.

✚No. 670—Seattle, Wash.—Sealed proposals will be received for furnishing coal for Coast and Geodetic Survey steamers "Patterson," "Explorer," "McArthur," "Gedney," and "Taku," at different points in Alaska during the coming summer. Particulars and date of opening bids may be had on application. Address Capt. J. F. Pratt, Inspector, Coast and Geodetic Survey, 204 Burke Building, Seattle, Wash.

✚No. 671—Chicago, Ill.—The South Park Commissioners will receive bids until noon May 19, for furnishing the coal required in the South Park System for the fiscal year beginning June 30. Specifications may be obtained on application. Address South Park Commissioners, Chicago, Ill.

✚No. 672—Charleston, S. C.—Sealed proposals will be received at the office of the lighthouse inspector, Charleston, S. C., for furnishing steam coal and stove coal (anthracite), as required during the fiscal year ending June 30, 1916, delivered at Charleston, S. C. Blank proposals and particulars may be obtained on application. Address Lighthouse Inspector, Charleston, S. C.

✚No. 673—Buffalo, N. Y.—Sealed bids will be received until 10 a.m. May 8, for supplying the fuel required by the City Poor Department. Deliveries are to be made in half-ton lots, and the amount used last year amounted to 2425 tons. Address Overseer of Poor Louis J. Kengott, Buffalo, N. Y.

✚No. 674—New York—Sealed bids were received until May 6, to supply the fuel requirements of the Board of Education at this place. The tonnage involved aggregates approximately 84,160 gross tons of anthracite and 4700 tons of semibituminous. Deliveries are to be completed on or before Mar. 31, 1916. Delivery is to be made in such quantity and at such time as may be directed. Address Supt. of School Supplies Patrick Jones, Park Ave. and 59th St., New York City.

✚No. 675—Seattle, Wash.—Sealed bids were received until 2 p.m., May 5, for furnishing the coal required by vessels of the Coast Guard for delivery at either Seattle or Port Townsend (at the option of the bidder). Deliveries to be made as required during the fiscal year beginning June 30. Blank forms and proposal sheets may be had on application. Address the Collector of the Custom House, Seattle, Wash.

Awards

Note—The names of successful bidders are noted in **full face** type.

No. 67—Schenectady, N. Y.—Some of the bids and the award on this contract (p. 398), which provides for furnishing the Board of Education with its fuel requirements for the ensuing year, were: Walter S. Wood Coal Co., $5.90 to $6.24 on stove coal; Milton E. Devoe, $6.44 for stove and $3.84 for bituminous; Horstman & Meyer, $6.20 to $6.25; J. M. Gaffers, $6.50 for stove and $3.09 for bituminous; Zeiser & Magee, $6.56 on stove coal; **Devenpeck Coal Co.**, $5.90 for stove and $2.85 for bituminous; this company, which was awarded the contract, also bid $6.15 on 150 tons of chestnut. Address Board of Contracts and Supplies, Board of Education, Schenectady, N. Y.

✚No. 188—Sturgeon Bay, Wis.—This contract (p. 399), which provides for furnishing the local Utility Commission with approximately 4000 tons of coal will be bought through the **Drake Coal Co.** under practically the same conditions as the last contract. The cost of the coal laid down at the point of consumption is estimated at $3.39 per ton. Address Supt. James B. Johnson, Sturgeon Bay Utility Commission, Sturgeon Bay, Wis.

✚No. 514—Springfield, Ill.—The award on this contract (p. 666), which provides for furnishing the local School Board with its annual requirements of coal were made to **Emil J. George** for supplying the City Hall, police and fire stations and the East Utica bathhouse, and to **Sang & Reusswig** and the **Clark-Davis Coal Co.**, for supplying the General Hospital and Bureau of Out-Door Relief. Representative bids made on this business for April to September deliveries were: Egg, $6.10; chestnut, $6.35; stove, $6.10; egg and stove, $6.10; bituminous, $3.75. For delivery September to January to April, egg, $6.60; chestnut, $6.85; stove, $6.60; egg and stove, $6.60; bituminous, $3.75. Address Committee on Supplies, Leland Office Building, 6th floor, Springfield, Ill.

✚No. 519—Seattle, Wash.—This contract (p. 666), which provides for furnishing fuel requirements for the quartermaster corps at Seattle and Tacoma, during the fiscal year 1915, has been awarded as follows: **Wellington Coal Co.**, Comox washed pea coal for steaming $3.20; **Pacific Coast Coal Co.**, domestic Newcastle, $6.50. Prices are per net ton. Address Col. George B. Davis, Depot Quartermaster's Office, Seattle, Wash.

✚No. 525—Washington, D. C.—This contract (p. 666), which provides for furnishing Navy Department with 100,000 tons of coal, has been awarded to the **Maryland Coal & Coke Co.**, of Philadelphia, who were the lowest bidders at $2.73 per ton. Address Paymaster-General of the Navy Samuel McGowan, Washington, D. C.

✚No. 532—Cincinnati, Ohio—This contract (p. 666), which provides for furnishing the local Water Works Department with coal, has been awarded to the **Reliance Coal & Coke Co.**, the gross consideration being $20,870.50. Address Dir. of Pub. Ser. Philip Fosdick, City Hall, Cincinnati, Ohio.

✚No. 555—Bridgeport, Conn.—This contract (p. 709), which provides for furnishing not only the fuel requirements of the Board of Education but other city buildings as well, has been let to **Patrick McGee**, at $5.70 for stove, nut and egg for delivery at the various schools and city buildings and $6 per ton for delivery in quarter-ton lots as may be required by the Board of Charities. Other bidders on this contract were Gregory Coal Co. at $6 and $7; J. A. Black Coal Co., egg and stove, $6.25, nut $6.50, before Sept. 1, with egg and stove at $6.50 and nut at $6.75 and $7.40 thereafter; Wheeler & Howe Coal Co., egg $5.95, stove $6.25, nut $6.75 and $7.40; Sprague Ice & Coal Co., egg, stove and nut $5.55 and $6.40; Berkshire Mills Co., stove $6, nut $6.25 and $7.20. The contract last year was awarded to the Sprague Ice & Coal Co., who were the second lowest bidders this year. Address Board of Contract and Supply, City Hall, Bridgeport, Conn.

Contract Notes

South America—The commercial attachés of the Department of Commerce in South America have cabled the Bureau of Foreign and Domestic Commerce that there is an opportunity for the sale of 380,000 tons of coal at this point. Full details may be had on application.

New Orleans—The New Orleans Coal Co. has just renewed an annual contract to coal the ships of the Southern Pacific Co. in the New York and Havana service. The contract calls for approximately 50,000 tons of Pratt coal per annum.

Buffalo, N. Y.—Spaulding & Spaulding were the low bidders and were awarded the contract for 1300 tons of anthracite for the Buffalo park board. George J. Meyer is Park Commissioner.

Charlotte, N. C.—Coal buying committee of the South Carolina Cotton Manufacturing Association has placed the annual contract with the Clinchfield Fuel Co. of Spartanburg, S. C. The contracts include a year's supply for the majority of the cotton mills of the state and will amount to about 275,000 tons. Largest companies in the bidding were the Virginia Iron & Coke Co., the Stonega Coal Co., Blackwood Coal & Coke Co., Bewley Darst Coal Co., Royal Consolidated Coal Co. and the Clinchfield Fuel Co.

COAL AGE

Volume 7, No. 20
Issued Every Saturday
Hill Publishing Company

NEW YORK, MAY 15, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

The Republic Iron & Steel Co's Meet at Republic, Ala.

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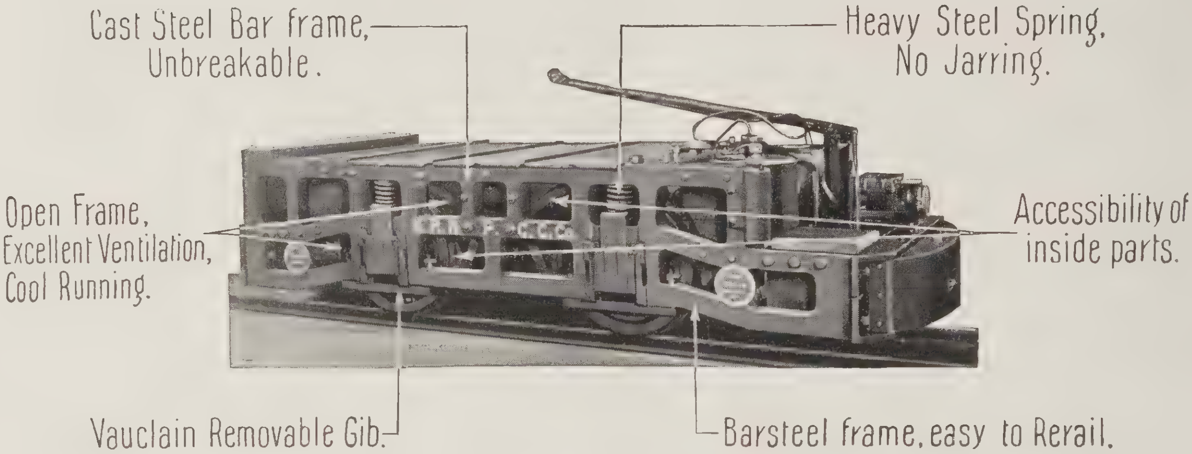
Group of Contestants

Barsteel Locomotive Advantages Reliability plus Accessibility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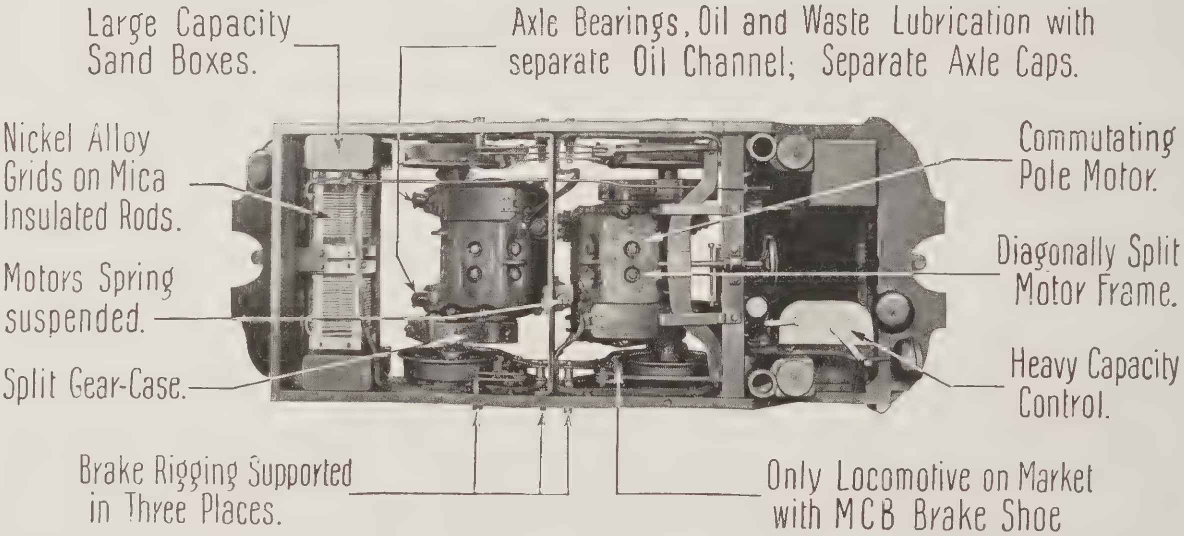
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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE." N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 11,200

None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

IF YOU DOUBT the value of advertising just look at what it has done for the automobile. A well-known economist figured that without advertising it would have taken sixty years to make the automobile as popular as about ten years of advertising did it.

It's the same story with the telephone, especially in rural districts. And if you think of the pleasure and wider outlook these two things the telephone and the automobile have brought to the isolated farm, you'll grant that advertising from a human standpoint is a good thing.

Get the Habit of reading the advertising pages of Coal Age.

A LOT OF MEN are still disputing whether the thousand and one stories told about the Ford Car are good advertising for that car or not. It seems though as if they must be good advertising when you consider how many Ford Cars are in use today.

Frank Tinney, the well-known black-face comedian, has a new Ford story:—

"I was cranking up my Ford," says he, "when it flew off the handle."

Only reliable products can be continuously advertised.

JOHN A. HILL, who is the president of the company which publishes Coal Age gave a lecture the other night before a class in industrial journalism. One of the most important things he said was, "A technical paper that does not teach its readers how to do things in their particular line, *better, cheaper or faster* has no excuse to live."

You could apply that "*better, cheaper or faster*" to every individual advertisement in this paper and you'd find that it stood the test pretty well.

These advertisers pay their good money to tell you certain real facts about their products and they know, as well as you know, that the day of hot air and buncombe has gone to a scrap heap from which, let's hope, it will never return.

Are you profiting by the information the advertising pages offer you?

HERE'S A THIRD STRIKE that the editors of "Cos" put over the home-plate, **"You can't hit the bull's eye with bull."**

COAL AGE

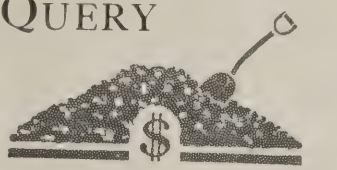
Vol. 7 NEW YORK, MAY 15, 1915 No. 20

Requirements of the Retail Dealer

It requires an occasional talk with a retail coal dealer to make the average coal-mining operator realize that there are many requisites in the coal business beyond the simple ability to load a certain number of railroad cars of coal (any old kind) per day, within a certain allowable cost per ton.

To make a success of the retail business a dealer must know the characteristics of each grade of coal produced by each coal mine selling coal within his territory.

QUERY



How Can the Retail Dealer Succeed if the Coal Operator Fails to Furnish a Uniform Product

?

He must forget that there is such a word as coal and do all of his thinking in terms of slack, pea, nut, egg and lump. His ability at diplomacy is tested by such terms as dirt, rock, slate and bone, and his salesmanship depends entirely on his understanding of ash, sulphur and clinkers.

The fuel demand for domestic purposes is divided between boilers, furnaces, grates and cook-stoves, and the dealer must be competent to recommend the most suitable grades for each of these purposes. Furthermore, his decision must often take into account the financial ability of the prospective purchaser, as well as his home habits and business reputation.

For example, a certain high-ash nut coal may be very economical as a furnace fuel, but one customer would rather pay a little larger fuel bill than be troubled with the extra bother because of the excessive amount of ashes. The next-door neighbor, perhaps not so well off in worldly goods, believes in cutting the initial cost of his fuel, and so is not concerned with the trips to the ash dump, but thinks only of the dealer's bill for the season.

A wide-awake retail coal dealer can get all the business he can handle if he can only succeed in getting close enough to prospective buyers, and providing most of his competitors are just average dealers, who encourage their customers to order without interesting them to the point where they request advice.

But after the retail dealer builds up his business on the basis of furnishing every customer just what he requires, think what it means to him if he finds that he cannot depend upon a uniform product from the mines.

In times like the present, when the steam-coal demand is an unknown quantity and the demand for domestic coal becomes the flywheel of the industry, the retail dealer and his requirements are worthy of pretty serious consideration on the part of mine operators.

Value of Daily Cost Sheets

By H. S. Mikesell*

SYNOPSIS—Cost sheets in order to be most effective must be prepared every day. Such a compilation need not take fixed charges on plant or equipment into account, but only such items as may be considered strictly as operating expense.

Western coal operators, as a result of several unprofitable years through which they have passed, augmented by the prevailing unsatisfactory business affairs resulting from conditions abroad, are in a critical position. Producers must act cautiously and keep closely in touch with operating costs. Many operators of coal mines do not conduct a system of accounting or daily costs that at all times reflects the actual current cost of production, which is the only basis on which selling prices can be legitimately figured.

The compilation of a daily statement showing the cost of production should be considered by every operator a necessity for each mine. On account of the close margin generally existing in this day between the costs of production and the selling price of coal it is highly important that a daily cost should be as accurate and comprehensive as possible, in order to enable the operator to see immediately whether or not his expenses are within proper limits.

Some mine owners delude themselves with the belief that monthly or semi-monthly cost sheets are sufficient, but figures so compiled are often too late to be of the benefit expected in reducing expenses or for use as a basis in figuring market prices of coal. Thus unnecessary expense may already have been incurred for some length of time, and when the monthly or semi-monthly cost sheets are analyzed it can only be eliminated for the future if such expenditure still continues. A daily cost sheet if properly used prevents this waste, because unnecessary expense is immediately seen and can be eliminated without delay.

At nearly every mine a clerk is employed to maintain payrolls, and with little additional labor on the part of such a clerk a cost sheet can be accurately and promptly prepared. A sheet of this nature to be of value and to enable immediate elimination of unnecessary expense should be compiled promptly, not later than the day following the one that it covers.

The objection has been raised that this cost sheet requires too much clerical labor, but it has been found that a clerk can correctly prepare such a sheet complete each day with two hours' work, and in many cases it is done in less time where the clerk has been accustomed to its preparation and is familiar with conditions. It is evident that it is just as important to compile a daily cost sheet as it is to maintain a payroll, if not more so, from the coal producers' standpoint. For the best mine management neither one can be eliminated without disadvantage.

Daily Reports Are Superior to Monthly Reports

The best results are secured when operating officials are brought face to face with the costs every day rather than when compelled to wait for monthly reports. If superintendents and mine managers are placed in touch with daily costs they are in a better position to immediately discover leaks, prevent useless expenditures of labor, and maintain the cost of production on a proper basis. At many operations the daily cost sheet is the subject of a discussion between the superintendent and his foremen each evening, and a free and frank expression of opinion on the points brought out by its compilation cannot but be helpful to all concerned in the management of a mine and cause reduction in expenses. At operations composed of a number of mines cost sheets are frequently interchanged and comparisons made which are found of great advantage in reducing expenses and keeping costs in the correct ratio with production.

A statement of this kind may with advantage be passed down daily to various under-officials, especially those items applying to expenses under their individual control. A foreman in order to maintain equilibrium will attempt, for instance, to neutralize an increased expense for haulage by a reduction of inside labor, particularly if he is able to ascertain quickly whether or not the number of men employed in each classification under his control is in conformity with the tonnage produced.

If idle-day expense is high and tonnage correspondingly reduced with increased cost, the mine manager will be acquainted with this state of affairs immediately upon analyzing the cost sheet and will be able to take intelligent steps to put his working-forces on a proper basis to maintain minimum costs. In the cost sheet idle-day expense is absorbed concurrently by the tonnage produced on working-days, which is proper, and is not deferred until the end of the month or some later period.

The daily cost sheet to be illuminating should present the same classification of accounts embodied in the monthly accounting results, and naturally if a coal company has a classification of accounts it should be followed in a proper order in compiling the cost sheet.

The accompanying form shows a cost sheet which has been used in the West with signal success. It is a condensed replica of the time-books or payrolls boiled down to one sheet to show all essential information applying to operating expenses.

Important Items That Are Covered

This cost sheet, which embodies a report of idle day expense, also brings out clearly the following information:

1. The cost per ton of the production on the day for which it is issued together with the total expense incurred.

2. Total operating expenses of the current month's production to date with cost per ton thereof.

3. Total operating expenses to same date of the previous month with cost per ton thereof. (This enables a comparison at any time of the current month's costs with the figures of the previous month and shows readily whether expenses are decreasing or increasing for an individual mine.)

4. The cost per ton of coal produced for each classification of expenses is currently indicated, together with

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*Auditor, Consolidated Indiana Coal Co., Chicago, Ill.

ROCK ISLAND COAL MINING COMPANY—OKLAHOMA DISTRICT

Daily Cost Sheet and Idle Day Report of Mine No. . . . . at . . . . Date . . . . 191 . . . .

	No.	Hr. W'd	Rate	Amt.	Per Ton
Superintendence:					
Hartshorne office					
Alderson office					
Local office					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Engineering corps:					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Mining:					
Machine boss					
Mach. runners, ton					
Mach. helpers, ton					
Mach. runners, day					
Mach. helpers, day					
Mach. miners					
Hand miners					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Haulage:					
Pit boss					
Master mechanic					
Stablemen					
Boss driver					
Drivers					
Tracklayers					
Track-helpers					
Spraggers					
Oilers					
Pushers					
Road-cleaners					
Motormen					
Trip-riders					
Trappers					
Rope-riders					
Planemen					
Rustlers					
Slope engineers					
Sandboy					
Switchmen					
Couplers					
Motor repairs					
Pit-car repairs					
Handling mules					
Dynamo attendance					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Inside labor:					
Pit boss					
Shotfirers					
Timbermen					
Electricians					
Jerrymen					
Loading rock					
Cleaning roads					
Mining mach. repairs					
Examining ladder					
Fire-runners					
Other labor (itemize)					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					

	No.	Hr. W'd	Rate	Amt.	Per Ton
Hoisting and loading:					
Pit boss					
Top boss					
Fuel inspector					
Master mechanic					
Engineers, day					
Engineers, night					
Firemen, day					
Firemen, night					
Slope engineers					
Trimmers					
Weighmen					
Cagers					
Spraggers					
Dumpers					
Slate pickers					
Box-car loader					
Sandmen					
Pushers					
Trackmen					
Car rustler					
Shaker engine					
Pumping water					
Loaders					
Couplers					
Washermen					
Oilers					
Screenmen					
Pinchers					
Slack and ash wheelers					
Screen repairs					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Ventilation and drainage:					
Pit boss					
Master mechanics					
Pumpers					
Bratticemen					
Water bailers					
Sprinkling roads					
Changing air					
Gasmen					
Fire-testers					
Cleaning sump					
Pump repairs					
Electric power					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Outside labor:					
Top boss					
Blacksmiths					
Machinists					
Blacksmiths' helpers					
Boss carpenter					
Carpenters					
Watchmen					
Teamsters					
Trackmen					
Rock-car men					
Roustabouts					
Cleaning up					
Handling timber					
Handling supplies					
Watering rock dump					
Work on rock dump					
Pay roll guards					
Other labor (itemize)					
Total					
Brought forward this month					
Total this item to date					
Total this item to date last month					
Loss and damage:					
Brought forward this month					
Total this item to date					
Total this item to date last month					

	Amt.	Per Ton
Rolls and deficient work:		
Brought forward this month		
Total this item to date		
Total this item to date last month		
Yardage and room-turning:		
Brought forward this month		
Total this item to date		
Total this item to date last month		
Material:		
Props and lumber		
Feed		
Mine rails		
Outside lubrication		
Inside lubrication		
Mine cars and repairs		
Mining-machine repairs		
Other repairs—outside		
Other repairs—inside		
Explosives		
Other supplies—outside		
Other supplies—inside		
Live-stock		
Total material		
Brought forward this month		
Total this item to date		
Total this item to date last month		
Summary:		
Superintendence		
Engineering corps		
Mining		
Haulage		
Inside labor		
Hoisting and loading		
Ventilation and drainage		
Outside labor		
Loss and damage		
Rolls and deficient work		
Yardage and room-turning		
Material		
Personal injuries		
General expenses		
Total operating expenses		
Brought forward this month		
Total operating expenses to date		
Less estimated local earnings		
Net operating expenses to date		
Total net operating expenses to date last month		
Additions and betterments:		
Labor		
Material		
Total today		
Brought forward this month		
Total this item to date		
Total this item to date last month		

	Today This Month	Same Day Last Month
Tonnage:		
Production today		
Less boiler coal used today		
Net output today		
Brought forward this month		
Net output to date		
Hours worked today		
Working days to date		

	Amount This Month	Amount Last Month	Per Ton This Mo.	Per Ton Last Mo.	Amount of Increase	Amount of Decrease
Total expense of this idle day						
Brought forward expense of previous idle days this month		*	*	*	*	*
Total expense of idle days to date		*	*	*	*	*
Average expense per day of idle days to date	*	*	*	*	*	*
Number of idle days to date	*	*			*	*
Amount of idle days estimate by general superintendent for current month	*	*			*	*
Amount of Sunday estimate by general superintendent for current month	*	*			*	*

* This mark to denote places figures must be inserted.

In computing "Costs Per Ton" boiler coal tonnage of each day must be subtracted from daily output.

Idle days must always include Sundays and holidays and periods embracing suspension of mining pending wage settlements.

In the columns reading "Increase" and "Decrease" show amounts of differences in expenses of idle days, not "Per Ton" figures.

In estimating Local Earnings use average revenue per ton for the current fiscal period shown for each mine in last monthly operating statement on hand. To arrive at the amount of Local Earnings, multiply production less boiler coal by the average revenue per ton. On idle days Local Earnings must not be estimated.

Cause for exceeding General Superintendent's Idle Day Estimate for this date, if so

Correct: Mine Clerk

DAILY COST SHEET WHICH HAS BEEN FOUND SUCCESSFUL BY THE ROCK ISLAND COAL MINING CO.

a comparison of the same expense up to the same time of the previous month. (By analysis of the sheet any one interested can note immediately under what classification of expense a decrease or increase is found as compared with the previous month.)

5. The number of men working under each classification, the hours worked, the rate of pay, the cost per ton for each item of labor, and the amounts earned by each classification of employees. (If an excessive number of men are employed in certain work as compared with what has been normally the case in the past, this may be readily seen. If rates of pay are not in accordance with wage agreements or do not conform to established usage, it may be discovered by means of this sheet.)

Some Charges Are Not Considered

This sheet applies only to operating expenses at the mines which are under the control of superintendents and mine managers, and it has not been considered necessary to include in this cost sheet fixed charges such as taxes, insurance and overhead expenses of executive officers and employees, which are usually arbitrary and with which the men on the ground have no connection.

The items of "rolls and deficient work," "yardage and room-turning" and "loss and damage" are for the purpose of this sheet estimated by payroll clerks on the basis of the previous month's actual figures, as well as the items of "general expenses" and "personal injuries," which may vary in actual amount from month to month. The item of "material" covers the actual value of supplies of all kinds used in or at each mine each day.

"Loss and damage" on this sheet covers the cost of labor and material used in repairing any damage, either in the mines or to the top works, tenement houses or other property, and expense in cleaning up débris resulting from fires, explosions, wind storms, cave-ins, etc. It is an account in which to place any extraordinary expense which is not found in the regular operation of a mine, so as to not disturb comparative costs or usual expenses.

Idle-Day Expenses Are Set Forth

Attention is directed to the feature reflecting idle-day expense. Where a mine is only operating part of the time the expense for idle time naturally increases the cost of production. It is consequently most important that a careful check should be maintained of labor employed under such conditions to prevent unnecessary expense.

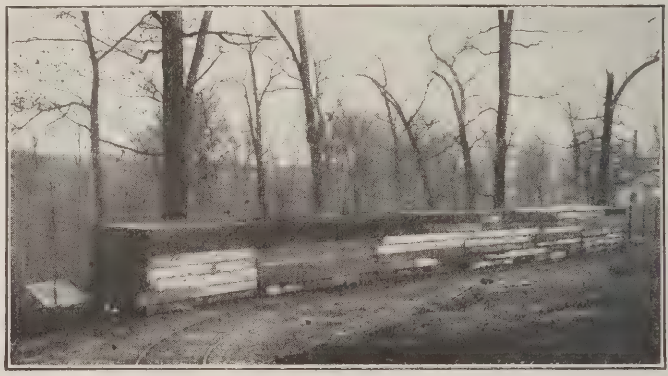
It has been the custom where this sheet has been in effect to have the superintendent make an estimate at the beginning of each month as to what the expense will be for Sundays and idle days during the following month, and if the actual idle-day expense exceeds the estimated figures an explanation is required.

Idle-day expense has been a most potent factor in disturbing expected costs of production, and it has been found that the showing of this information in the daily cost sheet has led to reduced expenses for idle days in mine operations. In several instances where the actual idle-day expense was increased over the estimated figures and an explanation asked, it has been found that help was employed unnecessarily. Economies have accordingly been introduced which would not have been the case had the idle-day expense not been considered as an element of cost.

The sheet has a column also for indicating the output of the mine on the day for which it is issued as compared with the same day of the previous month, and a comparison of the net output for the month up to the date it is issued compared with the same date for the previous month. It also shows an important item—the number of working-days to date as compared with the same information for the previous month.

Field Coal-Dust Explosion Gallery

A cheap and easily constructed wooden gallery for demonstrating the explosibility of coal dust at miners' field meets has been designed and tested with satisfactory results by George S. Rice and L. M. Jones of the Bureau of Mines.



"Mine Tunnel" Made of Scantling and Boards for Proving the Dangers of Coal Dust

The gallery is constructed of rough 1-in. boards, nailed to timber sets of 3x4-in. material, erected on 6-ft. centers. The gallery measures 7 ft. wide by 6 ft. high, inside of the timber sets, and should be approximately 85 ft. long; this length may be reduced somewhat if necessary.

Six inches beneath the roof are placed shelves of 1x12-in. material, which are supported, one at each timber set, by means of two nails driven into each of the uprights.

The gallery is left open at both ends; and 12 ft. beyond one end there is a cannon, consisting of a discarded 9-in. liner from an explosive-testing cannon, which can be supplied by the Bureau of Mines upon payment of trans-

The Wooden Tunnel after a Violent Explosion Has Wrecked It

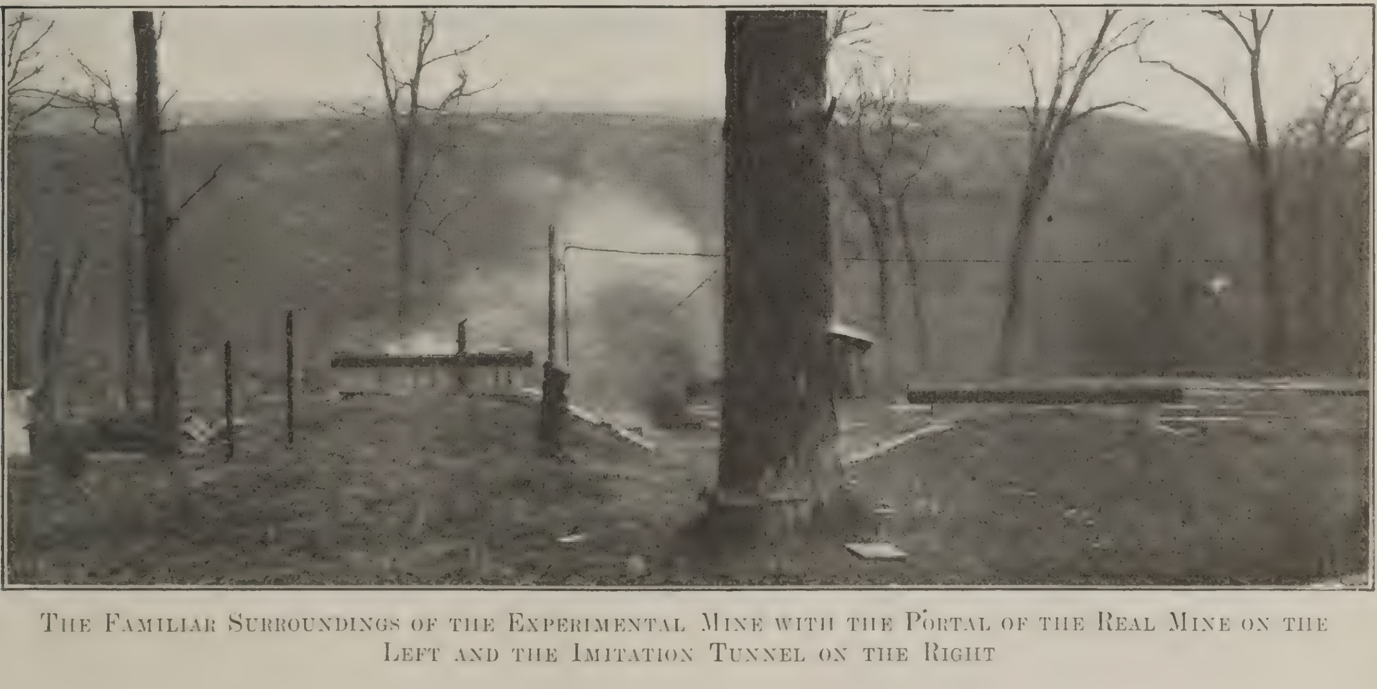
The Effect of Coal Dust Is Even More Apparent and Spectacular Than in the Boiler-Iron Gallery

portation charges. This is set on timbers so as to be a foot above the ground level and is placed with the borehole parallel to the axis of the gallery.

From in front of the cannon and extending to a point 3 ft. within the gallery, a platform on which to place dust is erected. A heavy wire is fastened to an eye-bolt screwed into the front of the cannon and is stretched over all of the shelves, being attached to each by a nail on the top side near the edge away from the cannon. The cannon is braced loosely by a timber, extending from it to a pile of dirt in the rear, so as to allow a recoil of from 1 to 2 ft. This recoil, by means of the heavy wire attached to the dust shelves, will effect the dumping of the dust.

Each of the shelves should be heaped with the dust to be tested and placed on the four nails of each timber set so as to be nicely balanced thereon and yet to be easily dislodged by the recoil of the cannon.

Coal dust should also be heaped on the platform in front of the cannon, extending therefrom for about 15 ft. so as to propagate the flame from the cannon to the dust within the gallery. Roughly, 200 lb. of coal dust will be required for each demonstration. Cannon should



The Familiar Surroundings of the Experimental Mine with the Portal of the Real Mine on the Left and the Imitation Tunnel on the Right be charged with 1 lb. of "FFF" black powder tamped with 3 lb. of clay.

When the cannon is fired, all of the dust shelves should fall so as to prepare a cloud for the propagation of the flame throughout the gallery. If the coal dust is inflammable, the flame will pass along the dust in front of the gallery and will then be sent through the cracks between the boards of the sides and roof, and finally emerge at the opposite end of the gallery. Wet the boards before each test to prevent their taking fire.

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Extracts from a Superintendent's Diary

The highbrows and the college graduates haven't a monopoly on philosophy by any manner of means. I realize the truth of that every now and then. Today, for example, our night watchman, whom I have always looked upon as a matter-of-fact, unimaginative fellow, volunteered a few remarks that entitle him to be classed as a near-philosopher to say the least.

I decided a few days ago to purchase a watchman's recording clock for our camp and asked our commissary manager and our master mechanic to decide upon the key stations. The key boxes were put up yesterday, and late in the afternoon our watchman was given his clock and all necessary instructions when he reported for work.

This morning, on arrival at my office, I found him sitting on the steps awaiting my coming ready to turn in his resignation. Assuming that his feelings were hurt, I tried to explain to him that we had no desire to devise a check upon his faithfulness, but were simply adopting a method recommended by all of the insurance companies and now in use at most industrial plants. I assured him that the old hit-and-miss system of doing things was rapidly losing ground and scientific methods were coming into use, covering all operations even to regulating night watchmen's movements. He shook his head.

"That's just the point, Mr. Thompson. The idea is all wrong, and I won't be a party to it. Talk about reducing everything to a scientific basis—that's the line of argument that made possible fake rain-producers out West.

"I've been trying to figure out the why's and the wherefore's of things in general, and it looks to me as if the things that count are being done by folks who don't know how they do them nor why they do them. A fellow day-dreams that something is going to happen or ought to happen, and he takes advantage of the advance information; and in consequence when it happens he comes in for credit which he does not deserve and really does not care for.

"I've tested it out many a time in night watching. Some nights I spend most of the time loafing around the power house giving and taking experiences with the engineer, and then on other nights I get a feeling that tells me that trouble is in the wind or some one is trying to outwit me, and I keep on the move all night. That's how I've earned my reputation as a night watchman, and now you propose to make me operate on a scientific basis and keep me moving when it isn't necessary and like as not make me walk into trouble some night when I'll be dead sure that trouble is awaiting me, but I won't be able to avoid it because I'll be due at a certain place at an exact minute irrespective of consequences. Wouldn't three or four fellows of average intelligence have a time trying to get the best of me and my clock?

"Whenever I recall the events in my life that have meant something to me I realize that generally I was pushed into them in some unaccountable manner by a subconscious power.

"A fellow might plan a system for controlling his passions, but about the only men who give a value to prearrangement schedules for all future actions are the ones who write books of advice for growing boys.

"Not being in sympathy with men of that school, I'll have to resign; and, Mr. Thompson, I suggest that you get a sleepy-headed fellow who has no imagination to take my place."

These were his exact words as near as I can recall them, even to that phrase "subconscious power."

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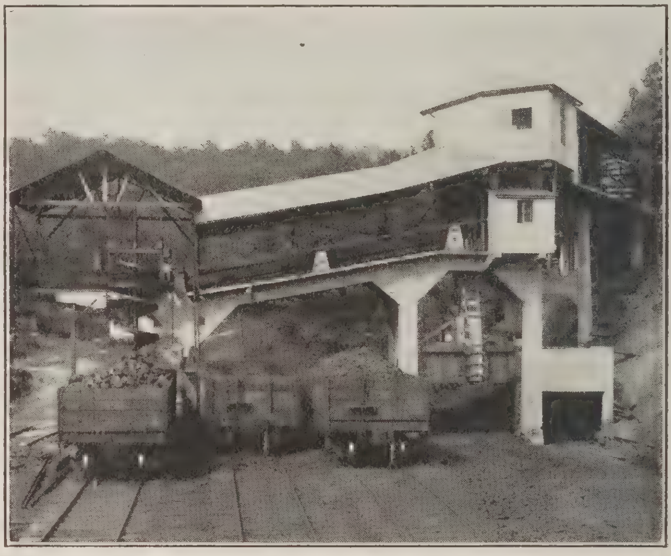
Concrete Tipple Construction

By E. L. Douglas*

The accompanying illustration shows the reinforced-concrete tipple of the Jellico Coal Mining Co. at Mountain Ash, Ky., built by the Associated Engineering Co., of Louisville, Ky. The tipple capacity is 1200 tons. Special features are screen hangers which require only 15 hp. to run under full load. The screens are adjustable from the sides so as to change the size of the coal by turning a wheel instead of having to take out the plates.



Jellico Coal Mining Co.'s Concrete Tipple at Mountain Ash, Ky.

Block coal is handled from the screen to the railroad by an adjustable spiral loader, which is shown in the cut. When the railroad car is placed for loading, the spiral chute is dropped to the bottom of the car and is gradually raised to the crowning point as the coal fills the car. The spiral loader is counterweighted and is handled by one man operating a chain wheel. No motive power is required.

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In the construction of coke ovens one authority recommends ganister bricks, built in with sagger clay mortar, these bricks and the clay partly fusing and making a lasting, airtight oven.

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*General manager, Jellico Coal Mining Co., Mountain Ash, Ky.

Fire at Black Hawk Mine, Utah

SYNOPSIS—A severe fire in a Utah mine is extinguished with the aid of oxygen apparatus after a fight lasting 59 days. It is thought that an incendiary started the fire.

The Black Hawk mine of the Black Hawk Coal Co. is located near Price, Carbon County, Utah. About midnight of Jan. 31 of this year the night inspector discovered a fire at the mine.

Its origin is unknown, but the general belief is that it was started by an incendiary. An alarm was given, but the mine being reached by an inclined plane a mile long and being located at an elevation of about 750 ft. above the tipple, it was 3 a.m. before much help arrived. By that time large volumes of smoke were escaping from the fanway, and it was realized that the fire had made much progress. There are four openings within 100 yd., consisting of a manway on the north, a double-track main gangway, a ropeway and a fanway.

RESCUE CREWS AT THE BLACK HAWK MINE FIRE NEAR PRICE, UTAH

THE HOIST BEING UNDERGROUND, IT WAS PUT OUT OF COMMISSION

As the haulage engine was located 200 ft. inside the mouth of the drift, an effort was made to shut off the hoistroom from all connection with the fire so as to have the use of the engine to raise material with which to subdue the conflagration. This attempt was unsuccessful, for the heat and smoke drove the men out. Consequently it was decided on Feb. 1 to seal up the mine, and work was started with this end in view.

A slight explosion occurred at noon on Feb. 1, from which no casualties resulted. By noon of the next day all the openings except the manway and the small ropeway had been closed. At that time a second explosion occurred by which half a dozen men were slightly injured.

The mine was completely sealed the next day, and as there was no water available and as hauling material by teams up the long and steep plane was a slow arrangement, preparations were made to install a pumping plant and a haulage engine.

On Feb. 1 government rescue car No. 2 in charge of J. C. Roberts, with his assistants, George W. Riggs and C. S. Arthur, arrived from Bingham, Utah; J. E. Pettit, state mine inspector, arrived on Feb. 2.

TRIED TO VENTILATE WITH A CENTER STOPPING

The company had its own rescue and first-aid car, five helmets and many trained helmetmen. These were organized into squads, and other men were trained to supplement the regular force. By the middle of the month, everything being ready, including an electric hoist, a new pipe line a mile long and the necessary pumps, two squads of helmetmen made trips into the mine, one going into the main gangway and manway and the other going into the fanway and first-east heading. These two teams approached within 200 ft. of each other, the fire being between them. They found the mine filled with an unbreathable atmosphere and very hot.

They returned to the outside, and it was decided to split the main gangway with a cloth brattice, to put a small blower on one side and with the aid of this provision try to reach the fire with hose. This scheme was tried as soon as practicable, and rapid progress was made for awhile, but on the 23d the smoke became so dense and the heat so severe that the men were all driven out, and the mine was resealed.

ONE FATALITY WHILE EXPLORING FIRE AREA

It was opened again on Mar. 1, and several squads of helmetmen went in, and on the evening of that day the first and only fatality occurred. One of the helmetmen was overcome when on the first-east close to the fire and about 1100 ft. from the outside. He was taken out, but never recovered consciousness.

It was then determined that the right course was to load out the material instead of trying to reach the fire and quench it with water. This work was started on Mar. 5 and continued for several days, and by the 11th the fallen material was cleared up to a point back of the hoist and the latter put into commission. However, in the afternoon of that day smoke came out in such volumes that the men were driven out, and the mine was sealed up for the night. Work was started the next day and continued for three shifts, when the men were again driven out, and the mine was resealed.

Fire Causes Thousands of Tons of Coal to Fall

This advance and retreat occurred at intervals until Mar. 30, when the fire was finally extinguished; and regular operations were resumed on Apr. 1, though much fallen material remained to be cleared up. Only a few tons of rock roof had fallen, but the seam being 18 ft. thick or thereabouts, several thousand tons of coal had come down, though the fire had not reached it. At some points 8 ft. of coal had chipped off in small pieces, and where this occurred the roof was in every case arched by the fall. On the whole, little damage was done to the mine, though the quenching of the fire was very expensive.

The company was fortunate in having the services of such experienced mine-fire fighters as J. E. Pettit, the state inspector of mines, J. C. Roberts, mining engineer in charge of United States rescue car No. 2, and Robert Howard, the company mine inspector. The latter was put in charge of the details of the operation by Vice-President J. F. Healy, and with the other two experts composed, as it were, a "board of strategy."

Deputy State Mine Inspector Smith also rendered valuable service, as did also Superintendent Garvey, of the Mohrland colliery, who had charge of the night shift. The company was also fortunate in getting the federal mine-rescue car so promptly, and is to be congratulated in that it was manned by such competent men, to whom too high praise cannot be given.

Bravery of the Mine Employees

It is pleasant to note the vigor, fearlessness and zeal with which all the company employees who were called upon responded. Not one of them refused to do his part. None of them showed the least hesitation in working in high temperature and bad air and under roof which might be dangerous. The loyalty shown throughout could not be exceeded and was most highly appreciated by the company. In acknowledgment, it has donated $1000 to the amusement clubs to be used to the best advantage of all its employees. It will also present medals to the helmetmen, who did some exceptionally good work and who undoubtedly saved some lives on Mar. 1. On that occasion the indefatigable safety superintendent, A. W. Dennison, was overcome while assisting another helmetman out of the mine.

"Safety first" was adopted as a binding rule from the beginning and was never overlooked. Aside from the one death, the rule was successful in preventing fatalities.

Determination of Gases

Roy Stevens, chemist of the United States Smelting Co., of Midvale, Utah, began analyzing the mine air on Feb. 4 and continued for a couple of weeks, and was followed by J. B. Forrester until the end of the work. About 200 analyses were made, each in a surprisingly short time, not more than 20 min. being required in some cases to determine the presence or absence of explosive gases, illuminants, carbon monoxide, carbon dioxide, oxygen and nitrogen. As the tests were many and quickly made they were of great help to those engaged in the work. No explosive gases have ever been found in the mine, but it was felt that possibly some might be made by the fire.

The operations in extinguishing the fire occupied 59 days, and during that period 20 or more Draeger oxygen apparatus were in use. These met the test satisfactorily, nothing but ordinary repairs being necessary such as long-continued use might be expected to require. J. E. Pettit, the state mine inspector, declares that without such equipment the fire could not have been extinguished.

Deaths at Layland Mines

From E. A. Henry, chief of the Department of Mines of West Virginia, we have received a complete list of the persons killed at the Layland, W. Va., explosion, and from that account the following enumerations have been made. Figuring by nationalities there were 36 Americans (including 1 negro), 28 Austrians (including 4 Austrian Poles, 3 Slavish Austrians, 3 Slavs, 1 Pole, 2 Bohemians and 3 men not classified, but with names suggesting Austrian nationality), 22 Italians, 21 Russians, 2 Syrians, 2 Scotchmen, 1 German, 1 Spaniard, 1 Welshman and 1 Englishman. In all there were 115 victims.

Grouping by occupations there were 85 miners, 7 triprunners, 5 tracklayers, 4 motormen, 2 mine foremen, 2 motor-runners, 2 stonemasons, 1 slate-man, 1 pumper, 1 substation man, 1 electrician, 1 store porter and 3 men who were not yet on the payroll.

American Coal for Brazilian Railway

The Central Railway of Brazil (Estrada de Ferro Central do Brasil), a government line, has recently approached an American concern here, says Consul General Alford L. M. Gottschalk, with a proposition to purchase 20,000 tons of Pocahontas coal. The price is said to be $15.09 per ton.

The Central Railway has had special permission from the government to make its purchases of coal for cash and to meet payments therefor out of its actual cash receipts month by month. The director of the road states that it consumes 300,000 tons of coal per year.

COMING MEETINGS

International Railway Fuel Association will hold its annual meeting at Chicago, Ill., May 17-20. Secretary, C. G. Hall, 922 McCormick Bldg., Chicago, Ill.

Oklahoma Operators and Miners Association and U. S. Bureau of Mines will hold a state-wide first-aid meet at McAlester, Okla., on May 22, 1915.

Retail Coal Dealers' Association of Texas will hold its meeting May 25-27, 1915, at Galveston, Tex.

The Illinois Mining Institute will hold its next meeting at Danville, Ill., May 27-29, 1915. The officers of the Institute are: President, J. W. Starks, Georgetown, Ill.; first vice-president, William Burton, Herrin, Ill.; second vice-president, Fred C. Pfahler, Belleville, Ill.; secretary and treasurer, Martin Bolt, Springfield, Ill.

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

The American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 W. 39th St., New York City.

M. O. I. Coal Association annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland.

The American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, inclusive at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

Comparative Costs of Motor-Truck and Wagon Delivery[*]

By Henry L. Miller[†]

SYNOPSIS—An analysis of the comparative costs of delivering coal by motor trucks of different sizes and by teams. The article is based on carefully compiled data covering a period of several years, and due allowance has been made for all the variable conditions. Prospective purchasers of motor trucks will find much of interest in the article.

Views Showing Truck Dumping and Normal

The figures presented herewith show the performance and averages on one 4-ton truck for two years, one 4-ton truck for one year, one 2-ton truck for five months and one double team and one single team for one year. Each study is divided into periods of six months, with the exception of the 2-ton truck, which has been in commission only five months.

In our efforts to ascertain the difference in the cost of truck and team delivery we found it quite necessary to know the average number of miles made by the teams.

TABLE SHOWING COMPARATIVE RESULTS OF DIFFERENT MOTOR TRUCKS AND TEAMS OVER SIX-MONTH PERIODS

	4-Ton Truck No. 50				4-Ton Truck No. 60		2-Ton Truck No. 70	Double Team		Single Team	
Six-month period	1st	2nd	3rd	4th	1st	2nd	*	1st	2nd	1st	2nd
Days operated	124	148	121	111	131	146	118	149	145	151	147
Days idle	2	4	27	43	14	8	8	3	9	1	6
Miles	3324	4822	3345	2894	3386	3970	2808	1717	1574	1950	1647
Tons	2503	2893	2625	2710	2611	3467	1200	1349	1347	695	627
Expense	$1.82	$3.29	$6.19	$4.49	$1.852	$3.07	$0.86	$2.04	$2.04	$1.02	$1.02
Overhead	5.78	5.78	5.78	5.78	5.597	5.74	3.42	1.00	1.00	0.55	0.55
Total (per diem)	7.60	9.07	11.97	10.27	7.449	8.81	4.28	3.04	3.04	1.57	1.57
Driver	3.00	3.00	3.00	3.00	3.00	3.00	2.50	2.33	2.33	2.17	2.17
Helpers	3.50	3.50	3.65	3.37	3.50	3.50	3.66	1.94	1.88	0.48	0.72
Total	14.10	15.57	18.62	16.64	13.95	15.31	10.44	7.31	7.25	4.22	4.46
Averages:											
Miles per day	26.8	32.5	27.64	26.07	25.84	27.19	23.80	11.52	10.85	12.91	11.20
Tons, per day	20.19	19.54	21.69	24.41	19.93	23.75	10.17	9.05	9.29	4.60	4.27
Load in tons †	4.00	4.00	4.11	4.08	3.97	3.96	2.11	2.25	2.41	1.03	1.00
Trips per day	‡	‡	5.28	5.98	4.98	5.99	4.81	4.01	3.86	4.45	4.27
Miles per trip	‡	‡	5.24	4.36	5.18	4.54	4.94	2.87	2.81	2.90	2.62
Cost per mile	0.526	0.479	0.673	0.638	0.539	0.563	0.438	0.634	0.668	0.326	0.398
Cost per ton-mile	0.135	0.119	0.164	0.156	0.135	0.142	0.208	0.282	0.277	0.317	0.398

*For a five-month period only. † Estimated. ‡ Figures not available.

Answers to inquiries made in a number of different directions were so much at variance that we endeavored to find some kind of an instrument that would register the mileage of a heavy wagon. A little more than a year ago we found such an instrument and have kept our mileage on two teams for twelve months. We also found that in order to make a fair comparison we should keep a record of the helpers furnished the trucks and the teams, and this has been done for the twelve-month period.

In presenting these figures I am well aware that both the performance and the cost will differ greatly from figures that many others have kept. I know that the average load will appear small and the cost per ton-mile large as compared with the results obtained by dealers in the vicinity of Boston; it is therefore necessary that a brief statement be made as to conditions under which the coal dealer in Worcester labors.

Worcester is the "City of the Seven Hills," and what the hills are can better be appreciated after one has done business there. We are sometimes able to place on our double teams a load as great as 7000 lb., but on long trips we seldom put on more than 6000 lb., and many times only 4500 lb.; and in all cases where hills are steep, teams go together, taking lead chains with them and helping each other over the heavier grades, or else they have to go loaded very light. Our average haul is long and is growing more so each year.

[†] Secretary, Claflin-Sumner Coal Co., 9 Pleasant St., Worcester, Mass.

[*] Paper presented at the New England Coal Dealers' Association meeting at Boston, Mass., Mar. 24 and 25.

There has been no attempt to make a record with either trucks or teams. Our truck record might have shown a much lower cost per ton-mile had we exceeded the rated capacity in our loading, but we have strictly avoided overloading, and while our figures for the first and second year are high we anticipate a considerable saving over a period of three or more years. I do not mean to infer that we have never loaded our 4-ton trucks with more than 8000 lb., but where we have loaded in excess of the rated capacity it was always under conditions where the load could be handled with perfect ease.

Overhead Charges and Depreciation

Our charges for expense on our trucks include the amounts actually paid out for gasoline, oil, grease, repairs, tires and sundries. Our overhead charges include depreciation and insurance, the latter covering employers' liability, property damage and fire insurance. Our depreciation we have figured at 33⅓ per cent. per year. We recognize that this is a much larger amount than has probably been given you for depreciation by truck salesmen, but careful inquiries in many directions have led us to adopt this figure. Should it prove at the end of three years that we still have a value left in our trucks, the cost of running will be decreased an amount equal to the value of the truck at that time. In our per-diem charge we have added to the expense and overhead charges the amount paid the driver and the average daily amount paid for helpers during each period of six months.

In our cost for team delivery we include the actual expense per day as shown by an average taken from records kept for four years. To this we have added overhead charges, which include employers' liability insurance, property damage insurance, fire insurance and depreciation. Our depreciation is based upon a cost of a horse at $300 with harness and wagon at $450. We have placed the life of a horse at six years and the average life of a wagon and harness at ten years.

Uses of Trucks and Wagons

The 4-ton trucks are equipped with power body-hoists and are used as much as possible where we can load them from overhead. They handle considerable bituminous coal where loads can be dumped and have also been used for family trade where a single order amounts to four or more tons. We have also used them for two or more orders on one delivery in a few cases, but have found this expensive.

The 2-ton truck has been used very little in manufacturing business, but has been confined more particularly to long distance 2-ton domestic trade; it is also often called upon to carry two or more orders on one trip. This is a more expensive delivery than is put to the 4-ton trucks, as will be noted on the record.

Double teams are kept as much as possible on not less than 2-ton orders, but sometimes we are obliged to load them with several orders on one trip.

Small business, such as quarter-ton and half-ton loads, goes usually to single teams, getting as many orders on one trip as can be conveniently delivered. Even then, such delivery is expensive, as will be seen from the record.

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Mining Exhibits at the Panama Exposition

The accompanying sketch shows in detail the plan and sectional views of the demonstration mine installed by the Bureau of Mines in the Palace of Mines and Metallurgy at the Panama-Pacific Exposition. This interesting installation is located beneath the floor of the building and is entered through a shaft and slope in the southern end of the Bureau of Mines space.

Palace of Mines and Metallurgy at Panama-Pacific Exposition

In the exhibit of the Bureau of Mines modern methods of rescue and recovery work are illustrated by trained men using Fluess, Draeger and Westphalia types of breathing apparatus. Two daily explosion demonstrations are given by the Bureau of Mines corps at the demonstration mine. One feature of this exhibit is the rescue of a supposed victim from a gas-proof smoke-room. There is also an extensive display of safety lamps from the earliest type

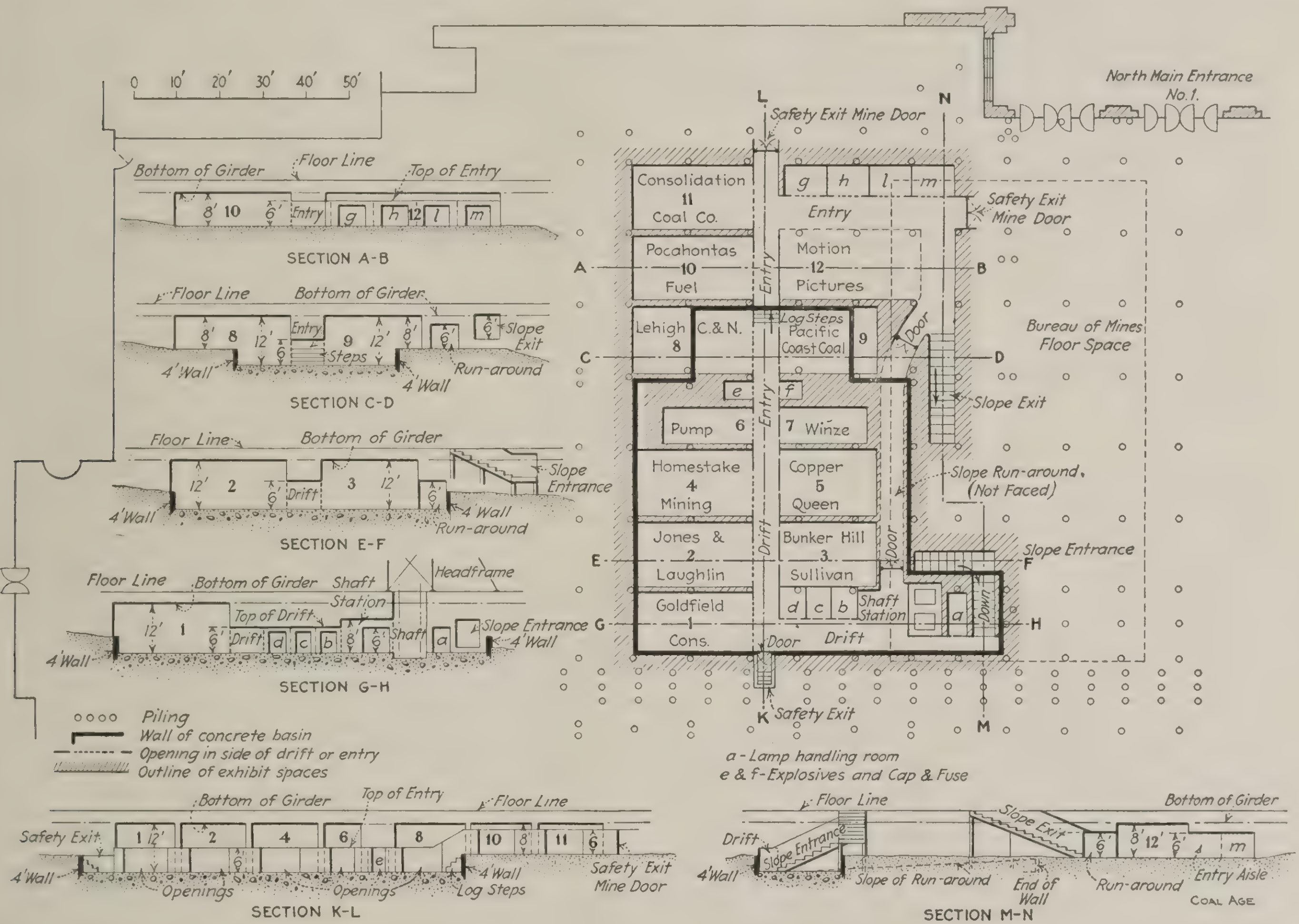
Part of Carnegie Steel Co.'s Exhibit

to the most modern permissible double-bonneted lamp. Another exhibit covers the matter of mine explosives and shows all the materials that are available in the manufacture of these explosives. Methods of testing explosives are illustrated by a carefully arranged photographic display.

The welfare exhibit of the bureau shows a model village and an ideal industrial arrangement of water-supply, hospital, recreation room, wash-house, etc. A model is shown of a wash- and change-house as an illustration of how such a building should be designed.

The explosibility of coal dust is illustrated by an apparatus which shows how finely divided coal dust in contact with a sufficient amount of oxygen becomes just as explosive when ignited as black powder. Another display shows a model of a rock-dust barrier designed by the engineers of the Bureau of Mines. Still another exhibit illustrates the loss that occurs in burning coal in various types of boiler furnaces.

In "the mine" is a motion-picture theater, in which methods of mining and handling coal are shown continuously throughout each day. Beyond this is an actual reproduction of full-sized entries, drifts, stopes and rooms selected from typical mines in various parts of the United States. Mining machinery and different appliances used in modern practice are shown installed ready for operation. Individual exhibits of large American mining companies may be located from the sketch.



PLAN AND SECTIONAL VIEWS OF "THE MINE" AT PANAMA-PACIFIC EXPOSITION

Arizona Has but Little Coal

Frank C. Schrader, of the United States Geological Survey, says in a report on the "Mineral Deposits of the Santa Rita and Patagonia Mountains, Arizona," that a deposit of lignite is reported to occur near the Whetstone mountains on the western edge of Cochise County in the southeastern corner of the state.

The thickness of the coal-bearing strata is about 40 ft., and the beds occur conformably in a formation of inclined sandstone and shale or slate which is apparently Mesozoic. The area thus enriched with lignite is said to have a known extent of nearly half a mile.

At one point R. R. Richardson opened the deposit by a 40-ft. shaft, but the coal, which was of low grade at the surface, was found not to be improved perceptibly at that depth. The shale on being rubbed or pounded with a hammer is said to give off a petroleum odor, but no oil seepage is reported. Plentiful remains of petrified trees, some about 100 ft. long, are found.

Nearby, Messrs. Fairlee and Jenson, of Benson, discovered and opened two beds, likewise lying conformably in sandstone and shale, which here incline at 22 deg. to the horizontal. The beds are about 8 ft. apart, and the coal is said to be of good grade. It was used with good results on the forge for sharpening miners' tools. But the thickest bed does not much exceed 4 in., so after developing the ground for a distance of about 1000 ft. the work was abandoned.

Comparison of Coal Consumption with that of Other Fuels

By A. A. Potter* and W. A. Buck†

SYNOPSIS—A valuable analysis of some coal statistics from the census reports, supplemented by data from other sources. A detailed comparison is made of the output of coal and other fuels in all sections of the country. Bituminous and anthracite coal made up 84 per cent. of the fuel consumed for manufacturing purposes in 1909.

Table 1 and Fig. 1, compiled from the U. S. Census Reports for 1913, show the amount and value of coal, petroleum oil and natural gas produced in the various sections of the United States.

The New England States have no fuel resources, while the Middle Atlantic States, which include New York, New Jersey and Pennsylvania, produced fuel valued at $434,317,220 in 1913, which is 40 per cent. of the total production of the United States.

The East North-Central division, which includes the states of Ohio, Indiana, Illinois, Michigan and Wisconsin, ranks second in the value of fuel produced. In 1913 this amounted to $193,454,756, or 17.8 per cent. of the total for the United States.

The South Atlantic States ranked third, producing 13.8 per cent. of the total fuel; the West South-Central fourth, with 10.5 per cent.; the Pacific fifth, with 5.25 per cent.; the East South-Central sixth; the Mountain States seventh; the West North-Central eighth, with only 3.6 per cent.; and the New England States last.

The states producing the greatest value of fuel in each of the various divisions are: Pennsylvania in the Middle Atlantic, Illinois in the East North-Central, Kansas in the West North-Central, West Virginia in the South Atlantic, Alabama in the East South-Central, Oklahoma in the West South-Central, Colorado in the Mountain States and California in the Pacific States. The Mountain and Pacific States have probably a greater percentage of undeveloped fuel resources than any of the other divisions in the United States.

TABLE I. FUEL PRODUCTION IN THE UNITED STATES, 1913

Source: Department of the Interior—Geological Survey

Geographical Divisions and States	Short Tons	Coal, Per Cent. of Total	Value, Dollars	Barrels	Petroleum, Per Cent. Total	Value, Dollars	Thousands of cu.ft.	Natural Gas, Per Cent. Total	Value, Dollars	Total Value of Fuel	Per Cent. of Total for U.S.
New England....	0	0	0	0	0	0	0	0	0	0	0
Maine..............	0	0	0	0	0	0	0	0	0	0	0
New Hampshire....	0	0	0	0	0	0	0	0	0	0	0
Vermont...........	0	0	0	0	0	0	0	0	0	0	0
Massachusetts......	0	0	0	0	0	0	0	0	0	0	0
Rhode Island.......	0	0	0	0	0	0	0	0	0	0	0
Connecticut........	0	0	0	0	0	0	0	0	0	0	0
Middle Atlantic..	265,306,139	46.5	388,220,933	8,865,493	3.56	21,974,809	127,375,526	21.90	24,121,478	434,317,220	40.00
New York.........	0	0	0	902,211	0.35	2,169,357	8,515,257	1.47	2,425,633	4,594,990	0.42
New Jersey........	0	0	0	0	0	0	0	0	0	0	0
Pennsylvania.......	265,306,139	46.50	388,220,933	7,963,282	3.21	19,805,452	118,860,269	20.43	21,695,845	429,722,230	39.58
East North Central	116,216,728	20.40	131,718,771	33,634,462	13.56	49,795,588	58,301,758	10.02	11,940,397	193,454,756	17.83
Ohio..............	36,200,527	6.35	39,948,058	8,781,468	3.54	17,538,452	50,311,940	8.65	10,416,699	67,903,209	6.25
Indiana...........	17,165,671	3.01	19,001,881	956,095	0.39	1,279,226	3,220,885	0.56	948,278	21,229,385	1.96
Illinois...........	61,618,744	10.82	70,313,605	23,893,899	9.63	30,971,910	4,767,128	0.81	574,015	101,859,530	9.40
Michigan.........	1,231,786	0.22	2,455,227	3,000	0.00	6,000	1,805	0.00	1,405	2,462,632	0.22
Wisconsin..........	0	0	0	0	0	0	0	0	0	0	0
West North Central	19,541,591	3.43	33,751,962	2,378,029	0.96	2,255,283	22,972,024	3.95	33,264,475	39,333,720	3.63
Minnesota.........	0	0	0	0	0	0	0	0	0	0	0
Iowa..............	7,525,936	1.33	13,496,710	0	0	0	120	0	120	13,496,830	1.26
Missouri...........	4,318,125	0.77	7,468,308	3,000	0.00	7,000	20,865	0.00	6,795	7,482,103	0.69
North Dakota......	495,320	0.07	750,652	0	0	0	33,246	0.01	15,583	766,235	0.07
South Dakota....	0	0	0	0	0	0	33,246		15,583	15,583	0.00
Nebraska.........	0	0	0	0	0	0	0	0	0	0	0
Kansas............	7,202,210	1.26	12,036,292	2,375,029	0.96	2,248,283	22,884,283	3.94	3,288,394	17,572,969	1.61
South Atlantic....	85,172,515	14.96	87,113,183	11,567,299	4.66	28,828,814	245,453,985	42.13	34,164,850	150,106,847	13.82
Delaware..........	0	0	0	0	0	0	0	0	0	0	0
Maryland..........	4,779,839	0.84	5,927,046	0	0	0	0	0	0	5,927,046	0.54
District of Columbia	0	0	0	0	0	0	0	0	0	0	0
Virginia...........	8,828,068	1.56	8,952,653	0	0	0	0	0	0	8,952,653	0.83
West Virginia......	71,508,982	12.52	71,872,165	11,567,299	4.66	28,828,814	245,453,985	42.13	34,164,850	134,865,829	12.42
North Carolina.....	0	0	0	0	0	0	0	0	0	0	0
South Carolina.....	0	0	0	0	0	0	0	0	0	0	0
Georgia............	255,626	0.04	361,319	0	0	0	0	0	0	361,319	0.03
Florida............	0	0	0	0	0	0	0	0	0		0
East South Central	44,198,906	7.76	51,484,187	524,568	0.21	675,748	15,150,239	2.62	1,570,420	53,730,355	4.95
Kentucky..........	19,616,600	3.44	20,516,749	524,568	0.21	675,748	1,821,526	0.33	509,846	21,702,343	2.00
Tennessee..........	6,903,784	1.21	7,883,714	0	0	0	2,400	0.00	600	7,884,314	0.73
Alabama...........	17,678,522	3.11	23,083,724	0	0	0	13,326,313	2.29	1,059,974	24,143,698	2.22
Mississippi.........	0	0	0	0	0	0	0	0	0	0	0
West South Central	8,829,021	1.55	16,755,369	91,687,690	36.60	86,513,472	100,872,527	17.35	10,659,993	113,928,834	10.50
Arkansas..........	2,234,107	0.39	3,923,701	0	0	0	368,791	0.06	89,807	4,013,508	0.37
Louisiana..........	0	0	0	12,498,828	5.02	12,255,931	13,326,313	2.29	1,059,974	13,315,905	1.23
Oklahoma..........	4,165,770	0.73	8,542,748	63,579,384	25.56	59,581,948	75,017,668	12.90	7,436,389	75,561,085	6.96
Texas.............	2,429,144	0.43	4,288,920	15,009,478	6.02	14,675,593	12,159,755	2.10	2,073,823	21,038,336	1.94
Mountain........	26,832,283	4.71	41,989,346	2,597,321	1.05	1,366,011	737,582	0.13	179,614	43,534,971	4.01
Montana...........	3,240,973	0.57	5,653,539	0	0	0	0	0	0	5,653,531	0.52
Idaho.............	1,000	0.00	2,600	0	0	0	0	0	0	2,600	0.00
Wyoming..........	7,393,066	1.30	11,510,045	2,406,522	0.97	1,187,232	368,791	0.06	89,807	12,787,084	1.18
Colorado...........	9,232,510	1.62	14,035,090	188,799	0.08	174,779	368,791	0.06	89,807	14,299,676	1.32
New Mexico........	3,708,806	0.65	5,401,260	2,000	0.00	4,000	0	0	0	5,405,260	0.50
Arizona............	0	0	0	0	0	0	0	0	0	0	0
Utah..............	3,254,828	0.57	5,384,127	0	0	0	0	0	0	5,384,127	0.49
Nevada............	1,100	0.00	2,685	0	0	0	0	0	0	2,685	0.00
Pacific...........	3,950,865	0.69	9,445,034	97,791,368	39.4	45,711,663	11,034,597	1.90	1,883,450	57,040,147	5.25
Washington........	3,877,891	0.68	9,243,137	0	0	0	0	0	0	9,243,137	0.85
Oregon............	46,063	0.01	116,724	0	0	0	0	0	0	116,724	0.01
California..........	13,911	0.00	45,173	97,788,525	39.4	45,709,400	11,034,597	1.90	1,883,450	47,638,023	4.39
Alaska...........	13,000	0.00	40,000	2,843	0.00	2,263	0	0	0	42,263	0.00
Grand total....	570,048,125	100.00	760,478,785	248,446,230	100.00	237,121,388	581,898,239	100.00	87,846,677	1.085,446,850	100.00

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*Dean of the division of engineering and professor of steam and gas engineering, Kansas State Agricultural College.

†Fellow in steam and gas engineering, Kansas State Agricultural College.

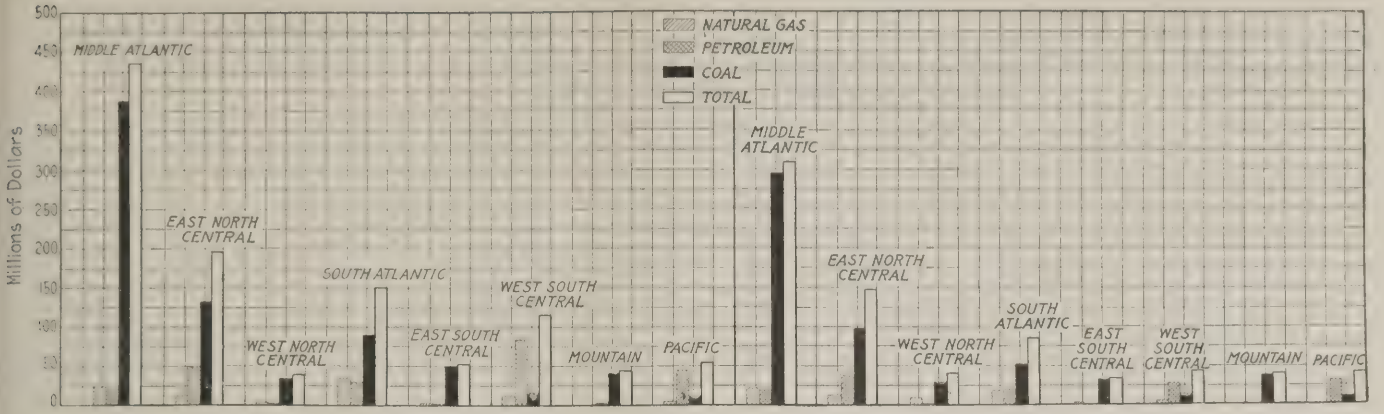

Fig. 1. (1913) Fig. 2. (1910)

Value of Fuel Produced in Various Divisions of the United States

The amount of coal, oil and gas produced in the various divisions in 1910 is shown in Fig. 2. Table 2 shows the relative values of the various fuels in the manufacturing industries. Bituminous coal constitutes over 87 per cent. of the total fuel used in manufacturing, when including the manufacture of coke. Anthracite coal ranks second as a fuel for manufacturing purposes; oil, including gasoline, ranks third; wood fourth, and gas fifth, the calorific value of the gas utilized constituting only 0.01 per cent. of the total value of fuel in manufacturing. This comparison is even more marked in Fig. 3.

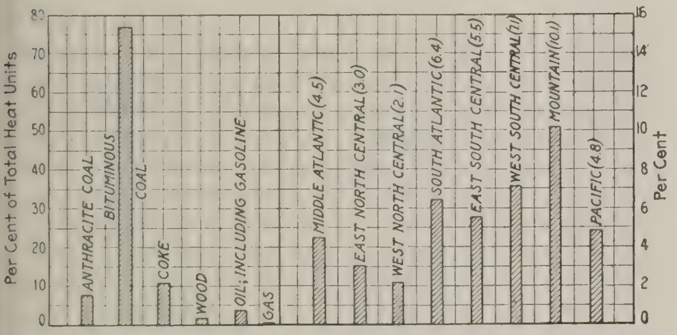

Fig. 3

Heat Value of Fuels Used in U. S.

Fig. 4

Ratio between Value of Fuel and Manufacturing

An analysis of different lines of manufacture revealed the fact that the cost of power varies from 1 to 3 per cent. of the total production cost in the majority of factories. Exceptions to this are probably cement and glass factories, where the cost of fuel is 10 to 30 per cent. of the total cost of manufacturing.

TABLE 2. FUEL USED FOR MANUFACTURING IN U.S.A., 1909

Source: Bureau of Census, Department of Commerce and Original Calculations

Kind of Fuel	Quantity	Equivalent Heat Value in Thousands, B.t.u.	Per Cent. of Total Heat
Anthracite coal........	14,339,220 long tons	439,000,000,000	7.74
Bituminous coal*......	161,792,218 short tons	4,368,000,000,000	76.93
Coke................	37,959,970 short tons	592,000,000,000	10.43
Wood................	5,481,311 cords	82,220,000,000	1.45
Oil, including gasoline.	34,331,632 bbl.	193,700,000,000	3.44
Gas................	451,302,493 cu.ft.	428,700,000	0.01
Total..............		5,677,348,700,000	100.00

* Includes 58,788,398 tons used in making coke.

Note: The calculations of the British thermal unit for the various fuels were made in accordance with the following:

Anthracite coal 13,700 B.t.u. per pound, or 30,650,000 B.t.u. per long ton.

Bituminous coal 13,500 B.t.u. per pound, or 27,000,000 B.t.u. per short ton.

Coke 7800 B.t.u. per pound, or 15,600,000 B.t.u. per short ton.

Wood average 2500 lb. per cord and 6,000 B.t.u. per pound, or 15,000,000 B.t.u. per cord.

Oil, including gasoline, 19,000 B.t.u. per pound, or 5,700,000 B.t.u. per barrel of 300 pounds.

Gas (natural) 950 B.t.u. per cu.ft.

TABLE 3. RELATION BETWEEN THE VALUE OF FUEL AND OF MANUFACTURING FOR U.S.A., 1909

Source: Bureau of Census and Geological Survey

Division	Value of Fuel	Value of Mfg. Products, Thousands of Dollars	Ratio of Fuel to Mfg. Products
New England...........	0	2,670,065	0.0
Middle Atlantic.........	318,267,468	7,144,761	0.045
East North-Central......	146,909,319	5,211,703	0.028
West North-Central.....	38,524,438	1,803,900	0.021
South Atlantic..........	88,864,143	1,381,187	0.064
East South-Central......	34,461,643	630,488	0.055
West South-Central......	41,346,943	625,443	0.066
Mountain..............	37,124,716	363,996	0.101
Pacific................	40,705,122	843,512	0.048
Grand total..........	746,203,792	20,675,055	0.0361

Table 3 and Fig. 4 were compiled from the 1910 Census to show the relation between the value of the fuel resources and of the manufactured products for the various divisions of the United States. The New England States have no fuel resources, while the Mountain States show the greatest ratio, which means that but little of the fuel produced in that division is utilized for manufacturing purposes.

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Anthracite Litigation—Confusion exists in some quarters regarding litigation pending against anthracite roads. For years this group has had the attention of the Attorney-General and the Commerce Commission, and there are now several cases of prime importance to the "hard-coalers."

Arguments were made Jan. 16 and 17 at Washington in general investigation by the Commerce Commission into rates and practices, the most inclusive investigation ever made of this much-probed subject. The carriers have been put on the defensive to justify existing interstate rates for carrying anthracite both east and west from Pennsylvania fields. The commission has under consideration the evidence and arguments, but opinion among interests which have followed the case is that decision may not come down until after the summer recess.

The other case of prime interest pending is the dissolution suit against the Reading system, including the Reading Ry. Coal Co., Jersey Central, Lehigh & Wilkes-Barre Coal Co., various smaller companies and various individuals. Final arguments were made last June before the Federal Court at Philadelphia. Decision may come any day.

Arguments were made before Judge Hough in the Lehigh Valley dissolution suit last November, and decision was rendered late in December dismissing the government complaint, the court digesting the evidence with refreshing promptness.

There are several reasons, however, why decision in the Reading case should be longer delayed. There are three judges considering the Reading, and only one heard the Lehigh evidence. The Lehigh, too, was much less complicated. This is the third time dissolution proceedings have been brought against the Reading, and naturally every case takes longer than the ones that went before.

The lower courts have decided against the government in proceedings against the Lehigh Valley and against the Lackawanna, but in each an appeal has been taken to the Supreme Court.—"Boston News Bureau."

The Wage Scale in the Coshocton District

SYNOPSIS—A rate of 55c. for run-of-mine machine-mined coal for wide work is secured by the Coshocton miners. The allowances for narrow rooms and car pushing are of much interest.

The following agreement was reached by the miners and operators of the Coshocton district of Ohio and was signed on Apr. 12, 1915, after a strike of over a year. The text is given almost word for word throughout, omitting, however, the preamble and all references to the Columbus agreement of Mar. 10, 1898, and the scale committee's report of July 3, 1914. The agreement will regulate wages till Mar. 31, 1916, that date closing a period of two years since the previous contract expired. It applies to No. 6 bed in Coshocton County, Ohio.

PICK-MINING SCALE

Mining, per ton	$0.716
Driving entry, taking top or bottom 5 ft. high from rail, per yard	2.34
Driving entry, under top, per yard	1.73
Break-throughs, between entries, for coal, per yard	1.73
Room break-throughs, single-entry system, for first break-through, per yard	1.73
Room break-throughs, single-entry system, after first break-through, per yard	1.00
Room break-throughs, double-entry system, per yard	1.00
Room turning, per yard of neck	.88
Rock shot in room necks, two yards	1.50
Four-yard wide places, per yard	1.05

CHAIN-MINING MACHINE SCALE

Cutting, wide work, per ton	$0.11
Cutting, narrow work, per ton	.13
Drilling, shooting and loading in rooms, per ton	.44
Drilling, shooting and loading in entries, per ton	.503
Room turning, cutter and loader, entry price	.503
Break-throughs, between rooms, loader, per ton	.471

Entry price is based on 12 ft.

THREE-RUN WIDE PLACES

Cutting with chain machines, three-run wide places	$0.16
Drilling, shooting and loading, three-run wide places	.538

INSIDE DAY-WAGE SCALE

Tracklayers, drivers, trip-riders, bottom cagers, water haulers, machine haulers, timbermen, wiremen and motormen, per day	$2.84
Tracklayers' helpers, per day	2.62
Trappers, per day	1.32
Pipemen, for compressed-air plants, per day	2.77
All other inside day labor, per day	2.62

OUTSIDE DAY-WAGE SCALE

Blacksmith, per day	$2.84
Blacksmith's helper, per day	2.18
Trimmers and carpenters, per day	2.49
Dirt dumpers, drum tenders and pushers-in, per day	2.22

RULES

Rule 1—Eight hours shall constitute a day's work and all mines may operate six days a week. An eight-hour day means eight hours' work in the mine at usual working places for all classes of inside day labor. This shall be exclusive of the time required in reaching such working places in the morning and departing from the same at night. Drivers shall take their mules to and from stables, and the time required in doing so shall not be regarded as any part of the day's labor, their work beginning when they reach the change at which they receive empty cars; but in no case shall the driver's time be docked when he is waiting for such cars at the point named.

Rule 2—Operators shall remove water from working places at the starting time or pay the miner a fair price for so doing, to be fixed by the miner and mine boss. The operators shall furnish facilities for handling the water when the miner is required to remove it. When water is bailed in barrels by the miner, 5c. per barrel shall be paid.

Rule 3—When bone coal and slate fall unavoidably in the working place it shall be removed promptly by the operator, or the miner shall be paid at the rate of inside day labor for so doing. This rule shall not apply in cases where it is determined that the bone coal or slate comes down through careless drilling, shooting or posting.

Rule 4—The price to be paid for clay veins, bottom rolls or horse-backs, shall be determined between loader or miner and mine boss. If they fail to agree the price shall be settled by the mine committee and mine boss.

Rule 5—Where a miner, loader, machineman or other employee, upon whose work other employees of the mine are dependent, absents himself from duty for two consecutive days without giving advance notice when possible to the mine boss, he forfeits his position. Sickness and unavoidable accidents are excepted.

Rule 6—Machine loaders shall not be charged for blacksmithing.

Rule 7—There shall be no free turns allowed in either rooms or entries. The turn must be made uniform at least once each week.

Rule 8—The check-off for the United Mine Workers' organization shall remain in force and be observed; the same to be deducted as a percentage of earnings. This is to include all dues and assessments for the organization.

Rule 9—The machinemen shall be required to cut coal level and close to the bottom and in no case shall the thickness of coal left exceed 4 in., except in case of pots or other extreme variations, and all machinemen leaving more bottom than the amount specified must lift the same, or it will be lifted at their expense. In cases where the mine boss or superintendent orders a greater thickness than 4 in. left, the company shall take care of it, and where the bottom left is sulphurous or unmarketable, the miners may call the attention of the mine boss to it and endeavor to arrive at an agreement for its removal or retention. In case of sprags being left by a machineman, he shall be notified by the loader, and if he refuses to remove them immediately, the loader shall do so and be allowed 50c. for so doing, said amount to be deducted from the machine runners. When any machine runner leaves 6 or more sprags in any one pay, he shall be removed from the machine and his services disposed of as deemed best by the superintendent of the mine.

Rule 10—The company shall provide shields for covering the cutter head of machines. The machineman shall be required to remove the bits from the chain cutter head, or place the shield over the cutter head to make the machine safe for removal. Any machineman failing to carry out this rule may be removed from the machine without question.

Rule 11—No strike or suspension of work except it be because of the failure of the employer to pay on the regular pay day shall take place at any time in this sub-district until the district miners' official and the operator have met and failed to adjust the dispute. But it is understood that the meeting of the official and the operator shall be held within one week from the date when the said meeting was requested by either party thereto.

Rule 12—All machine loaders shall be accorded two rooms for each two men, and the operators pledge themselves to provide two rooms for each two men at the earliest possible moment, but in the event of territory becoming scarce through a squeeze or by reason of striking a horse-back, or any other unavoidable obstacle, this shall not be construed so as to diminish the output of the mine.

Rule 13—Where a miner is required to make the height above the top of the rail 5 ft., $0.8776 per yard shall be paid for shooting and loading rock, 18 in. or less in thickness in three-run wide places and $0.9473 per yard shall be paid for this work in four-run wide places. Excess over 18 in. shall be paid for at the rate of 5c. per inch per yard.

Rule 14—All work 18 ft. wide and under 24 ft. shall be paid for at a rate of 2c. per yard over room price for loading; machine runners shall be paid narrow-work price, but when the company orders a place driven 24 ft. wide the pay of the cutter and loader shall be adjusted accordingly.

Rule 15—The company has the right to put two men in entries where isolated, to cut and load coal and move their own machines.

Rule 16—Daymen are to do whatever work about the mine the management may require, so long as they are paid scale price for the work.

Rule 17—A turn rail shall be laid in all break-throughs and rooms after the first cut of the machine is loaded out, except in room break-throughs; when desired by miner a turn rail shall be laid as soon as a cut is made, unless a second cut is unnecessary.

Rule 18—Entry loaders shall have two places to load from.

Rule 19—In case of local or general suspension of mining either at the expiration of this contract or otherwise, the engineers, firemen, pumpers and other men necessary to keep the mines in shape, shall not suspend work, but shall, when the mine is suspended, fully protect and keep in repair all the company's property under their care, and operate fans and pumps and lower and hoist such men or supplies as may be required to keep up steam at the company's coal plant; but it is understood and agreed that the operators will not ask them to hoist any coal produced by nonunion labor for sale on the market. The rates to be paid for such work are to be those in effect at the time of suspension, subject to any subsequent settlement.

Rule 20—When necessary to hold meetings at the mine and the miners so desire, one to four hours of one afternoon each month shall be allowed for the purpose of holding such meetings. Such afternoon shall be agreed upon between the management and the miners at the different mines. No other meetings than as herein provided shall be held at any mine during working hours.

Rule 21—Any new rules, local or general, other than contained in this agreement, governing the scale or conditions of employment in Sub-District No. 6 of Ohio shall be mutually agreed to by the operators and members interested, and said rules, before being enforced, shall receive the endorsement of the officials of the operators and those of District No. 6 of the United Mine Workers of America.

Rule 22—Where coal is lost owing to a fall or otherwise, through no fault of the miner, cutter or loader the company shall pay for work actually performed but in no case shall the said amount exceed the average wage received per day for the pay.

Rule 23—The regular pay day shall be on or before the tenth and twenty-fifth of each month. All pay shall be in legal currency. Employees shall receive a statement of their account on or before payday, the statements being retained by the employees.

Rule 24—Operators may require machine runners to cut on idle days in case of breakdowns or unavoidable accidents.

Rule 25—The mines of this district shall begin work at 7:00 a.m., working until 11:00 a.m., and beginning at 11:30 a.m. shall work until 3:30 p.m.

Rule 26—Where the company furnishes iron track instead of wood, the miners or loaders agree to lay it under the same conditions as the wooden track is now laid. Iron rails shall be furnished in lengths not to exceed 12 ft. and not more than 16 lb. to the yard. All rails, spikes and ties shall be delivered to the working-places in same manner as at the present time.

Rule 27—The miners agree to load out clean coal. In case bone coal, slate, sulphur or other impurities are sent out by a miner, it shall be the duty of the trimmers to call the attention of the weighman to that fact, who shall thereupon mark the record of the mine car on the daily weight sheet so that the miner may have due notice. For the second offense he shall be fined 50c. and for the third offense in six actual days' work, he shall be fined $2.50 or at the option of the mine boss may be suspended for three days. Should a miner or loader either willfully, carelessly, negligently or maliciously persist in loading impurities, he may be discharged. Should there be any question as to discrimination in the enforcement of this rule, it shall be taken up for settlement by the district officers of the United Mine Workers of America and the operator. The fines shall be paid by the company into the burial fund, and no fines shall be remitted.

Rule 28—The pushing price shall be 4c. per ton, to be deducted from the mining or loading price in either pick or machine mines where the company takes the load from the face of the working-place. Otherwise the miner or loader is to receive the empty at the room switch. Where necessary, on account of physical conditions, the company will assist the miner in placing the empty car at the face of the working-place.

Rule 29—Where in either pick or machine mines the company requires the entry or break-throughs between entries driven double shift, $0.3332 per yard extra shall be paid.

Rule 30—It is understood and agreed that under the mine-run system the coal shall be shot, gotten down and loaded in a workmanlike manner, that only clean, merchantable coal will be loaded, and that no excess of fine coal will be produced except that ordinarily made in the No. 6 Coshocton seam under a screened-coal system, this provision being in compliance with Section 978 of the General Code of Ohio. Should a loader willfully, carelessly or otherwise fail to load a clean, merchantable coal, and to prepare it for loading in the manner above set forth, he shall be notified and warned by the mine superintendent or foreman. If he then continues to load coal excessively fine as defined above, his case shall be investigated by the mine committee and the mine superintendent, and if found guilty he shall be suspended for three days, and for a further offense within 30 days his turn shall be stopped and the offense immediately investigated by the mine superintendent and mine committee, and in case they fail to agree upon the disposition of the same, his case shall be taken up by the general superintendent and district or subdistrict officials. If found guilty, he shall be suspended for two weeks, and in case he still persists in so doing his turn shall be stopped and he shall remain idle until a final disposition of his case is made by the superintendent and the officers of the United Mine Workers of America.

Retail Advertising in West

The Central Coal & Coke Co. has been indulging in quite an elaborate advertising campaign in Kansas City. Uptodate concrete and metal billboards, all electric lighted, have been installed by the company everywhere. Each board has a painting showing some feature of the company's service. The accompanying photograph is a board which shows the method of loading trucks by crane.

Concrete Electric-Lighted Billboard

The Central Coal & Coke Co. has received many comments on the neat and attractive appearance of the signs. Most of the boards are rented for only a few months in the year, but a few continue in service during the summer, the emphasis of continued appearance before the public being valuable.

Coal Situation in Brazil and Chile

Since the beginning of the European war, says Consul General A. L. M. Gottschalk, of Rio de Janeiro, in *Commerce Reports*, the scarcity of coal in Brazil has been so great and prices have risen to such an extent that there has been talk of converting a number of local coal-burning plants to use other fuel. The Central R.R. (government owned) is trying oil and has recently put into use 15 oil-burning locomotives; the Brazil R.R. (southern), it is said, now burns wood almost exclusively.

The coal used here has been principally Cardiff or Newcastle. It is said on reliable authority that a minimum of 107,780 metric tons (1 metric ton = 2204.6 lb.) of coal per month is consumed here, the chief consumers being the various foreign steamers, the local steamship lines, the railroads and the Brazilian navy. Present prices of coal are about $14.60 laid down in Rio de Janeiro, of which $8.76 to $9.73 is freight and marine insurance.

The following table shows the quantity, in metric tons of 2204.6 lb., and the value of the imports of coal into

Brazil from all countries and from the United States, and the coal imports at Rio de Janeiro during 1913 and 1914:

Years	Imports into Brazil				Imports into Rio de Janeiro	
	Total		From United States			
	Tons	Value	Tons	Value	Tons	Value
1913	2,262,347	$19,505,066	274,798	$2,162,098	1,293,346	$10,617,588
1914	1,540,126	10,347,085	260,594	1,815,806	900,332	5,911,903

It would seem advisable to keep a large quantity of American coal—say, 100,000 metric tons per month—on hand in Rio. Several American exporters might unite in sending this amount, or arrangements might be made to have several large dealers in Rio combine on a standing order for a specified amount of American coal per month for a term of months, which they would handle as their own speculation. It would be necessary for American coal dealers to make every possible concession in the matter of terms. Ample accommodation in the way of yards, coaling appliances, etc., could be had here by arrangement with some large local firm. (A list of coal importers of Rio de Janeiro may be obtained from the Bureau of Foreign and Domestic Commerce or its branch offices.) Credit ratings of Brazilian firms will be supplied by the National City Bank, of New York.

There is some preference shown here for English coal, not because of any particular superiority as to its steaming qualities, but because it is always sent here in regular-sized lumps (screened), which fit the grates in use in the country. Some people here make the objection to American coal that it is of greater friability than the British and breaks up during transportation; but this idea is probably due largely to the American system of shipping what is called run of mine, or unscreened coal, of non-uniform sizes.

Proposed Demands of Anthracite Miners

United Mine Workers' leaders have taken up the question of demands they propose to make on the anthracite operators at the expiration of the present contract next April, and have, according to report, agreed on the leading points.

The present agreement, made for a four-year term, expires on Apr. 1, 1916, which is Presidential year, and it has been said the miners' union would try to repeat the game it played so successfully on Mark Hanna in the McKinley campaign. At that time John Mitchell scared Mr. Hanna and the politicians into a hurried settlement which made important concessions to the miners. It is not likely an ulterior program of this kind will have any influence on the negotiations next year. Things are different in many respects.

The 1903-1906 and to an extent the 1909 agreements between the anthracite miners and operators were carried out fairly well by the men, but the agreement of 1912 has been violated by the miners almost continually. The last agreement was modified in some particulars at the instance of the miners to the detriment of themselves, operators and the anthracite industry.

Aside from this the men have not lived up to their agreement, and it has been plainly demonstrated that the leaders could not control them. Button strikes and all sorts of irregularities have occurred which have cost the men largely and the producing anthracite companies hundreds of thousands of dollars.

The miners' new demands include the old check-off proposition, before every conference since 1903, and always refused by the operators. The proposition, baldly, is that the operators shall collect the union dues from the miners out of their wages and pay it over to the leaders. The proposition is said to be illegal in this state, but besides this, the operators, who have always refused to recognize the union in any of the agreements of the last 12 years, do not propose to strengthen it by collecting dues out of miners' and laborers' wages. The other demands are an eight-hour day, an increase in wages and total abolition of the conciliation board.

Complete abolition of the board of conciliation would be a calamity. The effectiveness of the board was fully proved in 1903-1912, during which period it almost demonstrated the futility of the union as an agency between the operator and the miner. In 1912 the miners insisted that the board's power and prerogatives should be shorn and its efficiency has been less in the last three years than in the former 12 years since the mine commission award.

The operators will probably not take up the question of the new agreement until the early months of 1916. As a condition precedent to any negotiations they should insist that the body they deal with next year has the power to bind the miners to the new agreement, as well as the responsibilities which attach to parties who assume important contractual relations.—"Philadelphia News Bureau."

Recent Legal Decisions

West Virginia Wage-Payment Law Valid—The West Virginia statute which requires coal operators and other employers to redeem wage checks in cash is a valid regulation. (West Virginia Supreme Court of Appeals, Atkins vs. Gray Eagle Coal Co., 84 Southeastern Reporter 906.)

Places of Refuge in Indiana Coal-Mine Entries—In a suit against an Indiana coal operator for injury to a miner, based on breach of the operator's statutory duty to provide places of refuge in the side-walls of entries where only a single hauling track is maintained and there is not at least 3 ft. clear space between the sides of cars and the wall, it is not incumbent upon plaintiff to show that the operator had notice that the clearance space was less than 3 ft. or that it was practicable to provide places of refuge. It is a matter of affirmative defense to show the impracticability of making such provision. (Indiana Appellate Court, Vandalia Coal Co. vs. Coakley, 108 Northeastern Reporter 382).

Contributory Negligence of Injured Miner—The fact that there was danger in a miner remaining at work, on account of lack of props, does not necessarily bar his right to recover for injury received through falling of coal, unless the danger was so imminent that an ordinarily prudent miner would have refused to continue work in the same circumstances. Nor does an oral statement made by him after the accident, to the effect that he had been foolish in attempting to cut through the vein of the coal in its condition, necessarily preclude recovery, although the statement might be considered in determining whether he acted as a prudent man would have acted. (Kansas City Court of Appeals, Runyan vs. Marceline Coal & Mining Co., 172 Southwestern Reporter 1165.)

Loyalty

By Michael Bernard

Its value, at the very best,
In some small measure may be guessed,
But never certainly expressed
Behind the dollar sign.
Still, while it seems to mean so much,
It's not a thing that one can touch,
Like timbers, engines, rails and such
Equipment for the mine.

Although so subtle and unseen,
It marks the difference between
The living man and the machine,
The worker and the cheat;
And oftentimes this simple thing
May cause the balance beam to swing
From failure to success and wring
A triumph from defeat.

It's vain to strive to dam the tide,
And doubly vain to try to hide
This blend of honesty and pride
When it has shown its face;
For observation clearly shows
That everywhere its spirit goes
The workers strike with harder blows
And set a swifter pace.

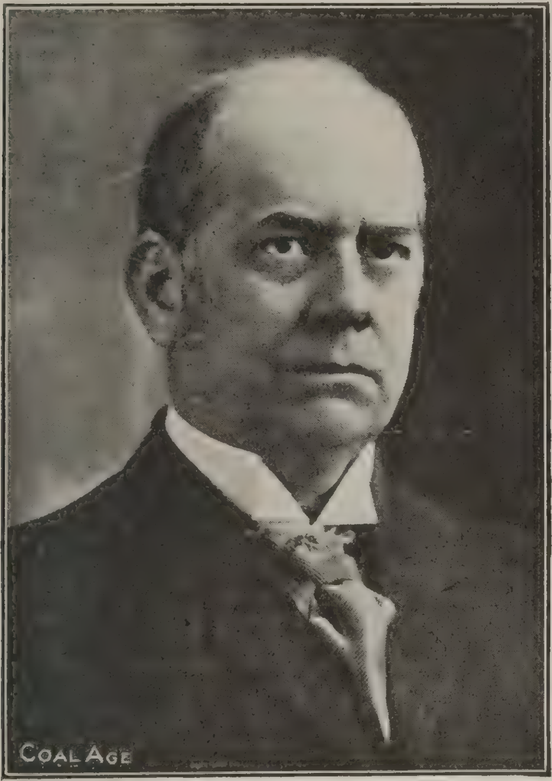
Although with such importance fraught
And everywhere so widely sought,
It's something that can not be bought
By gold or hope of gain;
Instead, it wields its power where
Employers' dealings all are square,
Where every rule is just and fair
And every act is plain.

Who's Who in Coal Mining

Edward W. Parker

It is doubtful if any man in the United States engaged directly or indirectly in coal mining has a wider acquaintance in the fuel industries than Edward W. Parker, for many years chief statistician of the U. S. Geological Survey. For this reason it is a matter of interest to his wide circle of friends that he has resigned as chief of the Division of Mineral Resources to accept a position in the employ of the anthracite coal companies, where he will establish a bureau of statistics to carry on a line of work similar to that which he has done for the U. S. Geological Survey.

At this time when Mr. Parker is leaving the government's service to turn his attention to important work on behalf of the anthracite industry, a brief sketch of his earlier activities is of timely interest. He will be 55 years old on June 16, having been born at Port Deposit, Md., in 1860. His early education was obtained in the public and private schools of his native town. Later he attended the City College of Baltimore.



DR. E. W. PARKER, STATISTICIAN
U. S. GEOLOGICAL SURVEY

His first business experience was obtained as accountant in Baltimore. From 1885 to 1889 he was business manager of the *Statesman*, a paper published in Austin, Tex. It was during this time that Mr. Parker secured his first experience in editorial work. In November, 1889, he was appointed to the Eleventh Census, and in 1891 became statistician of the U. S. Geological Survey. In 1907 he was advanced to the important office of chief of the Division of Mineral Resources, which post he has held up to the present time.

Mr. Parker is descended from old English stock, his ancestors on both sides having settled in America in the early colonial days. His mother was Henrietta Hyde Donnell, a descendant of William Hyde, of England, who came to America in 1633, settling in Hartford, Conn. Mr. Parker's father was the grandson of Edward Parker, a colonel of militia in the Revolutionary War.

Mr. Parker is a member of the Cosmos and Chevy Chase Clubs of Washington and the Engineers' Club of New York City. He is also a member of the American Institute of Mining Engineers, Mining and Metallurgical Society of America, Washington Geological Society, National Society of the Fine Arts, Washington Society of Engineers, Sons of the American Revolution and is Treasurer of the Washington Academy of Science.

Along literary lines Mr. Parker's efforts have been quite extensive; his most important work includes contributions to the Geological Survey reports, "Mineral Resources of the United States" and to the Eleventh and Twelfth Censuses. He has in preparation a history of the mining industry of the United States, a volume which is being prepared for the department of economics and sociology of the Carnegie Institute.

In his new field of labor Mr. Parker's attention will be devoted to the organization and operation of an information and publicity bureau for the hard-coal companies. The good wishes of his host of friends throughout the American mining field go with him in his new work, and we are all predicting that the American people as a whole will know more about the anthracite industry in the future than they ever did in the past.

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The Establishment of Standards in Coal Mines

By F. L. Parker*

In order to secure a basis for the establishment of standards in coal mines, an accurate, definite and clear report of work done by miners, repairmen, drivers, etc., for 10 consecutive shifts was obtained. Good, reliable and intelligent men were chosen for these tests, and where this was impossible the report was made by an engineer thoroughly acquainted with the work. From the time the men went underground until they came to the surface at the completion of their shift, all time spent was accounted for, whether it was drilling a hole, loading a car, standing timber, waiting on the driver or deliberately wasted. For every task reported on, a definite statement of conditions was made, otherwise the record would have been worthless.

In this way standards for every task performed by the underground workers were established, and these standards have been found indispensable in determining an employee's value and his consequent compensation.

Suppose for instance a certain gangway is not progressing as rapidly in the pittboss' estimation as he thinks it should. By referring to the chart of standards he is able to tell at once whether the fault lies with the miner or is due to abnormal conditions. In either case the trouble should be eliminated, and the result would be entirely fair to both miner and boss.

By employing standards the superintendent will do much toward harmonizing the laboring element and increasing the general efficiency of the employees.

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*Glen Carbon, Penn.

The Labor Situation

SYNOPSIS—The protocol has now been drawn for the ending of the strife in eastern Ohio, and the miners have already ratified it. This will end the last of the labor controversies, but after 11 months the strife will begin again and involve both the anthracite and bituminous regions. A strike has been proposed to save Lawson, the Colorado agitator, from the penitentiary.

After several weeks of parleying and discussions of all phases of the situation, the joint committee of operators and miners in the eastern Ohio district agreed on a wage scale at Cleveland late on Saturday, May 8. All the disputed points were settled, and a committee was left in charge to reduce the scale to writing for presentation to the miners at the district convenion to be called at Wheeling, W. Va., on May 11. This committee has ratified the scale as presented to them, and the representatives of miners will now meet the operators at Cleveland, Ohio, so that the agreement can be signed.

This ends the strike, which has lasted for more than 13 months. During that time a number of conferences were held and joint committees on the scale were named, but they never approached an understanding, always adjourning with the dispute unsettled. Governor Willis is given much credit for the successful ending of the strike, for it was through his efforts that the first meeting of the present series—that held at Canton—was called. He made a speech urging on both sides the necessity of arriving at an understanding, and thereafter the scale was discussed by both parties in a different spirit than that which had animated them at any of the previous meetings.

Miners Get Major Demand, but Surrender Several Hampering Provisions

The scale provides for a rate of 47c. per ton for cutting and loading coal This is the same as that paid in the Hocking Valley and other Ohio districts and is the rate which the miners have been demanding. Eastern Ohio operators have been refusing that scale because of their inability to compete with Pittsburgh corporations that are paying 44.61c. But reductions made on "dead work" granted by the miners almost counterbalance that difference, and the operators believe that they will now be able to compete with the Pittsburgh district.

Following are some other details of the scale: The cutting rate will be 8c. per ton and the loading 39c. Reductions have been made on all kinds of "dead work." The day-work wage scale remains the same as it was in the previous agreement. Machine-men agree to reset three posts without charge and are awarded 5c. apiece for all additional posts reset.

Rooms Are to Be Narrow so that Pillars Can Be Drawn.

Rooms are reduced in width from 24 to 18 ft. The operators desired a 16-ft. room, the best results being obtained with one only 12 ft. wide; but the miners succeeded in demanding that the size be 18 ft. The operators are hopeful that they can now recover all the coal, abandoning their practice of leaving the pillars to be crushed.

The miners urged that narrow rooms would increase the percentage of slack and defeat another aim of the operators, which is to make a maximum of lump coal. This argument overlooks the fact that the operators intend to leave large pillars which when drawn will give a large amount of coal of the most merchantable size. This pillar coal could not be obtained when rooms were driven as wide as has been customary.

Entry cutting is compensated by an additional payment of 5c. per yd. Double-shift work has been reduced from 31 to 25c. per yd. Entry yardage is now 30c. under the new scale. Entries are to be 15 ft. in width, but when driven wider less yardage is to be paid. This is an important concession from the old rule under which yardage was paid in all work less than 24 ft. wide. Engineers can belong to the union or refuse to be affiliated with it at their pleasure.

The scale is to extend to Mar. 31, 1916. Operators made an effort to have it extended to Mar. 31, 1918, but were unsuccessful. Provisions were included in the scale which practically insure the mining of clean coal and which will also tend to make as large a proportion of lump as possible.

Cost to Miners' Union Was About $1,400,000

Secretary-Treasurer Green of the Mine Workers said: "This agreement brings to an end a strike that in many respects is most remarkable. For almost 14 months more than 12,000 miners have been engaged in a most intense industrial struggle. Altogether, counting the miners and their families, more than 60,000 men, women and children have been directly involved. During all that time not a single violation of law has taken place nor has one dollar's worth of property been destroyed. As secretary-treasurer of the International Union I have sent $1,004,500 in weekly installments for the purpose of feeding, clothing and caring for these thousands of striking miners and their families. In addition the district organization has supplied approximately $400,000. From outside sources another $100,000 has been supplied, which makes in all $1,504,500."

One of the important points in the agreement is a penalty for unwarranted strikes or unjust lockouts. Heretofore operators have had no redress when the miners struck, even if the strike was unwarranted. This has been changed in the new scale.

Gallagher Bill Passed by House Goes to the Governor

Much to the surprise of everyone, the Gallagher bill was finally passed by the Ohio House of Representatives by 64 to 51, the Cincinnati delegation shifting its vote and making the result possible. Governor Frank B. Willis was against its passage, and it was thought on May 6, when the vote had resulted in its favor, that its approval by the House would make impossible a settlement of the strike. But it didn't prevent the protocol being completed.

Industrial War Declared Every Two Years

It is important to point out that this settlement marks the end of the labor troubles at present. Peace is assured for 11 months. After that time we start another series of strikes, both the anthracite and bituminous regions being involved. Our present rule is a war every two years. The industrial pacifists have a task here worthy of all their skill.

Not a Breach of Law to Discharge a Man for Unionism

The Ohio Supreme Court decided on May 4 that the law which prohibits the discharge of an employee for belonging to a labor union is unconstitutional and therefore void. It was questioned in court whether the law conflicted with the United States Constitution, and the Supreme Court in a similar case decided that it did.

The majority opinion was held by Chief Justice Nichols and Judges Jones, Newman and Mathias. Judges Wanamaker and Donahue dissented from this decision. The majority said that the Ohio court's hands were tied, as the ruling Federal Supreme Court made any lower court's action of no importance.

Officials Threaten a Strike to Cause Release of Lawson

Last week it was stated in this department that John Lawson, executive board member of the United Mine Workers of America for district No. 15, had been convicted of the murder of John Nimmo and sentenced to life-imprisonment, that official having been in charge of the miners during the fighting when Nimmo was killed. There is a threat to start a strike to secure his liberation.

Seeing that it is well known that Lawson was trying, and nearly succeeded, in making the position of the men who are now working in Colorado nonunion mines unsafe and unendurable, it is hardly likely they will quit work to save him from his own actions. Those who are in the unions and in other camps might strike, but the action will only assist those whom the union has tried to injure. So the strike is likely to die a-borning.

President Declines to Give Up Governor Ammons' Letter

Joseph P. Tumulty, the President's secretary, has refused to furnish the United States Commission on Industrial Relations the letter from Governor Ammons to the President relative to the Colorado miners' strike. This was requested by Basil M. Manley, a field agent of the commission.

It is clearly the duty of the President to surrender this letter, which is a public document on internal affairs. Demand for it may be made just as rightly as for the private letters of John D. Rockefeller, Jr., to the officials of the Colorado Fuel & Iron Co. The President takes a remarkable and wholly unjustified stand. At the same time it must be confessed that it is refreshing to see him rebuke by his action the unwarranted use that Frank P. Walsh has made of documents put in his hands. Mr. Wilson has shown again that while he is an autocrat, somewhat disposed to overestimate his rights and duties, he is nevertheless thoroughly conscientious in his attitude to public questions.

Editorials

Steel Activity and the Coke Trade

The revival in iron-trade activity has reached such a point that some interesting developments in the coke trade may soon occur. So many uncertain factors enter that it is not known whether enough coke could be made, upon occasion, to supply all the blast furnaces. It is a long time since the iron trade and its related branches had an opportunity to operate at capacity. The condition was approximated in the winter of 1909-10 and again three years later, but even at that only for short periods. The last time that the industry operated beyond question at its full physical capacity was in 1906 and the first nine or ten months of 1907. Iron and steel prices were then high, but the prices paid for Connellsville coke, $2.50 to $3, were by no means proportionate.

In 1906 and 1907 the production of byproduct coke averaged 5,000,000 tons a year. The present capacity is fully 10,000,000 tons greater. Meanwhile the blast-furnace capacity of the country has increased about 8,000,000 tons, requiring approximately 8,000,000 tons more coke a year to operate at capacity. That might suggest 2,000,000 tons of coke to spare, but the beehive capacity has not been kept up. The U. S. Geological Survey recently reported a few more beehive ovens in serviceable condition in 1913 than in 1907, but the maximum number fell in an intermediate year, 1910, since when there has been a constant decrease. From time to time in the Connellsville region the coal is worked out, to coke which certain ovens were built, but the ovens remain available only in case such high prices can be obtained for coke as to warrant the shipping of coal from other workings to the ovens.

There is some reason to suspect that the building of byproduct coking plants has lagged behind the erection of blast furnaces. There are scarcely any blast furnaces being built, but many retort ovens are being erected. The Youngstown Sheet & Tube Co. let a contract for 204 retort ovens only a week or two ago, though its blast furnaces have been built many years.

If the coking capacity has not increased largely at the close of the next two years, when all the byproduct-oven erection now on the boards is completed, and if the blast furnaces attempt to operate full, there will be a decided shortage of coke. The pig-iron production is now at the rate of 26,300,000 tons a year, the estimated commercial capacity being about 36,000,000 tons, while the nominal rated capacity, including unfit stacks, is well above 40,000,000 tons.

The Connellsville and lower Connellsville coke regions have increased their shipments from about 200,000 tons a week at the beginning of the year to approximately 300,000 tons a week of late, and the 50 per cent. increase has been attended by no stiffening whatever in the currently quoted prices. There is simply less coke left in the market and the price is unchanged. Perhaps if the region were called upon to ship 50,000 or 75,000 tons a week in addition to the 100,000-ton increase already experienced prices would begin to jump. Such a prediction is made in some quarters. The labor supply, it is said, is quite insufficient to operate the existing ovens at capacity.

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Our Coal Exports

The far-reaching influences of the war, together with the persistent efforts of some of our large coal companies, are at last having their inevitable effect upon our export coal trade.

At the beginning of the war, it seemed as if the inactivity of business was to be stimulated by the demands from foreign countries; inquiries for large amounts of coal poured in, while ten or twelve of our selling companies sent men abroad and to South America to investigate the situation and arrange for subsequent sales.

As an immediate result, our coal exports increased quite rapidly for the first three months of the war, only to meet eventually with several large-sized stumbling blocks in the way of credits, lack of banking facilities, resumption of British coal exports, an unprecedented rise in ocean freights and a decreased consumption in foreign countries, owing partly to the effects of the war and partly to enforced economies in consumption.

Now, however, it seems as if we had actually begun a steady increase in our coal exports and that our coals were about to take their rightful place in the world's markets.

Our coal-selling agencies have at last shown some signs of understanding the methods of foreign purchase and usage, banking facilities have been furnished, our coals have been tested and proved, while the stocks of coal in foreign countries have diminished and industries have been stimulated to some extent. Ocean freights are somewhat easier, the entrance of coasting schooners and steam colliers into oversea trade has added to the available tonnage, while the increase in price of British steam and gas coals, from 75 to 100 per cent., has been an additional factor.

The opening of an office in New York by the Italian state railways and the actual purchase of a large block of tonnage by the Italian government for marine and shore use have given an added stimulus to our export business.

At least one large contract is practically made with French buyers, while there has been a steady and increasing flow of coal to the east coast of South America.

Gas-coal users are also looking to the United States for their fuel; considerable coal of this description has already gone to the east coast of South America, and now the Chilean gas companies are making inquiries. At least one trial shipment of Pennsylvania coal has been arranged for to compete with Australian coal—a difficult matter, as the latter is an extremely satisfactory fuel for this use.

The following figures (Canada excluded) will show the fluctuations in our coal exports since the beginning of the war:

EXPORTS OF AMERICAN COAL

1914	
July	334,128
August	442,080
September	654,590
October	372,336
November	329,890
December	267,769
1915	
January	268,935
February	282,294
March (Baltimore, Philadelphia, Hampton Roads)	405,437

For April, the Philadelphia figures are not yet available; the Baltimore exports were 193,293 tons, while at Hampton Roads the exports for 28 days were 365,534 tons, or a total of 558,827 tons.

It cannot be too often repeated that we must own or control ocean transportation facilities if we are to increase our coal exports on a large scale. The markets are there; we have the coal; we must also have the means of getting the coal to the markets at a sufficiently low cost.

A step in the right direction has already been made by one of our large selling agencies in forming a permanent combination with certain large British coal and steamship owning interests, while two or three other of our companies are having colliers built for the foreign trade. But we must do more—we must show our confidence in foreign countries and their enterprises by money investments that will give us needed influence and prove that we are in the export business permanently.

Coastwise Contracts

The placing of a large power-house contract in November at a price understood to net $2.70 f.o.b. for an 18-month period foreshadowed the dullness and the low range of prices that have prevailed this spring in the coastwise coal trade. The lack of any consistent policy among the operators during 1914, particularly in the Pocahontas and New River fields, clearly indicated another off-year unless something radical would take place.

A sharp advance in coastwise freights the latter part of January did give a snap to the market, but when it was realized that once the weather cleared there would be enough bottoms for all the business offering, the flurry ended. Rates remained on a $1 basis, Hampton Roads to Boston, for several weeks, and during that time it was practically impossible to secure transportation at anything like a competitive rate for the season.

As a result the shippers who had little or no transportation under control could do nothing but bear the market and advise their customers to withhold purchases for the contract year until conditions settled down. On the other hand, the shippers who did control transportation urged buying, and in order to encourage it they discounted current freights quite liberally, but still made their season delivered prices 10@15c. up from the 1914 level.

As a consequence, the contract season in New England this year falls into two parts—the January-February period, when contracts generally were on a higher basis than a year ago, and the period since, when freight sagged to the normal basis of 75@80c.—and contracts have been either on the same basis as last year or somewhat less.

The award of the Panama R.R. contracts on a $2.70 basis really blazed the way, but it was not until February when the lowest bid on the Portsmouth, N. H., navy yard contract (No. 89) was $3.65, and later still when the Charlestown, Mass., navy yard supply (No. 79) was placed at $3.49 alongside, that it became apparent this would be another dull year with prices weak and fluctuating.

Any analysis of contracts placed since February, especially on the really comprehensive orders, shows a base price from 5c.@10c. less than last year. In April, 1914, although trade was dull, Hampton Roads standard coals were rather firmly held at not less than $2.80 f.o.b. There was a pessimistic undertone, yet until June prices were reasonably well maintained. There was evident on the part of operators a disposition to get their price or keep coal in the ground. This spring, however, there is greater effort to sell and correspondingly more diffidence on the part of buyers. Business conditions show very little improvement, and purchasing agents are inclined to scoff at any attempt to renew last year's prices.

The Boston Elevated Ry. (No. 528) is understood to have bought late in March at least 5c. less than last year, and so in the case of the Central New England Ry. The former buys f.o.b. loading port and the latter f.o.b. the mine, and for that reason they are perhaps not so significant, but the American Printing Co., Fall River, notwithstanding a higher freight market, is understood to have bought delivered on the same basis as in 1914. Instances could be multiplied where this has been the case on reasonably large orders, although on smaller business, where requirements for regular and frequent shipments are not so pressing delivered prices have lately been 10c. or so less than last year. The textile mills generally, particularly those that use Pocahontas and New River coals, have been able to close at 5c.@10c. less.

The City of Boston, for its harbor institutions, has been trying hard to secure an acceptable price. The order (No. 461) is for 40,000 tons, and already bids have been twice called for and twice rejected. Last year a part of this contract was awarded at $3.47 alongside, and the lowest price thus far this year on New River or Pocahontas is $3.67. The contract is now about to be advertised a third time. This, it should be said, is practically all for points that are on too shoal water for larger barges.

Local contracts, for delivery by team in Boston, have been much lower than last year. Prices on such business as the Boston postoffice (No. 437) and the Boston schools (No. 566) are due only in part to conditions at wholesale. The main reason is an unhealthy rivalry between dealers.

In summary, season prices are lower than last year. Whether a low range will continue depends largely on the export trade. If that develops as many think it will, there may well be a stronger tone to the market. The bulk of the year's business is placed, however, and operators will still have to look to "another year" for better returns, at least from the coastwise trade.

Coal Preparation

The June 5 issue of Coal Age will be devoted almost entirely to the subject of coal preparation. We want to make this particular number a really interesting and valuable compilation of engineering facts relative to this interesting and important phase of coal mining. All of our readers, therefore, are invited to submit articles on the preparation of coal and especially describe successful installations with which they are acquainted. Both anthracite and bituminous practices will be discussed.

Sociological Department

Republic Iron & Steel Co. Meet

The front cover shows two views of the Republic Iron & Steel Co.'s first-aid meet held at Republic, Jefferson County, Ala., on Mar. 27, 1915. The contesting teams were from the mining towns of Palos, Republic and Sayreton, all of which belong to the Republic Iron & Steel Co.

Officials at Palos Meet of Republic Iron & Steel Co., Sayreton, Ala.

From left to right, in rear—Dr. W. H. Godwin, physician and first-aid trainer, Warner division; R. C. Wynn, superintendent, Warner division; C. T. Fairbairn, manager, Southern district, Republic Iron & Steel Co.; F. G. Morris, general superintendent of coal mines, Southern district; W. T. Burgess, foreman of rescue work, United States Bureau of Mines; W. W. Kicker, superintendent, Palos division; J. G. Meagher, superintendent, Sayreton division; Dr. J. S. Norton, physician and first-aid trainer, Sayreton division; Dr. John W. Snow, physician and first-aid trainer, Palos division. From left to right, in front—R. E. Butler, engineer of coal mines; J. H. Lloyd, mine foreman No. 2 mine, Warner division; A. H. Verchot, mine foreman, Warner division; George Burgess, mine foreman, Palos division; Frank Ferguson, mine foreman, Sayreton division.

Palos had 4 teams of 5 adults, and the boys also had a team of the same size. Republic had 13 teams, of which 9 were of men, 1 of boys and 3 of women. Thus there were in all 90 contestants. There were nearly 1500 people on the grounds, the weather being most favorable for the event. A big barbecue dinner was served on a table 200 ft. long, the meat having been barbecued all through the previous night.

The Palos team carried off the honors. The women's teams acquitted themselves with great credit. First-aid work is spreading rapidly in Alabama, not only at the mines, but on the railroads and at the public schools. There are three oxygen-apparatus teams at Sayreton, two at Republic and one at Palos.

For four years the Republic Iron & Steel Co. has been training first-aid teams. It awards a gold-plated button or pin to all the men, women or children who show the desired proficiency. At intervals of two weeks a free motion-picture show is given in the first-aid hall of every mine village.

Mining Village Churches of the Colorado Fuel & Iron Co.

In the mining camps of the West little progress has been made in developing the needed religious restraints. Unfortunately the nationalities are so numerous and the desires of the people in this matter so variant that it is hard to provide for everyone, whereas in the matter of

Guild Hall at Crested Butte, Colo.

schools where all are collaborating and contributing the work is far more easy.

However, the need is not inconsiderable even economically, for there is no discontent which is so certain to bear good fruit physically, mentally and morally than discontent with oneself. This is or should be the work of the church. All political and labor movements are for the reform of other people, to make others perform certain acts which we believe will help *us*. Religious movements are, on the other hand, personal. The reformation sought is not a violent external restraint of the individual, but an increase of his own personal control.

Church at Fierro, N. M.

Church at Sunrise, Wyo.

No mining camp can therefore expect to do its bargaining, individual or collective, unless its members have been impressed with their need for such constraint, which makes the operator less autocratic and the workman less unfairly self-assertive. In fact, the relation religion bears to politics and industry is most vital as it provides the material of citizenship out of which is derived a right-thinking electorate and an intelligent, industrious and frugal personnel, without which both state and commerce must come to a disastrous end.

Where else can be taught the rules of moral accountability, fairness of judgment, the recognition of others' rights, the reciprocal duties of employers and employees, of parents and children, of the governing and the governed, of tradesmen and customers? Sometimes, of course, other purposes than these get the upper hand, and the churches seek to be political and industrial rather than to prepare the material out of which the best-governed state and a well-ordered industry will proceed; and the result is not all that it should be. But the attempt to do without such restraints entails more damage than can ever rise from a misapplication of the purposes of religion.

The Colorado Fuel & Iron Co. has erected several churches at its camps, of which a few are here illustrated.

Interior of Church at Sunrise, Wyo.

Discussion By Readers

Mining Laws and Legislation

Letter No. 3—Referring to the interesting point brought out in Ostel Bullock's letter, Coal Age, Apr. 10, p. 650, in regard to the legal irresponsibility of the mine superintendent, in contrast with the burden of responsibility imposed by law on the mine foreman, permit me to say that although the operators of Pennsylvania coal mines are not legally responsible for any injuries sustained by miners through negligence in respect to the manner in which a mine foreman performs his statutory duties, yet if any condition affecting the safety of employees is brought to the attention of the mine owner or the superintendent he is legally bound to take proper steps to correct it promptly.

This is the view taken recently by the Court of Common Pleas of Fayette County, Pennsylvania, in the case of Price vs. Etna-Connellsville Coke Co., 42 Pennsylvania County Court Reports, 664—a suit in which plaintiff recovered damages for injury to himself while bringing loaded cars out of a mine. The case was argued on the theory of negligence of the company in permitting a pile of slate and gob to remain between the track and a rib and maintaining insufficient clearance.

Art. 20, rule 3, of the Pennsylvania bituminous mining act of May 15, 1893, under which this case was tried, makes it the duty of the mine foreman to "see that the entries at places where road grades necessitate sprags or brakes to be applied or removed shall have a clear level width of not less than two and a half feet between the side of the car and the rib, to allow the driver to pass his trip safely and keep clear of the cars there."

Under this rule the court held that the defendant company would not have been liable to plaintiff, except for the fact that it was chargeable with the knowledge that the mine foreman had negligently failed to observe the requirements of the rule. And since the duty to maintain sufficient clearance was statutory, it was decided that plaintiff could not be deemed to have assumed the risk of being injured on account of the dangerous condition, although he may have known of its existence.

A. L. H. Street,

St. Paul, Minn. Attorney.

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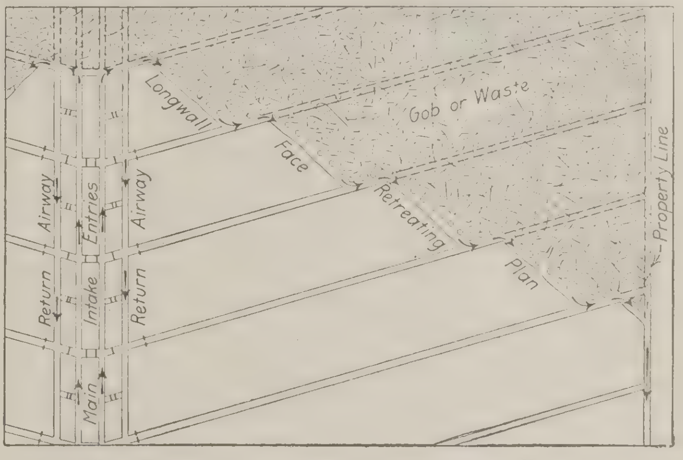
Longwall in Pittsburgh Seam

Letter No. 7—I was much interested in reading the letter of O. P. Rator, in reference to this subject, Coal Age, Apr. 17, p. 692, and to observe that he has the same opinion as myself in regard to the longwall advancing system not being adapted to the working of the coal in this seam.

I have been studying this question for some time, and have failed to see how it will be possible to prevent the occurrence of a squeeze on the haulage road if the advancing system is to be adopted. I am convinced that this could only be done by building cribs about 6 ft. apart and filling these in with rock that could probably be obtained in sufficient quantity from the brushing of the roof on the roadways and from nearby falls. However, I concluded some time ago that it is needless to consider further the advancing plan for working the coal in this seam. I am satisfied that no one who has had experience in the working of the Pittsburgh seam would attempt to mine the coal by the longwall advancing method, except possibly someone who has more money than brains.

I would like to explain briefly my idea of working this seam of coal on the retreating plan. I will confess at the start, however, that the plan has the disadvantage of not yielding a large output of coal until the boundary line of the property has been reached and the longwall face developed. I believe that there would be a benefit derived by the adoption of this plan in the long run. I realize fully that the expense of laying out the plant and installing the necessary machinery would mean a considerable investment at the start, but much of this preliminary work could be postponed and the expense curtailed until the mine reached a paying basis, when the improvement could be made in the equipment. The coal mined from the entries, in the advancing system, would help to meet the expense.



Proposed Longwall-Retreating Plan

In regard to the plan I have mentioned and attempted to illustrate in the accompanying figure, I would drive the main entries four abreast on the face of the coal. The two center entries should be made the intake and haulage roads for the two sides of the mine, while the entries on each side of these would serve as the return air-courses for the same. If the mine is opened by a shaft, these main entries should be driven in both directions from the shaft bottom. The main entries should be driven 9 ft. wide, and cross-headings turned at an angle of about 25 or 30 deg. with the face cleats on each side, as shown in the plan. These cross-entries should be driven at such distances apart as to afford a working-face of about 100 to 150 ft. in length. When these cross-entries have been driven to the property line, a heading should be driven along the line and the working-face opened up at the far inby corner.

The line of working-face should be stepped, as shown in the plan. The purpose of this is to reduce as far as possible the liability to a squeeze occurring as the work advances and to provide at the same time a steady settlement of the roof as the face recedes from the boundary line. The old broken posts may be used for the building of cribs, which should be spaced about 20 ft. apart, along the rear face to prevent the roof from swinging the timbers toward the face. I hope this plan will be clear as I have explained it.

JOHN OLDROYD.

Farmington, W. Va.

Firing Shots in Mines

Letter No. 2—Some time since there was published in COAL AGE (Vol. 6, p. 665) a description of a chemical fuse igniter, which, it was explained, had been invented for the purpose of firing shots "in mines generating gas and in dusty mines where the coal is highly inflammable." To the article was appended a note by the editor suggesting the discussion of the question, "Is the idea practicable?"

Thus far I have only seen one letter referring to this matter. I want to say most emphatically that, in my opinion, the idea is wholly impracticable and cannot be safely applied to the blasting of coal under any conditions. Indeed, were I in a position of authority, as mine inspector, superintendent, foreman or other official, I would not hesitate to debar such practice from any mine in my charge.

In my opinion, the use of black powder should be entirely eliminated from *all* coal mines generating gas, but especially dusty mines where the coal is highly inflammable. I am convinced that only permissible explosives and the most approved system of electric shotfiring should be permitted in such mines, and in order to insure the safe and successful operation of the mine, I believe particular attention should be paid to the following points:

1. The wire conductors should be so installed as to insure absolute freedom from accidental connection and premature explosion.
2. The system should be protected against stray electric currents from any source.
3. The system should be protected against a possible grounding of the current that would render ineffective the firing of the shots.
4. The system should be protected against any possible short-circuiting of the current for the same reason.
5. The proper voltage required to insure the firing of all the shots should be carefully determined.

Referring again to the suggestion of a chemical fuse igniter, I would say that such a method is open to the same objection as other methods of firing shots by means of fuse. Any imperfection of the fuse or any injury to the same caused in tamping the hole might make the shot hang fire. In addition to this the method suggested presents another risk due to a possible slight difference in the composition or thickness of the celluloid diaphragm, which may indefinitely delay the ignition of the charge. These risks are entirely eliminated in the use of an electric shotfiring system.

Referring to the suggestion made in this article, in regard to the danger of the powder becoming damp in the hole before the fuse is ignited, owing to the wrappings of the charge being broken by a rough and jagged drill hole, it occurs to me that is possible in any system of firing. He suggests that it should be prevented by the use of a drill that will bore a comparatively smooth hole. In practice, however, this is not always possible.

In my experience, the charge of powder should be incased in double wrappings, one of which is waterproof. Such wrappings are commonly used in the anthracite region of Pennsylvania and are called "bologna paper." By soaping the outside of the wrapper or greasing it with axle grease the danger is greatly reduced, but it cannot be expected that the charge will remain absolutely dry for a considerable length of time, such as might result from the delayed ignition of the charge.

In discussing this question, the suggestion is made, COAL AGE, Vol. 6, p. 996, that the possible delayed ignition of a charge would give an opportunity for the accumulation of a dangerous quantity of gas in the place and that this would be ignited by the blast. This objection, however, does not apply alone to the firing of shots by the chemical fuse igniter. The same condition may arise in electric shotfiring when a considerable period of time is allowed to elapse between the examination of the place for gas and the firing of the shots therein. Shotfiring in mines is surrounded by danger under the best conditions, and it should be the constant endeavor to reduce the risks in blasting instead of introducing new ones.

J. W. POWELL,
General Contractor.

Windham, Mont.

Liquor Question in Mining

Letter No. 3—I believe the liquor question as it pertains to the coal miner should be carefully studied from a moral, economical and psychological standpoint, instead of viewing it wholly in respect to its prevalence.

The consumption of alcoholic beverages is undoubtedly amazingly large among coal miners—inadequately large in proportion to their means for its indulgence. In any case, the indulgence of this habit impairs the mental, moral and physical well being of the individual. My study and investigation lead me to the conclusion that the prevalence of this evil among miners can be attributed mainly to three causes, which may be briefly described as follows:

1. The majority of those who indulge the drink habit to a greater or less extent firmly believe that its use is a material benefit stimulating and reviving the exhausted physical system after an arduous day's toil. They believe that it tones the nervous system, restores the muscular energies and invites a good night's rest in preparation for the labor of the coming day. Repeated inquiries in this regard reveal the fact that those who indulge to a moderate extent only are thoroughly convinced that over-indulgence is harmful and not to be tolerated.

2. Coal-mining camps as a rule are lacking in many needed attractions for the purpose of improvement, recreation and amusement. One of the strongest characteristics of human kind is to seek companionship and association with kindred spirits. Much as it is to be regretted, the saloon or hotel offers more conveniences and imposes less restriction on those who avail themselves of their privileges than could be found elsewhere. The convivial meetings that naturally result from these conditions invite the social glass with all its attendant evils.

3. The last and perhaps the least of the causes for indulgence is the desperation of overwhelming grief, anxiety and care. The nervous system is strung to the highest pitch by the continuous strain of the depressing conditions incident to coal mining. Some nervous temperaments require a stimulant to prevent a nervous breakdown, and these are the ones that are most liable to gravitate to the state of habitual drunkards as a result of over-indulgence. Such are often heartlessly condemned without due consideration being given to the causes that led to their downfall.

It is a recognized physical law that undue stress is always followed by extreme depression. Men of *nervous* temperament are most subject to this law. They devote their entire physical energy to the performance of what they undertake. Present welfare is ignored in the accomplishment of a desired end, which too often results in a physical breakdown followed by an irresistible craving for a stimulant. Coal mining, however, has a greater tendency to produce a *lymphatic* rather than a nervous temperament. Consequently, the average coal miner lacks the physical energy required to withstand the temptations to over-indulgence that are on every hand. The results are too well known to need description. It is useless to *preach* to these men; what they need is *health, better surroundings* and *attractive conditions* that will stimulate ambition.

To overcome the evils of the first cause mentioned, education is necessary—moral and physical. While men in this class realize the evil of over-indulgence, they do not grasp the fact that moderate indulgence saps the powers and impairs the efficiency of the human system. How such education is to be brought about is probably one of the most difficult problems in mining today. I have more hope along this line in the proper education of the young in our public schools.

In respect to the second cause mentioned, experience teaches that much good can be accomplished by the establishment in our mining camps of reading rooms, playgrounds and suitable places of amusement. These alone can effect the social uplift that is desired and provide the necessary association that is the craving of human nature, away from the harmful surroundings of the saloon and hotels. Much has been accomplished along this line by the Young Men's Christian Association, and the establishment of a branch of this organization in every mining camp would be of the greatest value to the coal-mining industry.

In a few instances, it has been argued by the management of coal mines that the entire elimination of the saloon from the mining camp would seriously handicap the operation of the mines, inasmuch as miners will have their booze. As a result, many coal miners seek those places where the saloon is permitted. While there is some logic in this argument, it must be acknowledged that the evil could be overcome by greater coöperation on the part of the management of different mines.

If coal companies, recognizing the unquestioned advantage to the industry, would unite their efforts to eliminate the saloon and the sale or shipment of intoxicating liquors in mining towns or camps, there would be no question of the success of the undertaking. If it is argued that this would be a restriction of personal rights and privileges at variance with the constitution, it should be remembered that personal rights and privileges are limited when they abridge the right or impair the best interests of the community, of which the individual is a part.

A. M. INER.

——, Penn.

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The Miner and Safety

In discussing the education of miners and their relation to the mine foreman, much has been said in reference to their attitude toward their own safety and toward the efforts made in their behalf to safeguard their work.

When passing into the mine a short time ago, I overheard a conversation between two miners that illustrates this point. They were as fine coal diggers as ever handled a pick, but more than that could not be said as they had no ambition to do anything else.

From their conversation I gathered that the old, experienced fireboss in charge of the section where these men were working had attempted the previous day to show them the importance of loading out the fine coal cuttings, or "bug dust" as it is commonly called. They had been throwing this back in the waste, and the fireboss, in trying to impress upon them the danger of a blownout or windy shot throwing this dust into the air and causing a dust explosion, explained that it had been found that each particle of fine dust that would float in the air was nothing less than a tiny gas bag.

The remarks of the fireboss were the topic of their conversation as they proceeded on their way to work. One stated with an emphasis that it is not necessary to repeat: "What do you think of that gas-bag yarn? Why, in the old man's day, miners did not know what an explosion was, or a blownout shot, and as for 'gas bags,' I guess they had none of them around. In those days, the government did not waste money hunting up dangers. There were no 'gas bags' and no explosions. They did not have a mining law as big as a family Bible—not much. I tell you, Jack, if there was less of this red tape, we would all be better off. Think of it—they even come around and tell a man how to set a post. Why, in the old man's time a miner was seldom caught by a loose piece of slate, and now men are getting killed every day."

The reply to this was: "You are right, Tom; if that old fellow was digging coal for a living and had to shovel 'gas bags' for nothing, instead of carrying that book of instructions and that safety lamp around the mine to make us believe he knows something, we would be better off."

This is only a fair sample of hundreds of such conversations in the daily life of the miner. It would seem that men would realize that conditions in mines today are wholly different from what they were in the days of their fathers. With the increased demand for coal, requiring the use of machinery and methods for its quick extraction that were not known in those days, it should be clear that the dangers of coal mining have greatly increased. A reasonable man readily understands that more precautions are necessary today than in the old days when the miner performed his work under less urgent conditions. Had the same conditions existed then as today, explosions would have been as frequent as Russian holidays.

Men who talk in this way do not realize that miners of yesterday were experienced workmen and avoided dangers of which the miner today is entirely ignorant, because he knows nothing of mining—in most cases had never seen the inside of a mine until his cousin sent for him and brought him from the old country to dig coal in American mines. Today, the experienced miner has largely disappeared, and in his place are foreigners taken from the farm and shop and in most cases unable to speak the English language.

These are the conditions that confront the mine foreman today. His task is almost superhuman. Naturally, violations of the law are frequent, and the foreman is not permitted to discipline his men for the act, but must "find some other way." His instructions are, "Increase the output; cut down the cost; fulfill the mining law in every respect." How to carry out these instructions is his problem.

James T. Reynolds, Assistant Foreman,
West Penn Mining Co.

Apollo, Penn.

Denies Investing for Kaiser

My attention has been drawn to the industrial news item published in Coal Age, Apr. 24, p. 742, which is evidently taken from numerous similar publications that have appeared in various newspapers on the Pacific Coast and which contained a number of misstatements that I have been obliged to correct in most emphatic terms practically each time they have appeared. Nothwithstanding this fact, many of the papers have persisted in referring to the story again and again, presumably because they consider it interesting reading. In doing so, they ignore the fact that such a publication of an untruth has the effect to prejudice unfairly important industrial interests both of myself and others associated in the same enterprise.

Permit me to assert briefly the following facts: His Majesty, William II, Emperor of Germany, so far as I know, has never directly or indirectly invested one cent in Canada, either through me or anybody else. Furthermore, my associates and I have never had $5,000,000 invested in Canadian coal fields. Our investments scarcely amount to $1,000,000. There is no reason why these investments should be "irretrievably lost," inasmuch as they are in companies formed under a British Columbia charter, and the shareholders comprise Germans, Canadians, Americans and Englishmen.

In closing, permit me to take this opportunity of saying that, although the press of this country has invariably insisted in conferring upon me the title of "Count," my proper name is the one with which I have always had the honor to subscribe myself.

Alvo v. Alvensleben.

Seattle, Wash.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

MINE EXPLOSION

Definition—A mine explosion is understood to be a violent disturbance of the atmosphere within a mine manifested by a destructive blast or rush of air accompanied by more or less flame, being the result of the ignition and combustion with explosive rapidity of gas and dust or either accumulated in the mine.

Gas Explosion—An explosion produced and maintained chiefly by gas accumulated in the mine workings and passages or mixed with the air current is described as a "gas explosion," although practically every mine explosion involves the combustion of both gas and dust.

Dust Explosion—An explosion in which the fine coal dust accumulated in the mine or suspended in the air current plays a prominent part is commonly called a "dust explosion," although it may have originated in a local explosion of gas, which is true of most mine explosions.

Few if any mine explosions are wholly due to gas or dust, but combine both of these elements in varying proportions, the character of the explosion as "gas" or "dust" being determined by the later evidences.

Development of a Mine Explosion—Explosion does not necessarily follow the ignition of gas in mine entries and workings. The firedamp mixture must, of course, be within the explosive range, as determined by the conditions in that portion of the mine. But even then a mine explosion will only take place when the **conservation of heat** is sufficient to render the explosive action self-supporting. Otherwise, a local explosion of gas or dust will expend its energy within a limited area and the disturbance will not be propagated throughout the mine.

The ignition of an inflammable mixture of gas or dust in the mine air may produce a considerable body of flame that, within the narrow confines of the mine, may gather force and generate sufficient heat to cause an explosion. **Experiment** has shown that an explosive mixture of gas and air placed in a tube and ignited at one end will burn quietly at first, then flutter or vibrate with increasing energy as the combustion penetrates deeper in the tube, the contending forces being the entering air and the escaping products of the combustion. This action, however, quickly develops sufficient energy to produce an explosion, which darts through the length of the tube.

The experiment illustrates more or less closely the development of an explosion in a mine entry or chamber. Investigation has shown that the **explosion gathers force** and probably **develops characteristic energy** within a few yards of its origin or the point where the ignition of the gas took place. This may vary from 10 to 30 yd. or more, depending on many conditions—chiefly the size or volume of air space available for the expansion of the gases of the explosion, the intensity of the igniting flame and inflammability of the mixture.

All of these factors determine severally the initiation as well as the character of the explosion and its limitations in the mine workings.

The Coal Age Pocket Book

RESCUE WORK

Entering a Mine after an Explosion—Prompt action and intelligent and effective measures are necessary for the rescue of any possible survivors of a mine explosion. The nature of the work and the great risk incurred in its undertaking demand that it shall be performed by the most experienced of the volunteers, of whom there is never any lack.

Immediately after an explosion in a mine, the following procedure is important:

1. Call for volunteers and from them choose those who are more experienced and familiar with the mine and the work to be performed.

2. At the same time, observe the mine entrances and judge of the probable effect of the explosion in the mine; examine the ventilating apparatus and have any necessary repairs made at once.

3. Collect the necessary safety lamps, tools, timber, canvas, brattice boards, nails, etc. Caged canaries or mice should also be provided, and two or more sets of breathing apparatus should make up the equipment.

4. Divide the rescuers into three parties, as follows:
  (a) Apparatus men to explore in advance;
  (b) Repair gang and rescuers;
  (c) Supply gang to render every possible assistance.

Organize each party under a competent leader who shall be in absolute control while underground.

5. Enter the mine at the earliest possible moment—the apparatus men proceeding first and keeping from 100 to 200 yd. in the lead of the others, who must not advance ahead of the air.

6. Each section of the mine should be explored by the apparatus men to discover any possible fire therein, before restoring the circulation in that section.

As quickly as any survivors are found they must be promptly removed to fresh air and the proper restoratives applied. At the surface, physicians should be in attendance and ambulances provided for the prompt removal of those brought out of the mine.

Suggestions on First-Aid to Explosion Victims—Those trained in first-aid work are the ones who should assume charge and have absolute control of the care of any survivors as quickly as found, until the arrival of a physician. The following brief suggestions are important:

1. Be calm and quiet; act promptly but not in a hurry; keep cool and observe closely every symptom and condition.
2. Remove promptly but carefully to fresh air.
3. Do everything possible to stop bleeding.
4. Examine for broken bones before moving far.
5. Use aromatic spirits of ammonia if stimulant is needed.
6. If overcome by gas, give artificial respiration.
7. If unconscious, loosen clothing, warm and stimulate by rubbing the limbs; give no stimulant if face is flushed and pulse strong, but sprinkle cold water on face and chest. If the body and limbs are cold, use warm applications; keep the patient covered with blanket or other coverings; apply smelling salts or spirits of ammonia cautiously to the nostrils.

Inquiries of General Interest

Electric Haulage Problem

The haulage road at a certain mine is 6000 ft. in length and laid with 30-lb. rails, which are bonded with 00 wire and bonding caps or sleeves. The rails are cross-bonded every 30 ft. An electric mine locomotive weighing 10 tons and using a current of 150 amp. is run on this road. A 0000 trolley wire supplies a current of 250 volts, which returns through the rails. A substation is located at one end of the line.

I would like to ask: 1. What will be the drop in volts at distances of 2000 ft., 4000 ft. and 6000 ft. from the substation? 2. What will be the percentage of loss in each case? 3. By installing a 0000 feeder wire and allowing 6 per cent. interest on the investment, what saving, if any, would be realized, the price of electric power being 2c. per kw.-hr.?

J. L. Gunter.

Handley, W. Va.

In estimating the drop at distances of 2000, 4000 and 6000 ft. from the substation, it is necessary to calculate the trolley-drop and rail-drop separately and add the results. Then, in order to estimate the possible advantage of installing a feeder-line of the same size as the trolley wire (0000), it is necessary to calculate further the combined trolley- and feeder-drop for the same distances.

The first step in the calculation is to take from an electric-wire table the circular mils of a 0000 copper wire, which is 211,600 circ.mils. For the combined trolley and feeder wires, the circular mils is double this amount, or 423,200 circ.mils. Now, to find the copper equivalent of two 30-lb. rails, properly bonded and cross-bonded, assume a rail-to-copper ratio of 11 : 1; that is to say, take the rail resistance here as 11 times that of copper, for the same sectional area. Then find the combined sectional area of two 30-lb. rails as follows: Since the weight of wrought iron is 480 lb. per cu.ft., and two 30-lb. rails weigh 60 lb. per lineal yard (36 in.), the cubic contents of the two rails is $60/480 \times 1728 = 216$ cu.in. per yd. The corresponding sectional area for the two rails is therefore $216 \div 36 = 6$ sq.in.

Again, since 1 mil is 1/1000 in., and a circ.mil is the area of a circle whose diameter is 1 mil, 1 circ.mil = $0.7854\ (1/1000)^2 = 0.0000007854$ sq.in. and 1 sq.in. = $1/0.0000007854 = 1{,}273{,}200$ circ.mils. The sectional area of the two 30-lb. rails in circular mils is therefore $6 \times 1{,}273{,}200 = 7{,}639{,}200$ circ.mils. For a rail-to-copper ratio of 11 : 1, the copper equivalent is $7{,}639{,}200 \div 11 =$ say, 694,500 circ.mils of copper.

It is now possible to calculate the drop of potential for the trolley line, feeder and rail return for each required distance by using the general formula,

$$\textit{Drop of potential} = \frac{10.8\ (\textit{distance} \times \textit{current})}{\textit{circ.mils}}$$

The drop of potential is expressed in volts and the current in amperes, while the distance is given in feet. Applying this formula to the present case gives for the drop at a distance of 2000 ft. from the substation the following:

$$\textit{Trolley-drop} = \frac{10.8\ (2000 \times 150)}{211{,}600} = 15.3\ \textit{volts}$$

It is evident that the combined trolley- and feeder-drop would be one-half of this amount, or 7.65 volts, since there are two wires of equal size for the transmission of the current to the locomotive. The rail-drop is

$$\textit{Rail-drop} = \frac{10.8\ (2000 \times 150)}{694{,}500} = 4.6\ \textit{volts}$$

The above results give the drop of potential for a distance of 2000 ft. For distances of 4000 and 6000 ft. the drop will be two and three times the above amount respectively.

A comparison of these results gives the following:

Total drop without feeder, $4.6 + 15.3 = 19.9$ volts
Total drop with feeder, $4.6 + 7.65 = 12.25$ volts
Voltage saved by feeder, $19.9 - 12.25 = 7.65$ volts
Wattage saved by feeder, $150 \times 7.65 = 1147.5$ watts

The percentage of drop in each case above is:

Without feeder (2000 ft.), $19.9 \times 100 \div 250 = 8.0\%$
With feeder (2000 ft.), $12.25 \times 100 \div 250 = 4.9\%$

Assuming 250 working-days of 8 hr. each (2000 working hours) in a year, the saving in that time at a cost for electricity of 2c. per kw.-hr. would be $2000 \times 1.1475 \times 0.02 = \$45.90$.

Against this saving must be reckoned the interest or fixed charges on the investment for the erection of 2000 ft. of feeder wire. At the present time the cost of copper is very high, having risen from 12 or 13c. per lb. to 20c. per lb. The weight of 0000 copper wire is practically 640 lb. per 1000 ft., making the cost for 2000 ft. of this wire, at 20c. per lb., $2 \times 640 \times 0.20 = \$256$. The cost of erection, including poles, will be about \$4 per 100 ft., or \$80 for a distance of 2000 ft., which makes the total cost of this length of feeder wire erected, \$336.

Estimating the fixed charges on this investment as, interest, 6 per cent.; depreciation, 4 per cent., and taxes and insurance, 2 per cent., making a total of 12 per cent., gives $0.12 \times 336 = \$40.32$. This estimate makes the net saving per year, $\$45.90 - 40.32 = \$5.58$.

Since the drop in potential, the saving in kilowatt-hours and the fixed charges are all proportional to the distance, the net saving per year will also be proportional to the distance, or \$11.16 for a distance of 4000 ft., and \$16.74 for a distance of 6000 ft.

In actual practice, however, the locomotive will not be running more than from one-half to three-quarters of the actual time, depending on the length of haul and other conditions, which will reduce the saving in kilowatt-hours at the same rate, while the fixed charges must remain constant. Although the figures would then show an excess of fixed charges over the saving in the cost of electricity, it would still be good practice to add the feeder wire. The gain in the operation of the locomotive will exceed what the actual saving in power would indicate.

Examination Questions

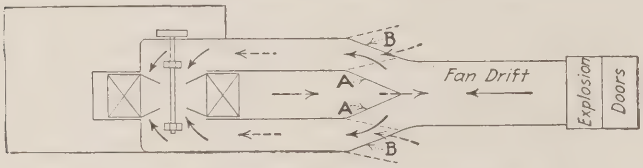
Pennsylvania Anthracite Mine Inspectors' Examination, Held at Wilkes-Barre, Apr. 20-22, 1915

(*Selected Questions*)

Ques.—What are the advantages and disadvantages of the exhaust and blew-fan systems of ventilation? What are the advantages of making fans reversible, and under what conditions would it be proper to reverse the air current? Show by plan how you would construct a fan drift so that the flow of air passing through a mine can be reversed.

Ans.—In the ventilation of a gaseous mine, the exhaust system of ventilation has the advantage that the main-intake airway can be used as the main-haulage road, which is impracticable in the blowing system of ventilation. One disadvantage of the exhaust system is that the ventilator is generally less efficient working on the warm mine air than when filled with the cooler outside air entering the mine. It is also more subject to the corrosive action of the warm, moist mine air under these conditions.

In the exhaust system of ventilation, the mine is ventilated under a pressure *below* that of the atmosphere and, on this account, the gases accumulated in waste and abandoned places readily find their way onto the main roads and airways. The blowing system avoids this trouble, the mine being then ventilated under a pressure *greater* than that of the atmosphere, by which the accumulated gases are forced back from the roads. It is frequently claimed, however, that the blowing system possesses the disadvantage that these gases expand more readily into the roads and airways when the fan ceases to work, while the reverse of this condition is claimed for the exhaust system.



Plan Showing Reversible Fan

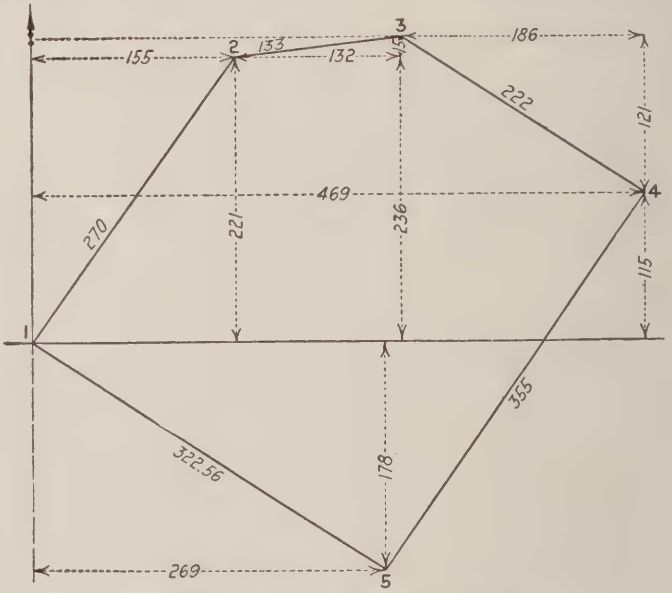
The advantage of a reversible fan is that the direction of the air current circulating through the mine can be changed at the surface when occasion may require. The air current in the mine should be reversed only when the conditions in the workings are thoroughly understood and there is reason to believe that lives may be saved or advantage gained by so doing. In the normal working of the mine the fan should never be reversed without first notifying and withdrawing the men.

The accompanying plan shows the arrangement of a fan drift that will enable the air to be reversed. The position of the doors *AA* and *BB* permits the air coming from the mine through the fan drift to pass to each side of the ventilator and enter the center opening of the fan, as indicated by the arrows. The dotted lines show the position of these doors when the fan is blowing air into the mine. The discharge opening of the fan is then connected with the fan drift. In this position of the doors the outside air enters on each side of the fan, and after passing through the ventilator is discharged into the fan drift and passes into the mine, as indicated by the dotted arrows.

Ques.—Plat the following traversed notes of a survey to the scale of 100 ft. to the inch.

Sta.	Dis.	Latitude	Departure	Total Latitude	Total Departure
1-2	270	221	155	221	155
2-3	133	15	132	236	283
3-4	222	121	186	115	469
4-5	355	293	200	178	269
5-1	322.56	178	269	0	0

Ans.—The accompanying figure shows the above notes of survey platted to a scale of 150 ft. to the inch instead of 100, to bring it within the column. Drawn to a scale of 100 ft. per in. the plat would be half again as large. In this question the south latitudes and the west departures should have been written —121, —293, and —200, —260. Likewise, for the total latitude, —178; but the total departures are all positive, being east departures.



Survey Platted by Departures

Ques.—State the advantages and disadvantages of large slow-running fans as compared with small high-speed fans in the ventilation of a mine.

Ans.—Large slow-running fans have the advantage of possessing a greater margin for increasing the circulation of air in mines. In other words, the range of capacity is larger than that of high-speed fans of smaller size. Large, slow-running fans require somewhat heavier foundations and cost more to install and operate. On the other hand, small high-speed fans have limited capacities or a less range in both gage and quantity and to that extent are less reliable for mine ventilation.

Coal and Coke News

Washington, D. C.

Reports of commercial conditions received in Washington from various sources are to the effect that the mining business in its different phases is showing some improvement. As yet there is, however, depression in coal in some places, though in others there is distinct evidence of revival. A report from Philadelphia to the Federal Reserve Board published in the current number of the "Bulletin" issued by that body states that "the anthracite coal business has improved."

On the other hand, the same authority reports from Cleveland that "the coal trade is still unsatisfactory, due to labor, legislative and trade conditons. Much Lake coal was carried over through the winter on the docks, and shipping will begin much later this year." From other soft-coal districts similar reports are received by various inquiriers here, and there is a general feeling that some time will be necessary to restore the business situation to normal so far as respects coal.

The Trade Commission Is Consulted

The first definite communication of an official nature between coal operators and the Trade Commission, which body is now in working order, occurred recently, when operators from Franklin County, Ill., appeared before the commission to state their views regarding certain trade practices and to get the ideas of the Commission on the subject if possible. They told the commission that they merely wanted to obtain official sanction for what they had heretofore done, and that if their acts of coöperation were approved, there would be no attempt to make agreements to control prices. The sole object would be to keep down the cost of production.

Furthermore, they desired permission to compare notes with one another over market conditions. For instance, it was noted, a prospective purchaser may tell one operator that another operator offered to sell coal 10c. cheaper and thereby argue the price down, whereas, as a matter of fact, the prospective purchaser may be falsifying about the prices quoted by other operators. The operators desire to have a system of coöperation so that they can compare notes. They would also like to compare ideas and methods of mining so that they could be able to produce the coal at the lowest possible cost.

HARRISBURG, PENN.

The Governor has succeeded in putting through one of his "pet measures," the child labor law, and it is now in his hands for signature.

Employed children who will not have reached the age of 16 by Jan. 1, 1916, will probably lose their employment, and their homes this source of income likewise. It is estimated that several thousand boys employed about coal mines of the state will be thrown out of employment by the operation of the law. Coal company managers and superintendents employing boys between 14 and 16 years of age are almost unanimous in their disapproval of this statute.

The new law gives the employer the choice of employing children between the ages of 14 and 16 for 42 hours a week and overseeing their attendance at school for a least 8 of the remaining hours, or not employing children below 16 years of age at all. It is declared by managers and superintendents of both coal and industrial operations that to arrange a working schedule to suit the needs of the law for children under 16 would be far more tedious and complicated than is practical for them to attempt and they will therefore dispense with the employment of these children.

The law is already having an effect, for in a number of places the children who will not have attained the age of 16 by January, 1916, are now being weeded out, none others being employed who will not comply with the law when it is in force.

One of the large anthracite companies estimates that it will discharge between 300 and 400 children at once.

Senator Crow has introduced a bill to amend section 4 of article 19 of the act of 1911, providing that bituminous mine inspectors who have served for 8 years and have passed two examinations shall be exempt from any further examination and providing for their suspension and removal. The amended section reads as follows:

The principal examination shall be in writing and each applicant shall also undergo an oral examination pertaining to explosive gas, safety lamps, methods of ventilation and mine management. The questions and answers thereto in the oral examination shall be reported verbatim by an expert stenographer and typewritten fully to assist the Board in the work of rating the qualifications of the candidates: Provided, That any person who has served as a mine inspector continuously for 8 years and has passed two consecutive examinations for the office of mine inspector shall be exempt from taking any further examination and shall continue in said office without any further examination unless removed or suspended as provided by Article 21 of the Act of June 9, 1911, P. L. 756, section 4, of the act of Apr. 14, 1903, P. L. 180. Any candidate who shall make a general average of at least 90 per centum shall be deemed successful. The manuscripts and other papers of all applicants in the principal examination together with the tally sheets and the correct solution of each question as prepared by the Examining Board, and also the stenographer's report of the oral examination shall be filed in the Department of Mines. The Examining Board or at least four members thereof shall certify to the Governor and also to the Department of Mines the names and percentages of all successful candidates who are properly qualified under the provisions of this article to fill the office of Inspector. A certificate of qualification prepared by the Chief of the Department of Mines shall be issued to each successful candidate.

The Examining Board shall as soon as practicable after the examination furnish to each applicant on printed slips of paper a copy of all questions (oral and written) given at the examination marked "solved right" "imperfect" or "wrong, as the case may be."

Bill to Bring Bituminous Miners Under Compensation Act

The bill prepared by the attorney general and introduced by Senator Miller, to bring the bituminous miners under the workmen's compensation act, has been amended by the committee on Mines and Mining, and section 1 of the proposed act now reads:

In order to secure efficient management and proper ventilation of the mines, to promote the health and safety of the persons employed therein and to protect and preserve the property connected therewith the operator or the superintendent shall employ a competent and practical mine foreman for every mine where 10 or more persons are employed, who shall be under the supervision and control of the operator. The mine foreman shall have full charge of all the inside workings and the persons employed therein subject, however, to the supervision and control of the operator in order that all the provisions of this act so far as they relate to his duties shall be complied with and the regulations prescribed for each class of workmen under his charge carried out in the strictest manner possible. If the mine is generating explosive gas in quantities sufficient to be detected by an approved safety lamp, the mine foreman must possess a first grade mine foreman's certificate, or be a person who in the judgment of the operator is a person equally competent with the holders of such certificate. If the mine is non-gaseous the mine foreman must possess either a first grade mine foreman's certificate or a second grade mine foreman's certificate, or be a person who in the judgment of the operator is equally competent with the holders of such certificates.

When the mine workings become so extensive that the mine foreman is unable personally to carry out the requirements of this act pertaining to his duties, he shall have the right to employ a sufficient number of competent persons to act as his assistants who shall be under his instructions and the operator's instructions in carrying out the provisions of this act. If the mine is generating explosive gas in quantities sufficient to be detected by an approved safety lamp the mine foreman's assistants must possess first grade assistant mine foremen's certificates or be a person who in the judgment of the operator is equally competent with the holders of such certificates.

In case of the necessary temporary absence of the mine foreman, he may deputize his work for the time being to his assistant, who shall perform all the duties of the mine foreman. And the right to hire and discharge employees, the management of the mine and the direction of the working forces are vested exclusively in the operator and no person or persons, association or associations, organization or organizations, corporation or corporations, shall interfere with or attempt to interfere with, abridge or attempt to abridge in any manner whatsoever such right: Providing, that this act shall not invalidate any existing contract.

Chairman Hess, of the House Committee on Mines and Mining attempted to have the Catlin bill recommitted to his committee for the purpose of amendment, stating that a similar bill affecting the bituminous miners had been passed by the Senate, and suggested that both be incorporated into one measure, which would then bring the wording of the third paragraph of section one of the bituminous measure in force in the anthracite region, but the House was against recommitment.

The Supreme Court Is Appealed to

The Alden Coal Co.'s appeal from the decision of the Dauphin County Court, which has held to be constitutional the anthracite tax law, which requires mining companies to pay to the state 2½ per cent. ad valorem on all coal shipped to market (with the exception of washery coal) was filed with the Supreme Court on May 5.

The coal companies affected by this act are attacking it, on the contention that it is class legislation. Much interest is being manifested in the case in view of the fact that taxes already levied total no less than $5,000,000.

The Alden Coal Co.'s stand is identical with that of the 100 or more coal companies which have appealed from paying the state tax. The appeal is based on the ground that bituminous coal is not taxed; that all localities are not benefited alike by the distribution of the tax funds, that the company is not liable to tax on coal shipped outside of the Commonwealth and that the company is already paying state and local taxes.

Neither the state nor the coal companies are optimistic about quick settlement. So much importance is attached to the court's decision and there are so many authorities cited in defense of the stands taken by the corporations and the state that it is considered almost impossible to have all the appeals ready for the Supreme Court which convenes at the Capitol on May 24.

Voluminous records are now being prepared by the coal companies, and it is doubtful if these will be prepared by the 24th, which means that the appeals would have to be heard when the Supreme Court convenes during the first week in October.

Prospects of a long session of the Legislature are also an obstacle in the path of the appeals, since the business of the lawmakers would force the printers to delay work on the records in the tax case.

PENNSYLVANIA

Anthracite

Georgetown—The engine house at the Katydid colliery of the Red Ash Coal Co. was destroyed on May 6 by fire of unascertained origin and several hundred men and boys will be thrown out of work until a new engine house can be erected. For a time the flames threatened to set fire to the breaker and machine-carpenter shops. The destruction of the machinery in the engine house will cause the shut down of Nos. 1 and 2 collieries of the company.

Springfield—The Court of Northumberland County on May 3 dismissed a preliminary injunction which restrained the Coal Township School Board from collecting $70,000 taxes for 1913 from the Philadelphia & Reading Coal & Iron Co., the Lehigh Valley Coal Co. and the Mineral R.R. & Mining Co.

Plymouth—Several "button strikes" are on in the anthracite region and several thousand men are affected. At Plymouth about 1500 men and boys at the Buttonwood and Parrish collieries went on strike because a few men refused to pay back dues and attain good standing with the United Mine Workers of America. At Shamokin 1000 or more went on strike on May 6 at the Scott colliery of the Susquehanna Coal Co., because some of the men are not members of the organization. Several hundred men went out at Oakhill colliery at Minersville, until wages are raised to what they claim is a scale equal to that of other collieries. The men also allege that they are being overcharged for powder furnished. Four thousand employees of the Packer collieries Nos. 2, 3 and 4 of the Lehigh Valley Coal Co., struck recently because 12 carpenters reported for work without union buttons. It is feared the strike will extend to other operations.

Wilkes-Barre—More than 1200 men were present on May 5, at the 8th annual dinner of the Wilkes-Barre District Mining Institute, in Irem Temple. It was an impressive gathering of laboring men, all engaged in the same occupation. The guest list included the names of general managers, superintendents, foremen, miners, and laborers of all classes. The dinner, an excellent but simple meal, was served by the Y. M. C. A., with a corps of volunteer waiters from the various coal offices throughout the valley. One of the features of the evening was the graduation of three students of the mining school who had completed the three year course. These are Edmund P. Thomas, of the Kingston Coal Co., Sidney Davis, of the Lehigh & Wilkes-Barre Coal Co., and Fred G. Williams, of the Delaware, Lackawanna & Western R.R. Co. coal department. The diplomas were presented by president Thomas H. Williams, who also refunded to them the tuition fees which they had paid into the school during their course, as one of the rewards of their perseverance and ambition.

Scranton—Miners working in the drift of the Diamond mine recently threatened to go on strike unless the company furnished better ventilation. It was claimed by the men that several laborers were overcome by the bad air. It is believed that the matter will be amicably settled.

Pittston—More than 650 men attended the 8th annual banquet of the Pittston Mining Institute, oldest in the anthracite region, at the Pittston Armory on May 8. Captain W. A. May, president of the Pennsylvania Coal Co., was among the speakers. In his address, Attorney Evan C. Jones, of Wilkes Barre, referred to the institute as the exemplification of altruism. The institute has a membership of 700 and holds monthly meetings in the Pittston Y. M. C. A.

Bituminous

Somerset—In spite of the depressed condition of the coal market the mines of Somerset County are as active as at any time last year. The plants at Hooversville, Ralphton, Jenner and Jerome are working full time, the last named loading 95 steel railroad cars every day. The average number of cars of coal handled daily in the local yards of the Baltimore & Ohio R.R. is 450, which is about all the yard superintendent can take care of with present facilities.

Pittsburgh—Judge John D. Shafer in an opinion on May 5, dismissed the petition of John H. Jones, one of the receivers of the Pittsburgh-Buffalo Coal Co., in which he asked the court to require George H. Calvert, master appointed by the court to sell the coal properties, to cease advertising the mines for sale, pending the decision of the Supreme Court in an appeal taken by Mr. Jones from the decree of the lower court ordering the sale. The property is being advertised for sale on May 27, it was stated to the court at an argument, so that the sale would not be made before the decision of the appeal to the higher court. The court states that it does not see how the advertisement hurts the Pittsburgh-Buffalo Co.

Connellsville—Evidences of returning prosperity are to be found on the railroads of the Connellsville coke region, particularly the Pittsburgh & Lake Erie and its allied system, the Western Maryland. It is said that both the Pittsburgh & Lake Erie and the Western Maryland are giving their trainmen such steady work that fast freight trains have been held up until the crews completed their 8-hr. rest period The Western Maryland within the next few weeks will begin hauling coal out of the Fairmont region by way of Connellsville, using the Baltimore & Ohio tracks to this point.

Uniontown—Orders have been issued by the W. J. Rainey Co. for the resumption in full of all ovens at the Allison plant of the company. There are 400 ovens at this plant, 350 of which have been in steady operation. The firing of the 50 additional ovens will provide employment for a number of heretofore idle men at this plant.

Republic—Six first-aid teams composed of the employees of the Tower Hill Coke Co., have begun a course of instruction in first-aid and mine-rescue work that, when completed, will enable the members to take examinations for American Red Cross diplomas. The teams will meet weekly for two hours for instruction from D. B. and H. O. Millward, who not only hold the Red Cross diplomas but also those from the American Mine Safety Association. Dr. W. S. Kimmell is a member of the executive committee and assists with the work. The course will continue for three months at the end of which time the Red Cross will appoint examiners to conduct an examination for certificates.

WEST VIRGINIA

Charleston—Several of the larger coal operations in Raleigh County that have been carrying the accounts of their employees during the slack season in order to hold them together in anticipation of the resumption of active operation have notified these employees that the rent for the houses occupied by them during the past six months of virtual idleness will be remitted and that the terms of leasing for the purpose of collections of rentals will date from the resumption of work by their occupants.

Fairmont—Fifteen hundred miners are wanted by the Consolidation Coal Co. to man seven mines that will be put in commission shortly. Mines now in commission are being operated to their limit. The mines to be opened are: Beechwood No. 30; Murray No. 45; Montana No. 24; Shaft Mine No. 38; Meadow Brook No. 55; Coal Station No. 62, and Two Licks No. 39. These operations will run with a full compliment of men six days a week as long as the car supply holds out.

Huntington—The West Virginia Coal Operators Association opened temporary headquarters in the Robson-Prichard Bldg., recently. A. H. Land, secretary of the organization, has charge of the office. A meeting of the executive committee of this organization will be held in Huntington May 14, when plans relative to a campaign of education to familiarize producers and consumers with scientific coal costs will be discussed. This association has no political object, as has been rumored in the past.

ALABAMA

Birmingham—The Sloss-Sheffield Co. will resume operations at the Bessie mines, at the furnace at Florence, and the coke ovens at Blossburg and Brookside, about May 15. One thousand men will be employed. These plants have been closed down for six months.

TENNESSEE

Nashville—Two measures which have been recommended by the Democratic steering committee for passage by the Legislature, are the semi-monthly pay day bill and a bill to create a state mining department. Another measure which is also recommended provides for re-organization of the state geological department. The Workmen's Compensation measure has not been treated, the committee waiting for further reports from sub-committees.

The State Mining Department has announced that certificates have been issued to those who have satisfactorily stood examination for foremen of mines in Tennessee as follows: John Pass, of Cardiff; J. A. Tidewell, of Emery Gap; I. S. Montgomery, of Cardiff; A. C. Montgomery, Harriman; S. J. Ingram, A. M. Derrick, L. Carroll, C. Bolin and S. S. Bledo, of Rockwood.

KENTUCKY

Harlan—It is reported that the Stonega Coal & Coke Co. is planning to build a road across the mountain from Keokee to its mines at the head of Clover Fork in Harlan County. W. J. Gennery, store manager for the company, recently made the trip from the Virginia town to the head of Clover Fork by automobile, being the first to reach that point by this means.

Ashland—A meeting of the directors and others who recently organized the Kentucky River Coal Corporation will be held here on May 19 at which time various details of the merger will be taken up and worked out.

Middlesboro—The clean-up and paint-up campaign which has been engineered by the health authorities and mine operators is having a general effect. The miners are brightening up their homes and one Middlesboro dealer in the last two weeks reports the sale of wall paper for more than 200 miner's houses.

Whitesburg—There is continued improvement in activities in coal mining throughout eastern Kentucky, especially in the Elkhorn and Boone's Fork fields. Both the Consolidation Coal Co. and the Elk Horn Mining Corporation in the Jenkins-McRoberts-Fleming field have large orders sufficient to keep all their mines running full time. Hundreds of new miners are being added daily to the work. Railroads entering the territory are taxed to handle the output. Continued increases, however, will be made as the work advances.

Praise—The Eastern Kentucky Block Coal Co. is beginning a coal development a few miles from here on the Carolina, Clinchfield & Ohio R.R. A mining town has been started and the opening of mines is giving employment to several hundred men.

OHIO

Columbus—The Sunday Creek Coal Co. of Columbus has taken over the sales end of the San Toy mines, of the Jones and Adams Coal Co. at San Toy Ohio. The mines are now known as Sunday Creek mines Nos. 401 and 402.

C. E. Haskins, receiver for the Starr-Hocking Coal Co., which has mines in Athens County, received a bid of $5000 for the property when offered for sale at public auction for the second time at the court house, Columbus. J. G. Westwater submitted the bid for unnamed parties. The court will be asked to approve the bid.

Teegarden—The announcement is made by the West Pittsburgh Coal Co. that its mines near Teegarden, Ohio, will be opened soon. The mines have been idle for almost a year. Extensive improvements have been made on the tipple.

INDIANA

Indianapolis—The Supreme Court of the United States has declared constitutional the Indiana law requiring coal mine owners to provide wash houses for their employees. The operators attacked this law as being class legislation and on the ground that it permitted minority rule, as it provided that a wash house must be furnished if only 20 miners petition for it.

Linton—The Lattas Creek mine which has been idle for six months has begun working again.

Clinton—In accordance with the decision of the Supreme Court upholding the validity of the Indiana miners' wash house law, miners in this district will promptly prepare petitions, asking that such houses be supplied. The Bunsen Coal Co. already has wash houses with shower baths and clothes lockers.

ILLINOIS

Maryville—The casting holding the drum for the hoisting table at the Donk Mine here broke recently while hoisting. The cage fell back, and before the engineer could bring the engine to a stop considerable damage was done to the tipple and other top works. Four hundred miners have been thrown out of work until repairs can be made.

Carterville—The Carterville Coal Co., the oldest operating coal company in the Williamson County field, with offices in St. Louis, has gone into the hands of a receiver. The general business depression, with a narrowing market and slow collections, were assigned as the cause.

PERSONALS

W. Roland Cox, consulting mining engineer, of New York, has removed his offices from the City Investing Building to the Equitable Building, at 120 Broadway.

W. A. Lafont, secretary of the Rutledge & Taylor Coal Co., of St. Louis, Mo., has severed his relations with that firm after a continuous period of 16 years with it.

J. H. Lane, for the past 10 years in charge of Oliver No. 3 plant of the Oliver & Snyder Coal & Iron Co., has been promoted to the position of general superintendent of the three Oliver coke plants and also of the Southwest Water Co., succeeding the late Fred C. Keighley.

A. H. Wood, of Petros, Tenn., president of the Petros Coal Co., and who has for some time past been consulting engineer for the Turley Coal Co., whose headquarters are at Atlanta, Ga., with a mine at Turley, Tenn., has severed his connection with the last named company in order to be able to devote more of his time to the Harlan Coal & Coke Co., which he has just recently organized to develop a coal lease he has in the Harlan, Ky., field.

J. H. Healy has resigned his position as vice-president of the Black Hawk Coal Co., the Consolidated Fuel Co., the Castle Valley Coal Co., and the Panther Coal Co., which he filled for 18 years, this resignation to be effective July 1. Mr. Healy will take a two months' vacation, the first he has taken in 20 years. E. L. Carpenter, president of the above named companies, will in future perform the duties formerly assigned to the operating vice-president, and as soon an injunction proceedings are settled the four companies will be consolidated into the United States Fuel Co. Robert M. Morgan has been appointed general superintendent. He was formerly superintendent of the Utah Fuel Co. at Castle Gate, Utah.

OBITUARY

Dr. C. Clifton Ferrell, president of the Export Pratt Coal Co., was shot and killed by two burglars at Praco, 39 miles from Birmingham, Ala., recently. The burglars attempted to break into the commissary adjoining his home. Dr. Ferrell was 50 years of age and was a well-known educator, author and student. His remains were taken to Hopkinsville, Ky., for interment.

Alexander Thompson, of Pittston, Penn., mine foreman for the Pennsylvania Coal Co. since 1876, died on May 6 in St. Francis' Hospital, San Francisco, Calif. He was stricken with pneumonia while on a pleasure trip to the western coast on his first vacation in 50 years. He was born in Scotland, learned mining in his native land and came to the anthracite region in 1866. He was a rock and shaft-sinking contractor before becoming a mine foreman. Mr. Thompson had been a city councilman and was at the time of his death president of the Pittston City Planning Commission. His son, Dr. James R. Thompson, is bringing the body home.

Col. Lloyd Burrel Huff, aged 43, died at his home "Rose Fountain Park" at Greensburg, Penn., on May 5. Death was due to Bright's disease, from which he had been suffering for more than a year. Colonel Huff was widely known and was interested in large coal holdings in Westmoreland, Cambria and Indiana Counties in Pennsylvania and in West Virginia.

Col. Huff was born in Greenburg, Dec. 8, 1871. He was the son of the late Congressman G. E. Huff and Mrs. Henrietta C. Huff. He received his preliminary education in the public schools at Greensburg and was graduated from the Rensselaer Polytechnic Institute at Troy, N. Y. Upon his graduation from this institute he engaged in the coal business with his father and became a factor in many coal companies in Westmoreland, Cambria and Indiana counties.

He was president of the Keystone Coal & Coke Co., the Pittsburgh, McKeesport & Greensburg Ry. Co., the Westmoreland Hospital, the Allegheny Co., a coal company of Washington, D. C., and the United Brick Co. He was also a director in the Acme Gas Coal Co., the First National Bank of Greensburg, the Keystone Clay Products Co., and the Latrobe-Connellsville Coal & Coke Co.

Col. Huff was married about 9 years ago to Eleanora Moorehead, of Pittsburgh. He was a member of the staff of Governor Hastings and in this manner acquired the title of colonel. He is survived by his widow, two daughters, and his mother.

TRADE CATALOGS

The Deming Co., Salem, Ohio. Catalog J. "Power Pumps." Illustrated, 190 pp., 7x9 in.

E. Keeler Co., Williamsport, Penn. "Return Tubular Boilers." Forty-five pp., 7½x10½, illustrated.

The Kerr Turbine Co., Wellsville, N. Y. "Economy Turbo-Pumps." Twenty-two pp., 6x9 in., illustrated.

The C. D. Pruden Co., Baltimore, Md. Loose Leaf Catalog. "Portable Steel Buildings." Illustrated, 8x11 in.

The Kerr Turbine Co., Wellsville, N. Y. "Economy Exhaust Steam Turbines." Fourteen pp., 6x9 in., illustrated.

The Jeffrey Mfg. Co., Columbus, Ohio. Bulletin No. 141. "Single Roll Coal Crusher." Illustrated, 32 pp., 6x9 in.

The Dover Boiler Wks., 50 Church St., New York. "Dover Rustproof Enameled Tanks." Fourteen pp., 6x9 in., illustrated.

The Weber Subterranean Pump Co., 90 West St., New York. "The Weber Subterranean Pump." Twelve pp., 8½x11 in., illustrated.

The North Western Expanded Metal Co., Chicago, Ill. "Kno-Burn Expanded Metal Lath." Fifty-two pp., 6x9 in., illustrated.

The Brown Hoisting Machinery Co., Cleveland, Ohio. Catalog U. "Brownhoist Transfer Cars and Larries." Illustrated, 32 pp., 6x9 in.

The North Western Expanded Metal Co., Chicago, Ill. "Designing Data for Reinforced Concrete." Eighty-seven pp., 4x6½ in., illustrated.

Myers-Whaley Co., Knoxville, Tenn. Catalog No. 5. "Shoveling Machines for Underground and Surface Work." Illustrated, 28 pp., 8½x10 in.

The Ohio Brass Co., Mansfield, Ohio. O. B. Bulletin. "Electric Railway, Mine Haulage, and Power Transmission," Twenty-four pp., 6x9 in., illustrated.

PUBLICATIONS RECEIVED

Department of the Interior, U. S. Geological Survey. "The Production of Sand-Lime Brick in 1914," by Jefferson Middleton. Seven pp., 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines. Technical paper 81. "The Vapor Pressure of Arsenic Trioxide," by H. D. Welch and L. H. Duschak. Twenty-one pp., 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. Bulletin 596. "Geology and Coal Resources of North Park, Colo.," by A. L. Beekly. One hundred and twenty-one pp., 6x9 in., illustrated.

Department of the Interior, Bureau of Mines. Bulletin 81. "The Smelting of Copper Ores in the Electric Furnace," by Dorcey A. Lyon and Robt. M. Keeney. Seventy-seven pp., 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. Bulletin 567. "Results of Spirit Leveling in Idaho; 1896 to 1914 inclusive," by R. B. Marshall. One hundred and thirty pp., 6x9 in., unillustrated.

Department of the Interior, U. S. Geological Survey. Bulletin 582. "Mineral Deposits of the Santa Rita and Patagonia Mountains, Ariz.," by Frank G. Schrader. Three hundred and seventy-three pp., 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. Bulletin 580. "Contributions to Economic Geology. Part 1. Metals and Non-Metals Except Fuel," by F. L. Ransome and Hoyt S. Gale. Four hundred and sixty-two pp., 6x9 in., illustrated.

INDUSTRIAL NEWS

Pittsburgh, Penn.—The J. A. Brennan Drilling Co. has changed its name to the Pennsylvania Drilling Co. It has also moved its Scranton office to 2623 Whitehall Bldg., New York. The firm will continue business under the same management and officers as heretofore.

Birmingham, Ala.—A substantial increase in the coal trade, and a prevailing tone of optimism among operators are felt throughout the Birmingham district. It is believed that within a short time the improvement in conditions will warrant a 100 per cent. operation in some of the mines.

Fairmont, W. Va.—A gain of nearly 200,000 tons was made in the Chesapeake & Ohio coal shipments for the month of April over the previous month. The total shipments in the four districts amounted to 1,796,990 tons, gains being recorded in every district. Kanawha district shipped 523,100 tons; New River 508,555; and Guyan district shipped 486,495 tons.

Columbus, Ohio—The lately organized Jackson-Hocking Coal Co. has opened headquarters on the fourth floor of the Columbia Building. George M. Silcott, who has heretofore made his headquarters at Nelsonville, will be in charge as vice-president and general manager. The company owns three mines which were bought at receiver's sale of the Maple-Gallia Coal Co. These have a combined capacity of 700 tons per day.

St. Louis, Mo.—At the recent annual meeting of the Western Coal & Mining Co. and the Consolidated Coal Co., Kingdon Gould, of New York, was succeeded as president by W. J. Jenkins, of St. Louis, who has been vice-president and general manager. These two companies which have mines scattered throughout several states on the so called Gould railroads are two of the largest in the Middle West. The new president, Mr. Jenkins, has been associated with the Gould properties for many years and no radical changes are likely.

Pittston, Penn.—Work on the new Ewen breaker of the Pennsylvania Coal Co. is progressing in good shape. Last December the breaker burned down, a lot of stick timber being left that was not consumed. Considering the time taken to clear away the débris and get down to real building, the work shows that no time is being lost in replacing the structure. The mines thrown idle were Nos. 7 and 4 shafts and the Hoyt, but the coal from the latter was sent to the No. 14 breaker, so there was no general suspension at that particular colliery.

Harrisburg, Penn.—An order was issued on May 8, by the Public Service Commission directing that the Pennsylvania, Lehigh Valley and the Lehigh & New England R.R. companies establish a through route for the transportation of coke and coal from the producing regions in Pennsylvania to the plants of the Lehigh Fire Brick Works, the Bryden Horseshoe Co. and the Crane Iron Works, located in Catasauqua. The Commission also ordered the companies to establish joint rates, as follows: Upon coke, from Galilitzin, $1.65, a ton; from Latrobe, $1.85, and from Connellsville, $2.05. Upon coal from Clearfield and Latrobe, rate group, $1.75; from Greensburg, rate group, $1.85, and from Westmoreland, rate group, $2.05. The rate and routes are to become effective on or before May 17. It was the contention of the complainants that they were required to pay unreasonable rates and were unable to compete with other industries.

Harrisburg, Penn.—Shipments of anthracite coal in April were the largest ever reported for that month. The total volume of coal moved was 6,486,201 tons, compared with 6,072,164 tons last year, an increase of 414,037 tons. With April's large tonnage the total anthracite movement for the first four months of this year is almost equal to that of last year. In the four months ended Apr. 30, a total of 20,481,241 tons was moved, compared with 20,534,050 tons last year, a decrease of only 52,809. The Lehigh Valley R.R.'s tonnage in April was unusually large and all companies reported increased shipments except the Philadelphia & Reading R.R. The Lehigh Valley also leads in the amount of coal moved in the first four months, its tonnage being nearly 500,000 tons ahead of the Reading, which shows a decrease of 900,000 tons from last year. The Delaware & Hudson and the Lackawanna companies show a larger tonnage for the first third of the year. The Pennsylvania R.R. reported a loss of 151,575 tons. Following are the individual tonnages for April, Philadelphia & Reading, 1,181,959; Lehigh Valley, 1,303,119; Central R.R. of N. J., 770,356; D. L. & W. R.R. Co., 977,948; Delaware & Hudson, 642,913; Pennsylvania, 647,395; Erie, 737,548; Ontario & Western, 215,963; totals, 6,486,201.

Coal Trade Reviews

General Review

April anthracite makes a new record, but the trade is slowing up notably. Heavy loading in foreign trade the feature of the bituminous market. Internal consumption continues low. Light movement in Lake trade.

The official figures of the anthracite shipments for April more than sustained the predictions of a heavy production, the movement having established a new high record for that month. In addition to this the official figures also show a substantial decline in stocks at Tidewater, but in spite of this apparently encouraging technical position of the market, the trade is showing a general slowing up in all directions. There is a decided paucity of orders among some shippers, while concessions of 5c. and 10c. are necessary to move coal, and a general curtailment is anticipated in the immediate future. The market is particularly weak on the steam sizes, and large concessions are being reported on pea coal. In addition to this the Western movement is not particularly large.

Loading on foreign accounts from Atlantic Range ports continues extraordinarily heavy, the announcement by the British Government of a conditional embargo against exports having resulted in another spurt in this business. This offshore movement is now attaining to such proportions that it will soon be a potent factor in the general market situation, and will undoubtedly do much to relieve the heavy pressure under which the bituminous market has been laboring for so long.

The slightly firmer tone of the past week or two has been well maintained, but the closing up of the large navy contract, involving nearly a million tons of Pocahontas coal, on the basis of $2.73 is significant evidence of the underlying weakness. The market is being maintained only by the most rigid restriction in production, and the movement is confined almost entirely to contracts, the consumption on which is at a minimum.

Unless there are some most unexpected developments in the Lake trade late in the season, the movement in this direction will be even more disappointing than last year. The large consumers in the Pittsburgh district are not increasing orders, although there are conservative observers who believe that consumption is slightly larger, and that stocks are being drawn on for the extra tonnage. Competition from outside districts continues so aggressive that prices are under constant pressure, and shippers find very little encouraging in the situation.

There is so little business to be had in the Middle Western market that the agencies do not consider it worth while to reduce prices to obtain it, with a result that quotations are relatively well maintained, though at a low level. It is developing that a great many contracts have been closed at close to the cost of production. Rumors of a big consolidation of a number of the large Middle Western interests is a feature of the week's developments. The screenings market continues so strong that operators will soon be forced to crush other grades to meet the demand on this size.

BUSINESS OPINIONS

War scares cause a note of hesitancy. Basic conditions still considered highly favorable. "Engineering News" reports a significant increase in building operations.

Financial Chronicle—Owing to the dislocation of trade occasioned by the war, abnormal conditions prevail practically everywhere, and it behooves our people to proceed cautiously until the outlook becomes clearer and the possibility of sudden and strange surprises no longer exists. Even the United States Treasury cannot claim exemption. It is distinctly weaker than it would be if its income had not been so seriously impaired by the war. The truth is, under the continued falling off in revenues, with the coincident increase in the expenditures, the Treasury situation has now reached a point where we should imagine it must at times be causing much anxiety.

Bradstreet's—Undercurrents run in a favorable direction though trends in certain lines and some sections, affected either by weather conditions or marked dependence on a particular commodity, still lag. But by and large, the outstanding factors indicate that industry has made further progress; steel mills are operating at close to 75 per cent. of capacity; buying of pig iron, helped by speculative purchases, has spread; plants making war supplies are pushed to the utmost; additional export orders of magnitude are pending and unemployment is decreasing.

Dun's — Business conditions show comparatively little change, and though the recent cheerful outlook is maintained, convervatism goes hand in hand with increased confidence.

Engineering News—Contemplated building operations in 23 cities in the Eastern States from plans filed in April show a gain of $4,000,000 or 16% compared with the same month last year. This gain is progressive for in March it was only slightly over $1,000,000, in February $3,000,000 and in January about the same. It is the largest gain recorded for more than a year. For the first four months the gain in these cities aggregated $9,000,000 or 11%. A falling off of $1,000,000 recorded in 25 Central cities, compares with one of more than $3,000,000 last month and nearly as much in each of the two previous ones. The loss of $1,300,000 in 14 Southern cities compares with one of over $2,500,000 in the previous month.

Iron and Steel—A falling off in the unfilled tonnage of the United States Steel Corporation of less than 100,000 was not unexpected for the output of steel products in April was substantially larger than in March. The steel manufacturers, those doing purely an ordinary business, are running to about 75% of capacity. One of the favorable developments has been the placing of several orders for steamships; contracts for at least four boats have been signed within the last ten days. Buying of pig iron has broadened out following large purchases of Southern foundry by speculative interests. Railroad purchases are small but the earnings of carriers have so improved that larger buying may soon take place.

American Wool and Cotton Reporter—Foreign wools, Australian and Capes, were the only feature of the Boston wool market this week. Total sales for the week ran about 1,750,000 lb., 75% of these being Australians and Capes. There is a distinct feeling in the market that fine wools will continue for a long time to be valuable property. Coarse wools, which have been most desirable for army cloth purposes, have remained high because of the war. Wools around the world are 50% higher than the average price.

The Southern Lumberman—Reports from leading hardwood markets for this week are more encouraging than for some time past. Development is spring business has been slow but steady, and now has assumed a volume which is gratifying.

Boston News Bureau—Of course the present situation depends entirely on foreign developments. There are numerous favorable features that are presenting themselves, such as the splendid outlook for wheat, our remarkable foreign commerce, the improvement in railroad earnings, the reduced surplus of idle cars, our strong financial position and the averting of war between Japan and China. These, however, are so overshadowed by foreign complications that they cease to carry the weight warranted.

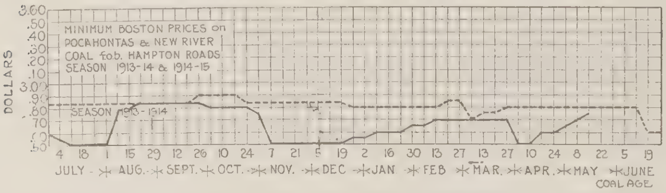
ATLANTIC SEABOARD

BOSTON

Pocahontas and New River market continues on a better price basis. No gain in demand, however. Export market closely followed, but buyers still holding back. Georges Creek demand off-shore keeps up but Pennsylvania grades are dull. Anthracite shippers beginning to get short of orders.

Bituminous—The market on Pocahontas and New River has developed no new features. The slight improvement reported last week in conditions f.o.b. Hampton Roads has been maintained and there is a slightly firmer tone both with respect to future business and current inquiry for export. The recent closing of a Navy Department contract at $2.73 f.o.b. is an instance of this slight improvement. Coastwise there is practically no demand for spot coal and the agencies are working almost exclusively on contract arrangements. Shipments are coming forward regularly but there is still an entire lack of snap to the trade in this territory. The export market is being followed with much interest here but there is some difference of opinion as to its probable bearing on the trade. The weight of the argument seems to be with those who feel that the foreign demand is bound to broaden and this will have a marked effect on prices. Should the railroads be called upon to meet such an extra demand it is likely that the deficiencies of equipment that have been suffered through the hard times will come to light all too plainly.

Meanwhile, buyers who have not yet made season contracts are still tempering the market and a supply of consignment cargoes at the distributing points here has been sufficient to encourage them in their holding off. For tail-end of cargoes, prices have been as low as $3.40 on cars Providence and $3.50 at Boston. Such figures net nearer $2.50 f.o.b. than $2.75@2.80.



Georges Creek output is still being confined to Baltimore loading and will continue to be routed there until the present delay in steamer loading is overcome. The ships of this grade were pioneers in several foreign markets and they are now getting results both from work put in heretofore and from their new financial connections. In this territory there is no change in prices and except in scattered instances no improvement in the demand for this grade.

The Pennsylvania coals share the general dullness. Inquiry is lax and with West Virginia coals so low in price for small lots inland there is very little chance even for Cambrias and Somersets. A fair volume of these coals is coming forward in conjunction with anthracite from Philadelphia but even this business will probably sag off in a few weeks. All-rail the movement is light. Most of the consumers are well behind their usual requirements.

Anthracite—There is already a decided lack of orders among some of the shippers, and concessions of 5@10c. are made in order to move coal. A general curtailment is looked for in the near future. The steam sizes and dock screenings are still in good demand in this market.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*..........	$0.85@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*.....	2.10@2.65	2.40@2.85	2.92@3.02	
New York*......	2.40@2.95	2.70@3.15	3.22@3.32	
Baltimore*......	....	....	2.85@2.95	
Hampton Roads*.	....	....	....	$2.75@2.80
Boston†.........	....	....	....	3.50@3.73
Providence†......	....	....	....	3.40@3.68

* F.o.b. †On cars.

NEW YORK

Bituminous quiet with shipments heavily restricted. Improved outlook in the export trade. Anthracite slowing down. Heavy April shipments create a surplus. Pea coal a drug on the market.

Bituminous—The soft coal market continues dull with little change from last week. Operators and shippers are full of hope, however, for a reversal of conditions in the near future. The mines are not very active but sufficient coal is being received here to meet all demands. As a result of this conservatism on the part of operators the market is not flooded with demurrage coal. Spot coals are scarce. Operators are realizing there is not much profit in shipping coal to this market when it must be sold at a loss to save demurrage charges. Mine owners as a rule are not shipping any more coal than they have orders to fill. This necessitates a curtailment of production and in the Cambria and Clearfield districts the mines are working on about a two and one-half day schedule. Those in the Somerset district are doing about four days a week while other mines with excellent coals are working from one to one and one-half days a week. On the other hand the mines in the New River district are working about four and one-half days a week and those in the Pocahontas district a trifle better.

The export business is becoming stronger. Inquiries are increasing. Some have come recently from Italy, Egypt, France and quite a number from Argentina. Many of the inquiries have been regarding New River and Pocahontas coals. One report had it that a New York banking house with French connections has been making inquiries regarding the shipment of 250,000 tons of three-quarter gas coal, and the same amount of run-of-mine to b,e used for the French Government.

In the local harbor the cheapest quotation heard is $2.25. The general quotations on various grades are as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek	$3.00@3.10	$3.00@3.10	$3.00@3.10	$1.45@1.55
Clearfield, medium	2.65@2.80	2.50@2.65	......	1.10@1.25
Clearfield, ordinary ...	2.45@2.55	2.40@2.50	......	1.00@1.10
Broad Top Mountain—				
Cambria County:				
South Forks	2.90@3.05	......	......	1.35@1.50
Nanty Glo..	2.75@2.80	......	......	1.20@1.25
Barnesboro..	2.65@2.70	......	......	1.10@1.15
Somerset County:				
Quemahoning	......	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.55@2.70	2.45@2.65	2.45@2.65	1.10@1.15
Latrobe	2.40@2.50	......	......	.90@1.00
Greensburg ..	2.60@2.70	......	......	.90@1.00
Westmoreland	2.90@3.15	......	......	1.15@1.60
W. Va. three-quarter	......	2.30@2.55	2.30@2.55	.90@1.00
W. Va. mine-run	......	2.50@2.90	2.50@2.90	.95@1.35
West. Maryland	......	2.25@2.40	2.25@2.40	.80@ .90

Anthracite—As predicted last week shipments of hard coal during April were greater than during the corresponding month of last year. Not only that, but April shipments were greater than those of any previous year. The shipments for the month were 6,486,201 tons while the best previous record for April shipments was 6,224,396 tons, made in April 1910. At the same time the coal on hand at Tidewater decreased from 873,698 tons on Mar. 31 to 735,567 tons on Apr. 30, a total of 138,131 tons. Notwithstanding these figures, shippers in this market say the anthracite coal business is quiet. Coal is plentiful at the docks. The mines are working full time and the Lake trade is taking its share of the supply. Egg coal is stronger while the greatest pressure has been on nut coal.

The steam coals remain inactive. There is plenty of these grades on the docks with little demand. Good qualities of pea coal have been quoted at from 40 to 50c. off while some of the cheaper grades are being sold at whatever can be obtained for them. There is no market for Nos. 1 and 2 buckwheat while No. 3 is in fair demand.

Quotations run about as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken..	$4.65		$4.70	-
Egg..................	4.90	$4.80	4.95	$4.85
Stove................	4.90	4.80	4.95	4.85
Chestnut	5.15	5.00	5.20	5.05
Pea..................	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat...........	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice................	2.00@2.25	1.90@2.10	2.05@2.30	2.00@2.25
Barley..............	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

BALTIMORE

The export trade continues the predominating feature. May shipments on foreign account will run close to quarter of million tons. General domestic situation remains dull.

The attention of the coal trade here is riveted on the immense foreign movement. At the present rate of loading it seems assured that 250,000 tons will be dumped into vessels here in May for foreign delivery. Most of this is going to South American account but large quantities are also going to Italy and Egypt. With the British Board of Trade having ruled that no coals shall be exported from the United Kingdom except to the war allies of that country, a large field is opened up to American coals that was previously held exclusively by the Welsh and English. It is generally expected that this will do much to relieve the flat coal situation.

The general situation as regards the local market remains dull. There is a little better feeling and slightly heavier ordering as a general thing, but there is still plenty of room for improvement. Prices are somewhat steadier, especially on the better grade coals.

Less desirable coals are still offering cheap. Maryland and West Virginia low-grade steam coals are to be had at from 80 to 90c. at the mines to the trade. From 90c. to $1 is asked for less desirable Pennsylvania line coals. The gas-coal situation remains weak.

The charters for the past week included the following:

Vessel	Nationality	To	Rate
William Chatham		Tiburon	$6.50
St. Helens		Tiburon	6.50
Alvarado		San Diego	6:98
Biblster	British	Barcelona	
Modiva	Northern	Isabela de Sagua, Cuba	
Ferndene	British	Palermo	
Christoforos	Greek	Mediterranean port	
Ubbergen	Dutch	Havana	
Linda Fell	British	Alexandria, Egypt	
Bertrand	British	River Plate port	0.39
Heighingham	British	Barcelona	0.28
Henry Ibsen	Northern	Barcelona	0.39

Note—Steamers are indicated by **bold face type,** all others being schooners.

PHILADELPHIA

Anthracite trade beginning to lag and curtailed operations likely in the near future. Operators handicapped with small sizes. Bituminous shows little disposition to improve.

Anthracite—The past week has shown a marked falling off in the demand, particularly on the small sizes, and as many of the large operators have carried over considerable of these, the lack of storage room is likely to result in a partial suspension of mining. It is also understood that the demand for chestnut has fallen off to such an extent that it will soon be necessary to store this size also. Broken, egg and stove still continue active, with the preference, if anything, on stove. Egg is also in good demand and there is no difficulty experienced in disposing of the production of broken. The price war in certain sections of the city makes the dealers rather uncertain about their position, and causes many of them to hesitate about taking on additional stocks, until something like order is restored. Collections are also reported slow.

Individual operators are taking advantage of the situation to quote coals that are inactive, at prices less than circular, although it is understood that the concessions are not heavy as yet. April prices for May and June delivery are frequently noted. The trade as a whole does not compare favorably with last year. At that time the mines operated full all through the month of May, but the prospects of continuing on this basis during the current month are not reassuring.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.35	$4.25
Egg	4.60	4.60
Stove	4.60	4.60
Chestnut	4.85	4.75@4.80

Bituminous—While there is considerable moving, most of it is being applied on contracts. Tidewater deliveries are prompt, and it is understood there is little or no coal standing for which disposition has not already been made.

HAMPTON ROADS

Export shipments continue heavy. Government colliers loading. Accumulations at Tidewater somewhat in excess of normal.

Dumpings over the Tidewater piers for the week, while not as heavy as anticipated, at the same time have shown up well. This is especially true as regards the export movement which continues heavy. The bulk of the export cargoes have gone to Italy with other shipments to South American, West Indian and other ports. One cargo of 8013 tons was shipped to Soubaja, Java, and about 10,000 to Spain. The shipment to Soubaja is one of the largest that has ever left Hampton Roads for Java.

Coastwise shipments have consisted of New River and Pocahontas mine-run, nut and slack and the high volatile coals but all shipments going foreign have been mine-run exclusively and a greater portion of them were Pocahontas coal.

The circular prices, so far as can be ascertained, are being maintained except where, perhaps, a shipper has coal on demurrage.

The bunker movement for the week has not shown up so well. It is understood that a fleet of these vessels is due for the coming week and with the Government colliers due and other tonnage expected it is believed that heavy dumpings will be made during the next few days. The following Government colliers are expected to load at Hampton Roads during May: "Proteus," "Nereus," and "Cyclops." These vessels will take approximately 38,000 and this with coal already taken by the Government will assist materially in swelling May dumpings at the various piers.

The following vessels sailed from Hampton Roads with cargoes of coal during the week Apr. 30 to May 7, inclusive:

Norfolk

Vessel	Destination	Tons
Montoso	San Juan	3000
Dinsdalehall	Genoa	4200
Posillipo	Gib for orders for Italy	8100
Mar Terso	Siracusa	4392
Jas. W. Maxwell	Para	1714
Tea	Caglairi	7158
Chinche	Chilian Ports	1900
Guineguada(bark)	Las Palmas	405
Henrik Isben	Valencia	7032
Palembang	Soubaja, Java	8013
Scillin	Messina	4392
Paddington	Spezia	5622
Wegadesk	Colon	6500
Tabor	St. Thomas	5500
Sicania	Italy	5316
Pendarves	Barcelona	3447
Boniface	Para	605
Windsor	Savona	7979
Juan	Kingston	1100
Haugarland	Venice	6550
Poviga	Savona	4475
Berlin	Kingston	2800

Newport News

Vessel	Destination	Tons
Wearbridge	Rio de Janeiro	5889
Svend 2nd	Havana	3000
Honduras	Havana	2715
St. Lenords	Rio de Janeiro	6400
Kanawha	Rio de Janeiro	2800
Oakland Grange		6300
Florizel	Port au Spain	

Virginian Ry.—Dumpings of this road at Hampton Roads for the week ended May 8 amounted to 178,738 tons.

Norfolk & Western Ry.—Dumpings of this road for the week ended May 8 were 138,105 tons.

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Falk	Norwegian	Philadelphia	Kingston, Ja.	1126	
Tysland	Danish	Philadelphia	Cienfuegos	876	
Chelston	British	Philadelphia	Havana	2389	
Iona Tunnell		Philadelphia	Galveston	1118	
Penaghi Lykiardopoulos	Greek	Norfolk	La Plata	2054	$8.40
Rosalia	Italian	Norfolk	Santos	2673	9.60
Den of Crombie	British	Baltimore	West Coast Italy	3128	10.80
Ferndene	British	Baltimore	Palermo	2444	
Modiva	Norwegian	Baltimore	Sagua	778	
Maude Palmer		Norfolk	Para	1485	
Dorothy B. Barrett		Baltimore	Boston	1799	
Claveresk	British	Philadelphia	Havana	2441	
Robert P. Murphy		Philadelphia	Porto Rico	572	
Edwina		Philadelphia	Porto Rico	398	
Robert A. Snyder		Philadelphia or Virginia	Nassau	302	
Urd	Norwegian	Philadelphia	Barcelona	1968	
St. Andrews	Norwegian	Philadelphia	Havana	1899	
Malinche	British	Philadelphia	Antilla	1165	
Clara A. Donnell		Atlantic Range	Canary Islands	990	
St. Helens		Atlantic Range	Tiburon	1212	$6.50
William Chatham		Atlantic Range	Tiburon	915	
Alvarado		Atlantic Range	San Diego	940	6.95
Augustus Welt		Norfolk	Rio Janeiro	1111	
Marguerite		Philadelphia	Mayport	1475	1.00
Linda Fell	British	Baltimore	Alexandria	1924	
Ubbergen	Dutch	Baltimore	Havana	1150	
Sif	Norwegian	Newport News	Martinique	1959	

Note—Steamers are indicated by **bold face type**, all others being schooners.

OCEAN FREIGHTS

Numerous export charters. Prohibition of British coal exports creating an expansion in American shipping. Rates easier to South America but firmer to Mediterranean.

The sinking of the "Lusitania" has had no appreciable effect as yet on the freight market. We continue to charter one or two steamers daily for export coal, and the action of the British Government in placing an embargo on the exportation of coals from Great Britain to countries other than her allies or colonies, will undoubtedly increase the exportation of American coal very materially.

Since our last report about 15 steamers have been chartered for Plate and Brazil coals, a few of which charters were effected in London for shipment of coal from here, and we find that the charters we have made will average about 48c. per ton less than the charters closed on the other side.

South American rates are easier but Mediterranean rates are stronger owing to the firm offers that are being made by Philadelphia parties of $10.80, all freight paid in advance for steamers to take coal from U. S. Range to Genoa.

Ocean freights are now quotable on the following basis:

To	Rate	To	Rate
Havana	$2.25@2.50	Bermuda	$3.50@3.75
Cardenas or Sagua	3.25@3.50	Vera Cruz	**3.50**
Cienfuegos	3.25@3.50	Tampico	**3.50**
Port au Spain, Trinidad	3.75@4.00	Rio	**9.24**
St. Lucia	3.50@3.75	Santos	**9.36**
St. Thomas	**3.25**	Montevideo	**8.64**
Barbados	3.75@4.00	Buenos Aires or La Plata	**8.76**
Kingston	3.00@3.25	Rosario	**8.88**
Curacao	3.75@4.00	Mediterranean*	**9.60**
Santiago	3.25@3.50	Spain**	9.60@10.08
Guantanamo	3.25@3.50	Valparaiso†	**6.72**
Demerara	5.50@6.00	Marseilles	**9.60**

Note—Rates noted in **bold face** type are only approximate.
* To a direct port on the West coast of Italy.
† With 800 tons per day discharge.
**Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

LAKE MARKETS

PITTSBURGH

No improvement in demand in general market and Lake shipments still very light. Prices irregular. Production at 50 to 60% of capacity.

The Pittsburgh district coal market is growing no better with the progress of the season. While Lake shipments are slightly increased they are still very small and no hopes are entertained for anything like a normal volume of shipments before July 1 at the earliest. Unless an unusual demand develops late in the season the movement as a whole will show little improvement over the disappointing tonnage of last year.

Retail demand continues light and manufacturing demand has shown no increase, having been practically stationary for several weeks. Reports from the steel trade are of production at an unchanged rate so that there has been no reason to expect an increase in coal shipments either to producers or consumers of steel. The railroad demand is only fair.

Prices for Pittsburgh district coal continue very irregular. It is claimed here that other districts are making the market, although of course it is admitted that the local competition is keen. There is very little contracting either for Lake shipment or for local consumption. The asking price on contracts to run to Apr. 1 remains at about $1.15 for mine-run, but it is probable this could be shaded. On Lake coal (¾-in.) the regular market continues to be $1.15 to consumers or $1.10 to dealers, but very little is being done at any price. For ordinary prompt shipment the market is quotable about as follows, subject to occasional concessions: Slack, 70@80c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district. Mining operations are at the rate of 50 to 60% of capacity.

BUFFALO

Trade continues in the rut particularly toward Canada. Slack the only size in any demand. Consumers apparently cleaning up their supplies. Anthracite slowing down and concessions are reported.

Bituminous—In spite of the acknowledged dullness of the trade there is a general feeling that the actual consumption is steadily increasing. The large consumers, including the leading railroads, are cleaning up their stocks of coal probably with a view to buying as little as possible till after the close of the fiscal year at the end of June.

There is no stir yet in the Canadian trade. It appears that Canada is going to turn her attention more and more to the European war and her manufacturing will be along that line. Some believe that this is sufficient to insure a large factory activity, but if the amount of coal taken is any indication, there is not much business there now. Buffalo coal shippers watch the Canadian market closely, but find little encouragement there as yet and the prospect for an early improvement is not very good. Quotations on bituminous coal remain as before, on the basis of $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack, with the market bare of the latter. Allegheny Valley sizes are about 25c. lower than Pittsburgh.

Anthracite—The trade is dropping off. Some sellers are apparently reconciled to this as being quite seasonable, while others point out that with all the effort to stimulate buying by cutting the price, the tonnage has not been large this spring; as a result the trade has lost doubly to the consumer, who is not only getting coal at a reduction in many instances, but it is economizing in quantity. The westward movement of anthracite is not heavy, either by Lake or rail, though no particular complaint is made. Only one shipper is crowding coal westward, the others believing that if it sells eastward there is no need of urging it in any other direction. Anthracite shipments by Lake for the week were 85,000 tons, destined to eight ports, but the great bulk of it as usual, goes to the heads of the Lakes.

TORONTO, CAN.

The market remains dull and heavy with little indication of any improvement.

The trade continues quiet, both in domestic and manufacturing lines. Dealers do not anticipate much change in conditions for some time, as the industrial situation shows little indication of improvement. Prices for bituminous remain unchanged, quotations for best grades being as follows: Retail, anthracite, egg, stove and nut, $7.50; grate, $7.25; pea, $6. Bituminous, steam, $5.25; screenings, $4.25@4.50; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars three-quarter lump, $3.56; screenings, $2.90.

TOLEDO

More boats will go up the Lakes despite light coal movement. Domestic trade fair in spots. Low level of water on the Lakes.

Considerable coal has arrived here and some little Lake coal has been shipped but the water movement is unusually light for this season of the year and little is expected in the way of improvement until some of the coal carried over at the upper docks is moved. There will be some movement by June but the really heavy Lake trade will not begin until July.

It is stated that the water in the Lakes is lower than usual which makes it necessary to load coal and ore boats to 18½-ft. draft instead of 19 ft. as was formerly carried. This means that there will be more boats in commission this year than usual for Lake carrying. There is some slight movement in Kanawha splint, Kanawha gas and Fairmont coal for Lake shipment. Owing to the fact that the Pittsburg No. 8 mines are practically all closed because of labor difficulties, Cambridge coal is selling rather better than usual here and prices are fairly strong.

The domestic trade is naturally at the dull season of the year. Prices are not ruling especially firm, depending largely on the urgency of the seller or buyer.

COLUMBUS

The trade continues quiet. Some activity is developing in Lake business and the tone of the market is slightly improved. Prices are still low.

All branches of the business are still quiet and prices are rather weak at former levels. The stocking period has not yet arrived and as a consequence there is little doing in domestic sizes. However, future prospects appear brighter than formerly.

Domestic business is scattered. Only small orders are being received to piece out stocks for the present. There is no disposition on the part of retailers to increase stocks and they have been devoting their energies to cleaning up. Domestic prices are unchanged from the levels of the previous week. Pocahontas lump is selling around $4 while West Virginia splints are quoted at $3.50 for lump and $3.25 for mine-run. Hocking Lump is rather strong at $3.25. Anthracite is also receiving some attention.

Lake trade is showing more activity. Some bottoms have been loaded with Ohio coal and started for the Northwest. Reports from the Upper Lake ports show that there is a large tonnage still on the docks and the interior movement is limited.

Production in Ohio fields has not increased to any extent during the past week. Some spurts are noted in the Hocking Valley where Lake trade is active. But generally speaking the output in the Hocking Valley and allied fields has been about 25% of normal. In the Pomeroy Bend field the output is not more than 40% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.60	0.60	0.55
Coarse slack	0.50	0.50	0.45

CINCINNATI

The market is dull in all departments. Prices generally weak except in smokeless. Buying is very slack.

The failure of the industrial situation to mprove, except in isolated cases, is largely responsible for an extremely dull market, and for very limited buying in all departments. The Lake movement, save from some of the new districts in the Kanawha field via the C., H. & D., is by no means satisfactory and such coal as is being moved is not shipped up the Lakes but is stored at the docks, in anticipation of better business later on.

The domestic market is at a complete standstill by reason of the general reluctance of the retail trade to buy, and industrial consumers seem to feel the same way about steam coal. Contracting has been considerably hampered by this feeling, buyers preferring to take up spot coal at low prices and take their chance of a rise later on. Everything is still waiting for a general improvement in business.

CLEVELAND

The trade is showing a marked weakness as compared with two weeks ago. The spot market is again down to the low point of the spring.

The absorbing power of the market does not increase Receipts run less than 300 cars over Sunday, but they stock the market. Fine coal is being sold at $1.65@1.75 and coarse grades in proportion. The Lake trade is not taking much coa and the local markets are getting as much surplus coal a they did all winter. Jobbing prices are so low that operator are unable to make anything, but they are not low enoug to let the jobber make a profit. As has been the case a goo part of the last six months the shipment prices to jobbers ar equal to spot prices.

While industries are increasing their operations slowl the contract business has been very small. Most of the com panies are buying on the open market and the outlook is th the contract business will be done late in the summer. O large shipper has not bought any coal except what goes o long-term contracts.

Lake shipping is very light. Only shippers are operatin their full fleets, and a number of these have only part their fleets in service. The Upper Lake docks are well su plied with coal.

Quotations for shipment to jobbers are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	......	......	......	......
Lump, ¾ in.	.....	$2.20@2.25	$2.00	$1.80@1.85	$1.75@1.
Egg	3.10	......	......	......	......
Mine run	2.65@2.70	2.10	1.85	1.85@1.90	1.75@1.
Slack	......	1.65	1.60	1.65@1.70	....

COKE

CONNELLSVILLE

Coke market dragging with prospects good but prices still low. Some contracting for foundry coke. Production decreased and shipments increased to the largest in months.

A contract for about 10,000 tons monthly of high-grade Connellsville furnace has been closed for the second-half of the year, the contract being practically a continuation of one now in force covering the first-half. Two or three other second-half contracts are under negotiation, but consumers show no haste. While nearly all operators regard the outlook for the more distant future as relatively good, it remains a fact that there is cheap coke on the market and until a moderate quantity has been absorbed prices are not likely to advance, however good the prospects. Spot coke, indeed, is a shade easier.

We quote furnace coke at $1.50@1.60 for spot, $1.60@1.65 for shipment to July 1 and $1.75 for shipment over second half. A few consumers have been in the market for foundry coke over the twelvemonth to begin July 1 and a number of contracts for from one car to half a dozen cars a week have been closed at about $2.40, this being for very high-grade coke. Other coke, of standard grade, is available down to $2.20. There is spot furnace coke as low as $2, but the best grades are held at $2.35 or higher.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 1 at 292,891 tons, a decrease of 6602 tons, and shipments at 303,377 tons, an increase of 9711 tons, and making shipments the greatest in any week for many months.

Buffalo—There is more activity in coke at the ovens than for some time and it is expected that this will extend this way soon, though it has not done so to any extent yet. Smelters are in operation, with a slightly increased demand for their product. It is believed that the improvement will continue. Prices are founded on $4.15 for best 72-hr. Connellsville foundry and $3.15 for stock coke.

Chicago—Furnace and foundry coke shows no change in prices or demand, and some byproduct coke has been sold during the past week at low prices. There seems to be no way of stimulating the market. Prices are as follows: Byproduct, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

St. Louis—Inquiries on foundry coke are few and far between. On byproduct coke a small tonnage is moving in from the East for domestic purposes. Local gas house coke is going out to various yards for storage, and the capacity of the local plant is crowded. There will be a large movement of this to the domestic consumer, beginning the middle of this month.

MIDDLE WESTERN

GENERAL REVIEW

Dullness still prevails but prices show no backward tendency. Screenings strong. Smokeless and Kentucky coals weakened. Anthracite slow.

Shipments of domestic and steam sizes during the past week have been reduced, although prices are fairly well maintained. The movement is less at this time of the year than in past seasons. The trade is not inclined to handle much consignment coal in the present state of affairs. So little business is in sight that it is not considered worth while to reduce prices to obtain tonnage.

Open confidence in the future is reflected in all phases of the trade, although present conditions are anything but satisfactory. Undoubtedly a number of contracts have been made at prices below the cost of production, due to delay on the part of the operators in getting their selling organizations in working order. Another year there is every reason to believe that Illinois, Indiana, Kentucky and West Virginia producers will have more effective selling organizations.

Most of the orders now being received are for future delivery, requests for immediate shipment being few and far between. It is said that loading of lake vessels is very slow, and it is not anticipated that the tonnage will be large before early next month. The docks still have a large accumulation of coal.

The operators continue to restrict production in keeping with market requirements, which means that the Indiana and Illinois mines still kept open are operating between two and three days per week. Screenings are strong, and the fine coal market is about reaching a point where the operators will soon be crushing mine-run or other sizes to meet requirements. It is difficult under prevailing conditions to fix definite prices for the coarser grades of coal, and it is easy to secure concessions of 5c. to 10c. per ton on these sizes when an order is offered for immediate acceptance. On steam coals, and particularly screenings, prices are fairly strong and on a parity with last week's figures.

CHICAGO

Steam coals fairly active but domestic grades are flat. Operations generally much restricted. Some Hocking on demurrage.

Southern Illinois mines virtually have no demand for domestic sizes, although the steam coal is strong, with prices somewhat higher than last week. Mines are being closed down rather than to sell domestic sizes under cost. There are some Saline County domestic sizes being shipped for steam purposes to prevent an over-accumulation of loaded cars at the mines.

A better state of affairs is reflected in the Springfield district, and screenings are strong at 80c. per ton. The demand for domestic coals from the Indiana mines is practically at a standstill, and steam sizes are moving slowly. Screenings from this district are strong.

Eastern Kentucky coal is doing almost the impossible thing of standing still, and there is little or no movement of these fuels into this territory.

There is nothing to be said about Hocking coals except that a few cars of demurrage coal have been sold during the past week at sacrifice prices.

The smokeless situation is still backward and there is little buying.

The demand for anthracite shows an improvement. Some storage orders have been placed, and May buying promises to cover a much heavier tonnage than April. Prices are well maintained.

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.35	$1.15@1.30	....	....	$1.35@1.50
4-in. lump..	....	....	$1.40@1.50	$1.40@1.50	....
Steam lump	....	1.20	1.15@1.25	1.10@1.25	....
2½-in. lump.	....	....	1.20@1.30	1.20@1.30	....
1¼-in. lump.	....	....	1.15@1.25	1.10@1.25	....
Mine-run...	1.10	1.00@1.05	0.95@1.10	1.00@1.10	....
Egg........	1.25@1.35	1.15@1.30	1.15@1.25	1.10@1.25	....
No.1washed	1.25@1.35	....	1.60@1.65	....	1.35@1.50
No.2washed	1.20@1.35	....	1.75	....	1.35@1.50
6x3-in. egg.	....	....	....	....	1.50
Nut.......	....	1.00@1.05	1.00@1.10	1.05@1.10	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	0.90@1.05	0.85	0.80@0.90	0.80@0.90	0.90

	Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.35	$1.15@1.35	$1.50@1.60	$1.50	1.35@1.50
1¼-in. lump.	1.25	1.15@1.35	....	....	....
Lump & egg	....	....	1.50@1.60	....	....
Mine-run...	1.00@1.05	....	1.25	1.15@1.25	....
Egg........	1.15@1.25	0.95@1.05	....	1.40@1.50	1.35@1.50
Nut.......	....	....	....	....	1.20@1.25
Screenings..	0.90@1.00	....	....	....	....

ST. LOUIS

Movement light and prices maintained with difficulty. Rumor of a consolidation of Carterville selling interests.

Only a small tonnage of coal is moving and there is no tendency to stock up on any of the sizes. The maintaining of prices on coal from the Standard field, or the effort to maintain them, has caused several buyers to purchase coal from the Carterville field at a 15c. higher rate. Carterville lump and egg can be bought for as low as $1 at the mine, while Standard lump and egg is held at from $1.10@1.20. The difference of 15c. a ton in favor of the Standard coal, which is inferior to Carterville, has forced the buyers to use the latter.

It is understood that a movement will be consummated in the next few days that will bring the Carterville operators into a selling agency to prevent ruinous competition. The headquarters of this movement will likely be in Chicago, and several sales agencies will be eliminated.

An exceptionally good tonnage of anthracite is moving in the first of May and a fairly good tonnage of smokeless has been ordered and some moving. Storage purchasing will be slow this year in a domestic way, perhaps even more so than last year, which was distressing to the retailer.

INDIANAPOLIS

Mines doing about three to four days a week. Prices steady; slack relatively the best sale. A very small improvement in the factory demand.

The coal industry in Indiana keeps at a steady level as to volume and prices. The demand for domestic lump is small as is to be expected at this season. Later on the movement to the Northwest will begin but at present steam coal is all that is going in that direction. The railroad demand changes little and there is only a microscopical improvement in the industrial takings. Screenings continue to be the backbone of the trade; they sell quite readily at 85 to 90c. On other grades prices are at the summer level. Mines are making something better than half-time. The retail yards have begun stocking up with Eastern coals, in order to obtain the advantage of the low April prices.

The operators in order to avoid the necessity of closing down entirely are shutting off portions of the mines and operating the remaining rooms full time. Contracting is about up to normal for the season; prices, as a rule, are the same as those prevailing last year. Most of the mine owners seem not to expect much revival in trade until the fall demand begins.

KANSAS CITY

Trade generally dull but shows a slight increase due to a better manufacturing demand.

Business is exceedingly dull according to the dealers. The wholesale trade has been holding up well and increasing with a slight increase in manufacturing lines. The operators say that they have been operating their mines nearly to capacity for the past week. They claim that they will begin the extensive winter preparations, probably as early as the last of June, as they expect an early season this year. The mines in the central part of Missouri have been operating steadily and many cars of domestic lump are standing on the tracks. The number arriving here is increasing every week.

PORTLAND, ORE.

Business quiet. Mine owners in Utah and Wyoming send notice that prices will advance 25c. per ton June 1. Wood prices lowest for many years, which weakens coal market.

Business in coal for domestic purposes is very quiet here for the present, and yet dealers face the probability of an advance of 25c. per ton on Utah and Wyoming coals June 1, as they have received notice to that effect. It is supposed that the step was taken by the mine owners to induce May purchases. Wood is cutting into the coal business more than ordinarily just now because of low quotations offered. The price is $4.50, the lowest in many years. How long this price will rule is an open question. The coal dealers put in their summer or storage prices a few weeks ago and may be forced to advance the retail price 25c.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for April and the first four months of 1914-15 were as follows:

	April		4 Months	
	1915	1914	1915	1914
Phila. & Reading........	1,181,959	1,185,930	3,597,874	3,884,153
Lehigh Valley...........	1,303,119	1.160,742	4,038,489	3,579,875
Cent. R.R. N.J.	779,356	748,162	2,439,902	2,766,684
Del. Lack. & West.......	977,948	894,513	2,828,664	2,755,042
Del. & Hudson..........	642,913	615,573	2,428,790	2,090,979
Pennsylvania	647,395	619,159	2,014,992	2,166,567
Erie....................	737,548	648,426	2,443 688	2,548,960
Ont. & Western.........	215,963	199,659	688,842	741,790
Total..............	6,486,201	6 072,164	20,481,241	20,534,050

THE CAR SITUATION

The surplus of idle coal cars on May 1 amounted to 119,545 and the shortage 130. The gross surplus of all kinds of idle equipments for the past three months compares as follows: May 1, 1914, 230,533; Apr. 1, 1915, 327,441; May 1, 1915, 290,819.

SAULT STE. MARIE CANALS

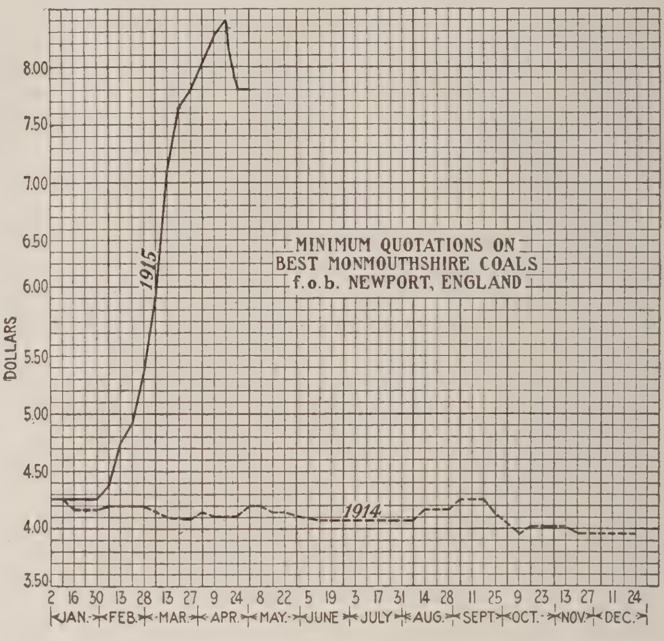
Shipments of anthracite through the Sault Ste. Marie Canals for April of the current year amounted to 130,111 tons. Bituminous shipments totaled 149,455 tons. Bituminous shipments were confined entirely to the United States Canal and 8459 tons of anthracite only passed through the Canadian canal. The United States canal opened Apr. 17 and the Canadian canal Apr. 13.

FOREIGN MARKETS

GREAT BRITAIN

Operators and miners reach an agreement on the Coal Conciliation Board. Reduction of rates on interned steamers. Restriction of exports.

Apr. 30—The coal trade throughout the country during the past week showed little notable change, what change there was being towards a little more coal available at maintained prices. The anthracite trade naturally was quiet, in view of the embargo on exports to neutral countries. The renewal of the Coal Conciliation Board has now been arranged. After discussing the details jointly and separately for many months, the coal-owners' and miners' representatives on Wednesday signed an agreement of renewal. In the House of Commons this week, the President of the Board of Trade stated that he was in communication with the London County Council regarding the Committee's recommendation in favor of the accumulation of a stock of coal in London.



Apr. 30—Conditions for prompt shipment remain easy, while for May shipment colliery owners are quoting with a great deal of firmness. Quotations are approximately as follows:

Best Welsh steam.......	Nominal	Best Monmouthshires....	$7.80@7.92
Best seconds...........	Nominal	Seconds................	7.68@7.80
Seconds................	$7.92@8.40	Best Cardiff smalls......	5.16@5.28
Best dry coals..........	8.16@8.64	Cargo smalls..........	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Tonnage is offering freely and chartering continues active. Rates show a heavy decline and are approximately as follows:

Gibraltar.........	$4.80	Naples..........	$6.72	Las Palmas......	$5.04
Marseilles........	5.79	Venice..........	9.60	St. Vincent.......	5.16
Algiers...........	5.79	Alexandria.......	6.72	Rio de Janeiro....	6.00
Genoa............	6.72	Port Said........	6.72	Monte Video.....	5.76
				River Plate......	6.00

Note—These quotations are based on an exchange rate of 24c. to one shilling.

DIVIDENDS

The following is a partial list of some of the more important dividend declarations by the coal companies:

Island Creek Coal—Regular quarterly dividend on the common of 50c., payable May 1 to holders of record, Apr. 23, and on the preferred of $1.50, payable Apr. 1 to holders of record, Mar. 23.

Lehigh Valley Coal Sales Co.—Regular quarterly dividend of $1.25, payable Apr. 17 to holders of record Apr. 8.

Pittsburgh Coal Co.—Regular quarterly dividend on the preferred of 1¼%, payable Apr. 26, to holders of record Apr. 15.

Delaware, Lackawanna & Western Coal.—Regular quarterly dividend of 2½%, payable Apr. 15 to holders of record Apr. 1.

Burns Bros.—Regular quarterly dividend on the common of 1¼%, payable May 15, to holders of record May 1, and quarterly dividend No. 9 on the preferred of 1¾%, payable May 1 to holders of record Apr. 16.

Consolidation Coal—Regular quarterly dividend of 1½%, payable Apr. 30 to holders of record Apr. 24. The transfer books do not close for this dividend.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
558	Board of Education	Hamilton	Ohio	1400b	709
616	Lighthouse Inspector	San Francisco	Calif.	b	795
643	Board of Education	Lansing	Mich.	5000b	835
644	U. S. Army	Fort Hancock	N. J.	4050a	835
644	U. S. Army	Fort Hancock	N. J.	200b	835
645	Toronto University	Toronto	Canada	8000b	835
645	Toronto University	Toronto	Canada	4000a	835
648	St. Andrews College	Toronto	Canada	400b	835
648	St. Andrews College	Toronto	Canada	100a	835
651	Canada Bread Co.	Toronto	Canada	800a	835
651	Canada Bread Co.	Toronto	Canada	600b	835
656	Murphysboro Water Wks.	Murphysboro	Ill.	12,000b	835
664	U. S. Navy	Washington	D. C.	941,300b	834

a Indicates anthracite coal. b Indicates bituminous. c Indicates coke.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

✚No. 585—Washington, D. C.—Bids on this contract (p. 749) were opened on May 6, and complete list is given herewith on all items amounting to 100 tons or more. The amount of coal required on the principal items was given in the previous notice. The principal bidders were as follows:

	Bur. E. & P.	Trea. Bldg.	Wind. Bldg.	Prop. Gard.	Frem. Hosp.	Land Off.	Agri. Bldg.	Natl. Zoo	Muse. Bldg.	Sold. Hom.	W. & N. Bldg.	W. & N. Bl.[7]	Prin. Off.	Prin. Off.[10]	P. O. Bldg.	P. O. Anex.	Dept. Comm.	Trea. Bldg.	Navl. Obsv.	Mils. Bldg.
J. Maury Dove	$3.31[1]	$3.65	$3.85	....	$3.88[3]	$3.43[4]	$3.36[5]	$4.05	$3.29	$3.50[6]	$3.59	$3.44	$3.35[8]	....	$4.78[11]	....	$4.74[12]	$3.53	$3.98	$4.65[1]
Commercial Coal Co.	3.40	3.69	3.83	....	....	3.48	3.40	....	3.33	....	3.54	3.49	3.43[9]	$4.59	4.68	....	4.69	3.64	....	4.67
W. H. Marlow	....	3.65	3.68	....	3.33	3.35	....	....	3.50	....	3.60	....	3.30	4.45	....	$4.35	4.85	....	....	4.75
L. E. White	....	3.75	3.80	....	....	.365	....	....	3.42	....	3.65	....	3.45	4.75	4.80	4.65	4.75	....	....	4.80
W. W. Griffith	....	....	....	3.82[2]	3.39	3.45	....	3.80	....	3.40	....	3.47	....	4.40	4.60	4.35	4.60	3.47	4.00	....
C. C. Smithson	....	....	....	3.98	....	....	....	....	....	....	....	3.49	....	....	4.76	....	....	3.47	....	4.76
J. E. Chapman	....	....	....	....	....	....	....	3.70	....	....	....	....	....	4.44	4.62	4.64	4.58	....	4.15	....
J. P. Agnew & Co	....	....	....	....	3.37	....	....	....	....	....	....	....	3.35	4.62	....	4.52	4.83	....	....	4.83
L. P. Steuart & Bros.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4.70	....	....	....	....	4.85

	Butl. Bldg.	Butl. Bldg.[14]	Medi. Muse.	Lemo. Bldg.	Fod's. Thea.	Dept. Just.	Civ. Serv.	Geol. Surv.	Dept. Agri.	Weth. Bure.	Dept. Agri.	Dept. Com.	Cost. Surv.	Bur. Fish.	Exec. Man.	Exec. Off.	Green Huose	Wash. Mon.	Navy Annex	Sldr. Hon.	Sldr. Ho.[15]	Botn. Gard.
J. Maury Dove	....	$6.40	$5.73	$6.29	....	$6.30	$6.35	....	....	....	$5.93	$5.86	....	$6.15	$6.02	$6.02	$5.68	$6.08	$5.81	....	....	....
Commercial Coal Co.	$5.73	6.54	5.74	6.42	6.57	6.47	6.63	$6.12	$5.85	$5.95	5.89	5.88	$5.68	6.38	6.08	6.14	5.82	6.23	5.93	....	....	$5.64
W. H. Marlow	5.83	6.65	5.85	6.30	6.65	6.35	6.20	6.30	5.90	6.10	5.90	6.05	5.75	....	5.95	5.95	....	....	6.05	....	....	5.73
L. E. White	5.78	....	5.82	....	....	....	....	....	5.83	....	5.97	5.98	5.83	6.65	6.10	6.10	5.95	....	....	....	....	5.80
W. W. Griffith	6.20	6.55	5.90	6.45	6.90	6.45	6.60	6.06	6.05	5.85	6.00	6.00	6.20	6.45	5.95	5.95	5.95	6.45	6.20	$7.00	$6.20	5.95
C. C. Smithson	5.77	6.45	5.78	6.40	6.69	6.44	6.59	6.09	5.88	5.92	5.89	5.95	5.74	6.34	6.17	6.15	5.83	6.18	6.02	6.82	6.09	5.72
J. E. Chapman	5.69	....	5.74	....	6.65	6.40	6.45	5.94	5.70	5.68	5.68	5.68	5.60	6.30	5.98	5.98	....	....	5.73	6.74	5.84	....
J. P. Agnew & Co	....	....	....	6.47	....	6.47	....	6.13	....	....	6.13	....	....	....	6.16	6.16	....	....	....	....	....	....
L. P. Steuart & Bros.	6.04	....	6.04	....	....	....	....	....	5.85	....	....	....	....	6.47	....	....	....	6.40	....	....	....	5.85

[1] Also $3.08, 3.30, 3.16. [2] Also $3.90. [3] Also $3.43. [4] Also $3.38. [5] Also $3.31 and 3.26. [6] Also $3.43. [7] Anthracite, buckwheat No. 1. [8] Also $3.25. [9] Also $3.41 and $3.59. [10] Anthracite pea. [11] Also $4.89. [12] Also $4.85. [13] $4.79. [14] Anthracite nut. [15] Anthracite furnace.

PROPAGATING GARDENS—Chas. F. Miller & Co., $3.94. HOSPITAL FOR THE INSANE—New Central Coal Co., $2.95; Peerless Coal Co., $2.98; Quemahoning Coal Co., $3; Piedmont & George's Creek Coal Co., $3.10; Sullivan Bros. Coal Co., $3.07; Weston Dodson Co., $2.95; Davis Coal & Coke Co., $2.89; W. H. Bradford, $2.88; Consolidation Coal Co., $3.30; Enterprise Coal Co., $2.87; George's Creek Coal Co., $3; Lynah & Read, $3.07. U. S. SOLDIERS' HOME—Enterprise Fuel Co., $3.53; C. W. Hendley & Co., $3.40. NATIONAL ZOOLOGICAL PARK—Chas. F. Miller & Co., $3.99. GOVERNMENT PRINTING OFFICE—National Coal Co., $3.20. ARMY MEDICAL MUSEUM—Henry W. Zeh, $5.78. Address Acting Sec. of the Treasury, Byron R. Newton, Gen. Sup. Com., Washington, D. C.

✚No. 448—Springfield, Mass.—The proposals noted in this contract (p. 834) do not supersede those previously requested for Apr. 15 (p. 627). The new contracts are to supply the requirements of the Ordnance Department. A bond for $3000 will be required only of the successful bidder, and not of all bidders, as previously noted. All bidders will be required to submit an amount equal to 2% of the estimated amount involved in the contract. Address Commanding Officer, Springfield Armory, Springfield, Mass.

✚No. 454—Cleveland, Ohio—Bids on this contract (pp. 627-748), which provides for furnishing coal for the East 53rd St. Station of the Municipal Electric Light Department will be received until noon, May 28. Complete specifications and details may be obtained on application. Address Comr. F. W. Ballard, Heat and Light Dept., 1443 East 3rd St., Cleveland, Ohio.

✚No. 465—St. Louis, Mo.—The bids received on this contract (pp. 627, 707, 794), which provides for furnishing the various school districts in St. Louis with coal during the ensuing year, were as follows: BITUMINOUS—Devoy & Kuhn, $1.94¾; Polar Wave Ice & Fuel Co., $1.91¾ (O'Fallon coal); Bald Eagle Mining Co. (Winkle coal), $1.91¾. ANTHRACITE—Polar Wave Ice & Fuel Co., $7.47 on stove and $7.72 on chestnut; Devoy & Kuhn, $7.73 on stove and $7.98 on chestnut; the Boehmer Coal Co., $7.54 on stove and $7.79 on chestnut. This business usually has from eight to twelve bids offered on it, but the uncertainty prevailing in this district has restricted the number of bidders. Address Supply Commissioner, 3431 School St., St. Louis, Mo.

✚No. 475—Rock Island, Ill.—Sealed proposals will be received until 10 a.m., June 1, for furnishing the Rock Island Arsenal with coal and coke as follows, per gross ton: Anthracite, Lehigh egg, 100 tons; bituminous (blacksmith coal), 100 tons; mine-run bituminous, best quality, for delivery in lots of 100 to 200 tons, 5000 tons; Connellsville coke, selected, 72-hr., 50 tons; Solvay coke, 50 tons. Address Lieut. Col. Geo. W. Burr, Rock Island Arsenal, Rock Island, Ill.

✚No. 542—Harvey, Ill.—This contract (pp. 708, 834) will not be concluded at the present time, the company having decided to purchase its requirements for the time being in the open market. Address Pur. Agt. L. C. Curl, the Buda Co., Harvey, Ill.

+No. 631—Milwaukee, Wis.—The Gross Coal Co. was the lowest bidder on this contract (p. 795), which also provides for furnishing 1300 tons of coal to the North Point pumping station, in addition to the 1000 tons of Pocahontas for the high-service pumping station previously noted. The bid of this company was $2.975 per ton. The bid on the Pocahontas contract last year was on the basis of $3.60 per ton. Address Deputy Comr. of Pub. Wks. Percy Braman, Department of Public Works, Milwaukee, Wis.

+No. 674—New York—Bids on this contract (p. 795), which provides for furnishing and delivering 84,160 gross tons of anthracite and 4700 tons of semibituminous coal for the Board of Education, were as follows:

BOROUGH OF MANHATTAN

Entire Borough

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	18,500	30	300	2500	7500	1200
Burns Bros.	$5.78	$6.63	$6.63	$4.59	$3.60	$3.93
Grove D. Curtis	...	7.00	7.00	4.95	4.20	...
William Farrell & Son	6.10	6.75	6.75	4.90	4.15	4.20
John W. Peale	6.07	6.85	6.85	4.85	3.93	3.98
G. D. Harris & Co.	5.95	6.25	6.25	4.60	3.55	3.75

District No. 1

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	6500	30	100	1500	2500	250
G. D. Harris & Co.	$5.95	$6.25	$6.25	$4.60	$3.55	$3.75
C. D. Norton & Co.	...	...	...	...	3.84	...

District No. 2

Grade	Broken	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	5700	90	100	1800	950
G. D. Harris & Co.	$5.95	$6.25	$4.60	$3.55	$3.75
C. D. Norton & Co.	6.07	6.75	4.94	3.84	3.84

District No. 3

Grade	Broken	Stove	Pea	No. 1 Bkwht.
Tons	6300	110	900	3200
Olin J. Stephens, Inc.	$5.90	$6.70	$4.90	$3.90
George D. Harris & Co.	5.95	6.25	4.60	3.55
C. D. Norton & Co.	6.07	6.75	6.94	3.81

For delivering the entire estimate for Manhattan Borough "alongside" in boats, bids were received as follows: Meeker & Co., 2500 tons pea, $3.45; 7500 tons No. 1 buckwheat, $2.79. George D. Harris & Co., 18,500 tons broken, $5.10; 30 tons egg, $5.40; 300 tons stove, $5.40; 2500 tons pea, $3.75; 7500 tons No. 1 buckwheat, $2.70; 1200 tons semibituminous, $2.90.

BOROUGH OF THE BRONX

Entire Borough—Furnishing and Delivering

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.
Tons	5500	45	280	200	4800
S. Trimmer's Sons	$6.43	$7.15	$7.00	$5.25	$4.40
Olin J. Stephens, Inc.	6.15	7.00	7.00	5.10	4.15
Burns Bros.	6.18	6.69	6.69	4.74	3.89

Entire Borough—Delivered "Alongside" in Boats

Meeker & Co. $2.82

District No. 1

Grade	Broken	Stove	No. 1 Bkwht.
Tons	2800	100	3000
M. L. Bird Co.	$6.13	$6.88	$3.87
S. Trimmer's Sons	6.30	6.85	4.30
C. D. Norton & Co.	6.40	7.00	4.14

District No. 2

Grade	Broken	Stove	Pea	No. 1 Bkwht.
Tons	1400	100	200	1800
C. D. Norton & Co.	$6.50	$7.00	$5.14	$4.24

District No. 3

Grade	Broken	Egg	Stove
Tons	1300	45	80
Richard Morrison	$6.50	$7.00	$7.00

BOROUGH OF BROOKLYN

Entire Borough—Furnishing and Delivering

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	1500	55	500	4000	8500	500
Bacon Coal Co.	$5.74	$6.36	$6.36	$4.66	$3.91	$4.04

Entire Borough—Delivered "Alongside" in Boats

Meeker & Co. $3.45 $2.79

District No. 1

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	4500	5	130	650	2300	275
S. Tuttle's Son & Co.	$5.83	$6.60	$6.60	$4.77	$4.02	$4.09
C. H. Reynolds & Sons	5.95	7.00	7.00	4.93	3.84	4.00
A. J. & J. J. McCollum	5.77	6.64	6.64	4.59	3.64	3.74
Brooklyn Union Coal Co.	6.15	7.00	7.00	5.00	4.15	4.05

District No. 2

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	6800	40	70	650	1700	225
T. W. Woods Sons & Co.	$6.09	$6.69	$6.69	$4.93	$4.07	$3.94
C. S. Somers & Co.	6.25	7.00	7.00	5.15	4.15	4.00
J. F. Schmadeke	5.84	7.00	7.00	4.80	4.05	4.00

District No. 3

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.
Tons	2400	5	165	2200	1800
S. Tuttle's Son & Co.	$5.83	$6.60	$6.60	$4.77	$4.02
C. H. Reynolds & Sons.	5.95	7.00	7.00	4.93	3.84
A. J. & J. J. McCollum	5.92	6.89	6.89	4.79	3.82

District No. 4

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.
Tons	1300	5	135	500	2700
J. F. Schmadeke	$6.10	$7.50	$7.50	$4.99	$4.20
A. J. & J. J. McCollum	6.32	7.09	7.09	5.19	4.36
John W. Peale	6.29	7.10	7.10	5.10	4.23
Middle Lehigh Coal Co.	6.30	7.00	7.00	5.10	4.25

BOROUGH OF QUEENS

Entire Borough—Furnishing and Delivering

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	8000	50	350	300	4600	3000
S. Tuttle's Son & Co.	$6.17	$6.90	$6.90	$5.23	$4.19	$4.13
Bacon Coal Co.	5.99	6.59	6.59	4.89	4.14	4.17
V. H. Youngman & Co.	..	..	..	..	..	3.91
John W. Peale	..	..	..	..	..	4.05
G. D. Harris & Co.	..	..	..	..	..	3.84

Entire Borough—Delivered "Alongside" in Boats

Meeker & Co. $2.82

District No. 1

Grade	Broken	Egg	Stove	No. 1 Bkwht.
Tons	3300	10	145	2350
S. Tuttle's Son & Co.	$6.17	$6.90	$6.90	$4.19
A. J. & J. J. McCollum	5.97	6.72	6.72	3.89
Burns Bros.	5.93	6.78	6.78	3.74
Bacon Coal Co.	5.95	6.51	6.51	4.06

District No. 2

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.	Semi-Bitu.
Tons	1800	5	55	50	1100	3000
S. Tuttle's Son & Co.	$6.17	$6.90	$6.90	$5.23	$4.10	$4.13
A. J. & J. J. McCollum	6.39	6.99	6.99	4.89	4.39	..

District No. 3

Grade	Broken	Egg	Stove	Pea	No. 1 Bkwht.
Tons	2900	35	150	250	1150
S. Tuttle's Son & Co.	$6.17	$6.90	$6.90	$5.23	$4.19

BOROUGH OF RICHMOND

Entire Borough—Furnishing and Delivering

Grade	Broken	Egg	Stove	Pea
Tons	2800	65	125	160
Richmond Ice Co.	$6.40	$7.25	$7.40	$5.15

C. W. Mooers, Elmira, N. Y., offered to furnish 7500 tons Bernice free-burning No. 1 buckwheat, Borough of Manhattan, at $2.45 per ton f.o.b. Perth Amboy. He bid the same price for 2300 tons No. 1 buckwheat for Brooklyn, District No. 1, and 2350 tons same coal for District No. 1, Borough of Queens. He also offered this coal delivered on cars at Jersey City at $2.50 per ton.

Address Supt. of School Supplies Patrick Jones, Park Ave. and 59th St., New York City.

New Business

+No. 676—Hoboken, N. J.—Bids will be received some time in June by the Board of City Commissioners for supplying all of the city requirements, including the City Hall, fire houses, police stations, libraries, schools and all other city buildings. This is a radical departure from previous practice, when the City Council awarded all contracts in small individual lots. The contract will cover about 18 buildings, and will probably be awarded just prior to the closing of the schools. Address Board of City Commissioners, Hoboken, N. J.

+No. 677—Everett, Mass.—The Board of Education at this place will receive bids until May 28, for furnishing the fuel requirements at the local schools during the ensuing year. The approximate tonnages involved are: Anthracite, 2000 tons; bituminous, 1500 tons; screenings, 1000 tons. Deliveries are to be made in the bins of the various school houses. Address Chn. of Com. on Fuel, Charles Mauser, Bd. of Edu., Everett, Mass.

+No. 678—New Brunswick, N. J.—The local School Board will be in the market during either May or June for its annual requirements of coal. Last year stove, egg and chestnut were used, but the new contract will be for stove and egg alone. Stove and egg coal were purchased at $6.62 per ton last year, and nut at $6.81. The call for bids is advertised and the contract let to the lowest bidder. Address Secy. of the Board of Education Morris Bauer, New Brunswick, N. J.

+No. 679—Dayton, Ohio—The local Board of Education will be in the market during the latter part of May or the first of June for about 6000 tons of coal, which was bought at $3.10 to $3.35 per ton last year. Two-thirds of the tonnage is to be delivered during the summer period and the balance as required. The call for bids is advertised. Address Clerk of the Board of Education, Dayton, Ohio.

+No. 680—Utica, N. Y.—The Board of School Commissioners at this place will be in the market about June 1 for 3000 to 3200 tons of anthracite and bituminous coal. The current contract was negotiated on the following basis: Egg, $6.10; stove, $6.10; nut, $6.35; buckwheat, $3.60; bituminous, $3.50. The call for bids is advertised and the business let on a competitive basis. Address Secy. D. J. Kelly, Bd. of School Comrs., 13 Elizabeth St., Utica, N. Y.

No. 681—Toronto, Can.—The Upper Canada College at this place consumes annually about 1000 tons of soft screenings, the present contract expiring shortly. Bids will be received until July 1. Address The Bursar, Upper Canada College, Toronto, Can.

+No. 682—Apponong, R. I.—The School Board at this place will be in the market some time in June for a contract covering their annual requirements of coal involving from 500 to 600 tons of anthracite. White ash and Lehigh grades are usually bought, the price ranging from $6.80 to $7.05. The call for bids is advertised, and the business let to the lowest bidder. Address Clk. C. O. Carpenter, School Board, Aponang, R. I.

+No. 683—Perth Amboy, N. J.—The local School Board will be in the market some time during June for their annual fuel requirements involving about 1400 tons of Lehigh egg coal. The business is usually let at about $6.50 per ton. The call for bids is advertised. Address the School Board, Perth Amboy, N. J.

+No. 684—Morganton, N. C.—The Light & Water Plant at this place will be in the market some time during June for approximately 800 tons of coal. The present contract is held by the Stonega Coal & Coke Co., and provides for furnishing 3- to 5-in. "Rhoda" coal at $3.65 per ton in the plant. Address Supt. F. Jerome Wortman, Light & Water Plant, Morganton, N. C.

No. 685—Albany, Ga.—The Albany Power & Manufacturing Co. of this place will contract some time in June for approximately 2000 tons of coal. The present contract is being filled with 4 in. Jellico coal from the Tennessee and Kentucky fields at about $3.20 per ton. The call for bids is usually advertised. Address Purchasing Agent, Albany Power & Manufacturing Co., Albany, Ga.

+No. 686—Millen, Ga.—The City Light & Water Plant at this place will contract some time in June for their annual requirements of coal amounting to about 500 tons. It is understood that the business is not competitive. Mine-run coal is required. Address H. B. Davis, City Light & Water Plant, Millen, Ga.

+No. 687—Ketchikan, Alaska—The Lighthouse Department at this place will receive bids until 2 p.m. May 30 for furnishing about 1500 tons of coal, during the fiscal year 1915. Blank proposals and specifications may be had on application. Address Lighthouse Inspector, Ketchikan, Alaska.

No. 688—Vandalia, Ill.—The City Light & Power Plant at this place will be in the market some time during June for 2700 tons of screenings. The present contract was made at 70c. per ton, f.o.b. mine. The call for bids is usually advertised. Address City Clk. F. C. Chandler, Vandalia, Ill.

No. 689—Chicago, Ill.—H. W. Caldwell & Son Co. will be in the market about June 15, for one year's supply; 250 tons per week, of No. 3 Illinois or Indiana washed nut will be required. Address Purchasing Agent, H. W. Caldwell & Son Co., Chicago, Ill.

+No. 690—Port Huron, Mich.—Sealed proposals will be received by the Board of Education at this place until 2 p.m., May 26, for furnishing approximately 1200 tons of Pocahontas smokeless coal. Bids should cover the cost of delivery in bins at the various school buildings, and will generally be completed before Sept. 1. The ash contents must not exceed 7% and analysis of the coal must accompany all bids; nothing under 14,700 B.t.u. will be considered. A certified check for $300 must accompany each bid. Address Secy. Bd. of Edu. Loran C. Elliott, Port Huron, Mich.

+No. 691—Watervliet, N. Y.—Sealed proposals, in triplicate, will be received until 1 p.m., June 8, for furnishing the fuel requirements of the Watervliet Arsenal, during year ending June 30, 1916. Information furnished on application. Address Col. W. W. Gibson, Watervliet Arsenal, Watervliet, N. J.

+No. 692—Ottawa, Can.—The Board of Education at this place will receive bids until May 21 for furnishing the fuel requirements at the local schools during the ensuing year. Address Sec.-Treas. Crawford Ross, Public School Board, 222 Gilmore St., Ottawa, Can.

No. 693—Madison, Wis.—The University of Wisconsin is now in the market for their next year's coal requirements, amounting to approximately 20,000 tons of 2-in. screenings per annum. Bids will be received until May 18. Address Secy. M. E. McCaffrey, Regents Board, University of Wisconsin, Madison, Wis.

No. 694—Toronto, Ont., Can.—The Central Young Men's Christian Association building will be in the market until the middle of May for a supply of 1500 tons of soft coal. The contract is let on a competitive basis. Address, Superintendent of Buildings, Central Y. M. C. A., Toronto, Ont.

No. 695—Chicago, Ill.—The Brand Brewing Co. will be in the market about June 15 for a contract for one year's supply of coal; 8 cars per month of Illinois or Indiana steam lump will be required. Address Purchasing Agent, Brand Brewing Co., Chicago, Ill.

+No. 696—Salem, Mass.—The County Commissioners at this place received bids until May 10 for furnishing 2000 tons of steam coal and 100 tons of white ash and Franklin stove coal. Address Asst. Clk. James P. Hale, County Comrs., Salem, Mass.

No. 697—Chicago, Ill.—Rosenbaum Bros. will purchase from time to time on the open market 150 cars Illinois screenings. They will be in the market about June 15. Address Purchasing Agent, Rosenbaum Bros., Chicago, Ill.

No. 698—Toronto, Ont., Can.—The Toronto Public Library will receive bids until about the end of the month for 500 tons of semi-bituminous coal for heating supply. Pocahontas coal is usually bought and arrangements must be made for summer delivery. Address Secretary, Public Library, College St., Toronto, Ont.

+No. 699—National Soldiers' Home, Me.—Bids will be opened May 20 for 3400 tons bituminous coal, Georges Creek, Pocahontas, or equal coal, of good quality, dry and merchantable, in fair proportion of slack and lump, 2240 lb. to the ton. This coal is to be delivered in cargo lots alongside Home Wharf at Randolph, Me. (opposite Gardiner, Me.). Delivery to be during the time that navigation is open in the Kennebec River. The wharf will not accommodate vessels drawing more than 13 ft. under ordinary circumstances. Bids to be submitted on a form provided. Bids will also be opened on the same date for 800 tons of anthracite, egg, coal, and 200 tons of range size. The latter also to be delivered in cargoes alongside the Home Wharf, Randolph, Me., during the season. Address Maj. F. L. Appleton, Treas., National Soldiers' Home, Me.

No. 700—Louisville, Ky.—The Kentucky Paper Box Co., which consumes about 960 tons of coal annually, announces it is in the market for coal and is now testing out various grades to find one suited for the manufacturing of their products. At present, eastern Kentucky nut and slack is being used. Delivery is to be by rail on the company's terminal. Address Purchasing Agent, Kentucky Paper Box Co., Louisville, Ky.

+No. 701—Portland, Me.—Sealed proposals will be received at the office of the Lighthouse Inspector, Portland, Me., until May 20, 1915, for furnishing fuel for vessels and stations. Blank proposals and particulars may be obtained on application. Address Lighthouse Inspector, Portland, Me.

+No. 702—Peru, Ind.—The City Power Plant at this place will be in the market some time during June for approximately 6000 tons of coal. The business is done on a competitive basis, and Island Creek coal is usually bought. The approximate cost is 97c. per ton. Address Mgr., Arthur Herren, Electric Light & Water Co., Peru, Ind.

+No. 703—Lowell, Mass.—Sealed proposals will be received by the Middlesex County Commissioners until 10 a.m., May 17, for coal to be delivered as may be required. The requirements are: 150 gross tons of New River, 20 tons of Lackawanna broken, both of these for delivery at the Lowell Jail; 500 gross tons of New River, 20 tons of Lackawanna broken, 30 tons of the best stove coal, all of these for delivery at the Training School of North Chelmsford. A certified check for $200 must accompany each bid, and specifications and proposal forms can be obtained on application. Address County Commissioners, Middlesex County Court House, Lowell, Mass.

+No. 704—Cambridge, Mass.—Sealed proposals will be received until 10 a.m., May 18, for a supply of coal to be delivered at the East Cambridge House of Correction. About 3500 gross tons of bituminous, 50 tons of anthracite furnace and 25 short tons of anthracite stove coal will be required. A certified check for $200 must accompany all bids, and specifications and proposal forms may be had on application. Address Middlesex County Commissioners, Court House, East Cambridge, Mass.

+No. 705—Corning, Iowa—Sealed bids will be received until 8 p.m., June 2, for furnishing and delivering 200 tons of coal to the three local school buildings, as directed by the Board. Deliveries are to be made between Aug. 1 and 15 of the current year. Address Secy. Bd. of Edu. W. C. Chubb, Corning, Iowa.

+No. 706—New York, N. Y.—Sealed bids will be received until noon, May 20, for furnishing and delivering coal to the Armory Board, Bellevue and allied hospitals, departments of bridges, correction, fire, health, parks, in Manhattan and

Richmond, Bronx, Brooklyn, Queens, police, public charities, street cleaning and water-supply, gas and electricity, during the period ending Mar. 31 of the next year. Blank forms and further information may be obtained on application. For previous bids and awards on this contract see pp. 567 and 710. Address Contract Clerk, Room 1226, Municipal Building, New York.

✚No. 707—Sunbury, Penn.—The local Board of Education will receive bids until 6 p.m., May 21, for furnishing coal during the fiscal year beginning Sept. 1, as follows: Egg coal 465 tons; pea 69 tons; buckwheat 80 tons; stove 30 tons. Deliveries are to be on cars at siding and also into the cellars of the dfferent school buildings. Address Committee on Supplies, Sunbury School District, Sunbury, Penn.

✚No. 708—North Adams, Mass.—Sealed bids will be received until noon, May 15, for furnishing coal to the several public buildings at this place. Specifications as to quantities, delivery, etc., may be had on application. Address Com. of Pub. Wks. John Martin, North Adams, Mass.

✚No. 709—Lewistown, Penn.—The Board of Education at this place will receive bids until June 1 for furnishing and delivering in bins of the various school buildings about 200 tons of bituminous coal in addition to a very small tonnage of anthracite. Address Secy. J. J. Biemesderfer, Bd. of Edu., Lewistown, Penn.

✚No. 710—Detroit, Mich.—Sealed proposals were received until noon, May 11, for furnishing the City Poor with coal for the fiscal year beginning July 1. Specifications were on file at the office of the board. Address Secy. Harry S. Prenzlauer, Municipal Bldg., Detroit, Mich.

✚No. 711—Detroit, Mich.—Sealed bids will be received until noon, May 21, for furnishing the coal required for the County Poor Institutions at Eloise during the fiscal year beginning July 1. Both anthracite and bituminous will be required, and specifications may be viewed on application. Address Secy. Harry E. Prenzlauer, Wayne County Bd. of Poor Coms., Detroit, Mich.

✚No. 712—Boston, Mass.—Sealed proposals were received until 10 a.m., May 10, for furnishing 250 tons of coal for use at the local Immigration Station during the fiscal year beginning July 1. Complete details can be had on application. Address Commissioner of Immigration, Long Wharf, Boston, Mass.

Awards

✚No. 453—Fort Keogh, Mont.—This contract (pp. 627, 707), which provides for furnishing the Remount Depot at this place with about 750 tons of coal, has been awarded as follows: **Quintin Johnston, Jr.** (Chicago), Carney lump, 10.577c. per 1,000,000 B.t.u., f.o.b. Chicago; **Roundup Coal Mining Co.** (Roundup) mine-run, 18.73c. per 1,000,000 B.t.u., f.o.b. Fort Keogh. Address Depot Quartermaster Capt. Sam'l Van Leer, Fort Keogh, Remount Depot, Mont.

✚No. 475—Rock Island, Ill.—This contract (p. 628), which provides for furnishing the Rock Island Arsenal with coal for the fiscal year beginning July 1, has been awarded to the **Rock Island Fuel Co.** on the following basis: 6-in. bituminous lump, $3.57; anthracite nut, $9.14; stove, $8.71. Prices include cost of delivery to buildings at the station. Address Lt.-Col. Kenneth Morton, Ordnance Dept., Rock Island Arsenal, Ill.

✚No. 496—Malden, Mass.—This contract (pp. 665, 748, 707), which provides for furnishing the fuel requirements for the local Board of Education has been awarded as follows: **Locke Coal Co.,** bituminous, $4.44; anthracite furnace, $5.83; egg, $6.33; stove, $6.33; stove (in ¼-ton lots), $7.40; nut (¼-ton lots), $7.60. The **Malden Coal Co.** obtained the contract for nut coal at $6.57. Address Clk. of Com. John L. Gilman, City Hall Bldg. Malden, Mass.

✚No. 521—Front Royal, Va.—This contract (pp. 666, 707), which provides for furnishing the Front Royal Remount Depot with about 345 tons of anthracite coal, has been awarded to the **Commercial Coal Co.** of New York at $5.89 for egg and $6.14 for stove. Prices include cost of delivery. Address Depot Quartermaster, Front Royal, Va.

✚No. 560—Auburn, N. Y.—The awards on this contract (p. 709), which provides for furnishing the local school board with their annual requirements of anthracite egg coal, were: **Harlie J. Churchill** (Syracuse, N. Y.), 500 to 600 tons at $6 for spring delivery, 300 tons at $6.10 for summer delivery, and $6.25 for winter delivery. **Simmons & Rapalee** (Auburn, N. Y.), stove or egg or mixed stove and egg coke, 685 tons for summer delivery at $5, and 150 tons for winter delivery at the same price. Address Supt. of Schools, Henry D. Hervey, 144 Genesee St., Auburn, N. Y.

✚No. 567—Brookline, Mass.—This contract (p. 709, 748), which provides for furnishing the local city government with 2963 tons of anthracite and 2000 tons of bituminous coal has been awarded as follows: **Massachusetts Wharf Coal Co.,** furnace, $5.73; egg, $6.25; stove or nut, $6.50. **H. N. Hartwell & Son, Inc.,** buckwheat, $2.36. **E. Russell Norton,** bituminous, $3.45. Address Sec. of Bd. Edward A. McEttrick, Town Hall, Brookline, Mass.

✚No. 580—Union, N. J.—This contract (p. 749), which provides for furnishing the local Board of Education with its fuel requirements for the ensuing year has been awarded to the **Lehigh Coal & Supply Co.** of Hoboken, N. J. at the following prices: Pea coal, $4.24; stove, $5.67; nut, $5.94. Address Secy. Fred. Cortal, Bd. of Edu., Union, N. J.

✚No. 587—Cohoes, N. Y.—This contract (p. 749), which provides for furnishing the Board of Education at this place with approximately 400 tons of coal, has been awarded to **M. V. Van Santvoord** at $5.57 for egg coal, $5.57 for stove, and $5.34 for pea. There were four other bidders on this contract. Address Clk. Elmer E. Bell, Bd. of Edu., City Hall, Cohoes, N. Y.

✚No. 589—West Hoboken, N. J.—This contract (p. 749), which provides for furnishing fuel requirements of the local Board of Education during the ensuing year has been awarded to the **McCann Coal Co. of Jersey City,** at $5.70 per ton. Other bidders on this contract were: E. A. Kiesewetter, $6.01; James Coyle, Jersey City, $6.08; Isaac Jennings, $6.20; Consumers Coal Co., $5.59 for May delivery, $5.69 for June; $5.79 for July; $5.89 for August, and subsequent months $5.97. Address Secy. Alexis Benoist, Bd. of Edu., Hoboken, N. J.

Contract Notes

New York—The cost of unloading coal from vessels into elevated coal bunkers or storage piles has been reduced by the New York Edison Co., in New York City, from more than 25c. originally to not more than 2c. a ton. This, according to George A. Orrok, M. E., is the result of an extensive study of the question of coal handling on piers and involves mechanical handling equipment properly designed for this purpose.

Europe—Denmark and Sweden purchase almost all their coal from the United Kingdom, and the distance and high freight rates will handicap the American shipper in competing for this trade when conditions return to normal. But Sweden has bought some American coal during the last few months and has recently turned to Germany for coal and coke. France stands ready to purchase in the United States if prices can be arranged. Italy is threatened with a coal famine, and it is reported by cable from Madrid that Spain offers a market for American coal of all grades.

South America—Coal supplies have heretofore come chiefly from the United Kingdom, Australia and Germany; but the United States exporters have already begun to take advantage of present conditions to increase their sales. Markets for American coal in Europe, South America, Mexico, India and Egypt are discussed in Special Consular Reports No. 69, Foreign Markets for Coal, just issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce, copies of which may be obtained, for 5c. each, from the Superintendent of Documents, Government Printing Office, Washington.

Spain—A royal decree of Apr. 7, suspends until further notice the import duty and transportation tax on coal, the exemption to apply to all shipments made to a Spanish port on or after the above date. The combined import duty and transportation tax on coal imported from the United States amounted to $1.06 per metric ton (2204.6 lb.). The Director General of the Spanish Customs Department has requested quotations of current prices for coal shipped f.o.b. and c.i.f. from the United States to Spain.

Greenville, S. C.—Press reports are to the effect that the South Carolina Cotton Manufacturers' Association has signed a contract with the Clinchfield Coal Co. for 350,000 tons of coal, the price being unofficially announced to be 85c. per ton. The cotton manufacturers are said to have effected important savings in their coal bills by this coöperative purchasing which is done by a buying committee consisting of three members. About 100 mills are said to participate in the buying.

Buffalo, N. Y.—The contract for furnishing the Buffalo schools with bituminous coal for the ensuing year has been awarded to **C. A. and M. Kaiser.**

STATE GEOLOGICAL SURVEY,

COAL AGE

Volume 7, No. 21
Issued Every Saturday
Hill Publishing Company

NEW YORK, MAY 22, 1915

Price, Ten Cents
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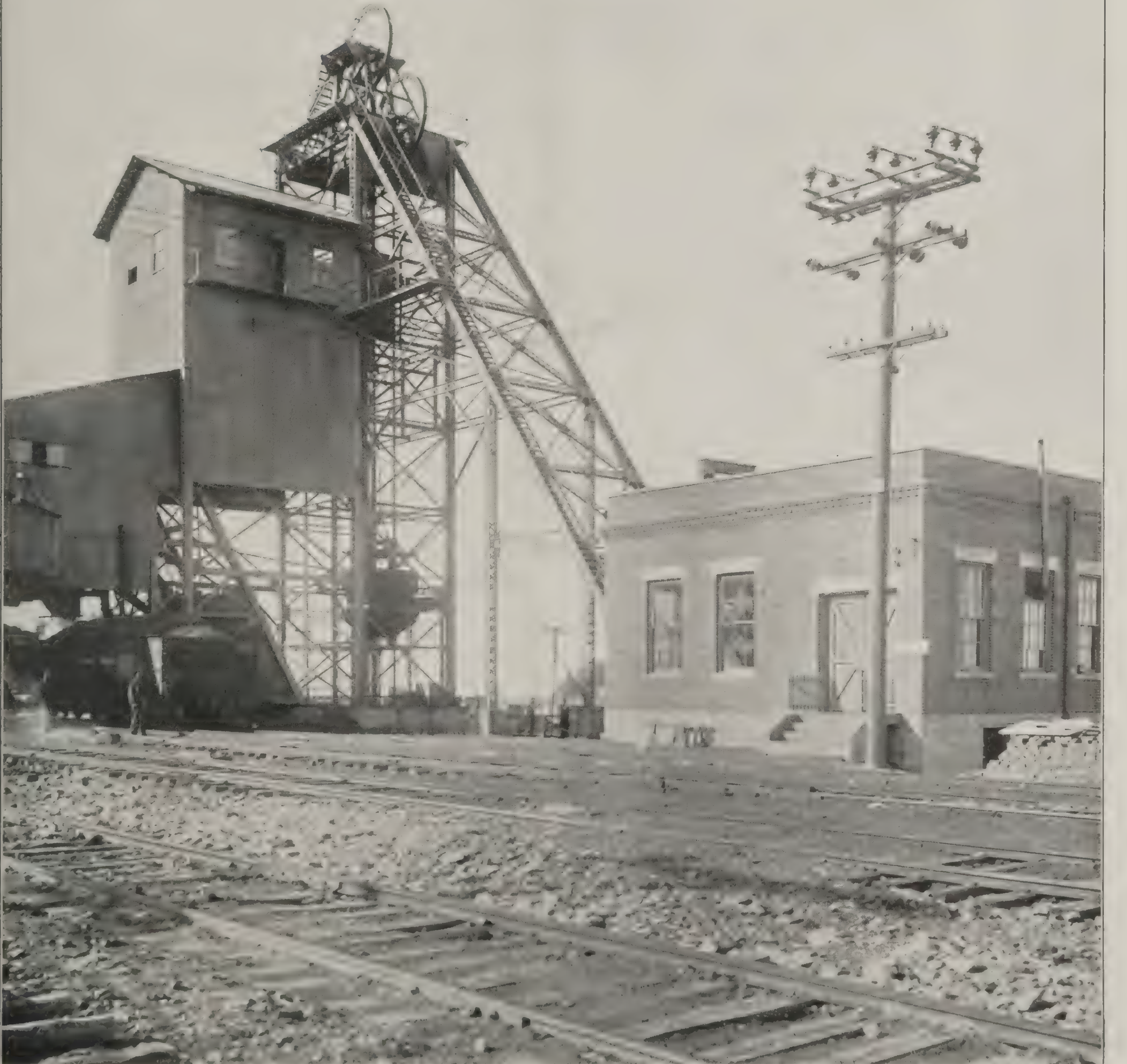
Peabody Coal Company's Plant at Kincaid, Ill.

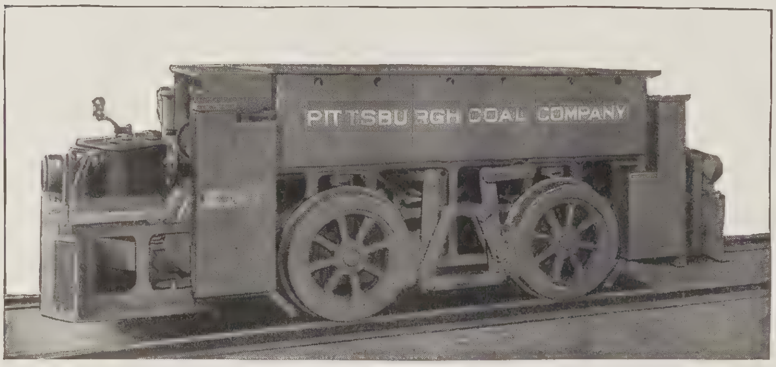
One of the Handsomest and Best Equipped Coal Mines in the Middle West



Why It Costs Less

to gather coal with

The Barsteel Storage Battery Mine Locomotive



It handles more cars on one charge—

Pulls less current from the battery—because it has

1. Five-point series-parallel control—Only two resistance points.
2. Low voltage battery motors—with highest efficiency.
3. Maximum drawbar pull—with minimum current.
4. No dead weight in frames.

Low Maintenance Cost—Secured by

1. Outside-hung motors—*accessible without removing battery.*
2. Open side frames—*Inside parts accessible without removing battery.*
3. Most rugged batteries made—*long life—minimum repairs.*
4. Spring-suspension of entire frame—*prevents jarring of battery.*
5. Best brake rigging—3 point suspension—Double brake shoe hangers—M. C. B. detachable Brake Shoes—Turnbuckle adjustment to keep full pressure on Brakes.
6. Barsteel frames—*Unbreakable.*

The Baldwin Locomotive Works
Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

"UNTIL you can prove to our satisfaction, by actual results at some mine, that your machine will do what you claim for it, you can't make those claims in the advertising section of Coal Age."

That's the gist of a letter we had to write to a man the other day. He has a mining machine for which he makes very extravagant claims, and perhaps they are true—if so, he should be able to prove them. However, his reply to our letter shows that we have made an enemy, but our solace is that by so doing we have protected 10,000 friends—our readers.

Advertising is business insurance both to buyer and seller.

A NEW version of the "do one thing at a time and do it well" maxim comes from Henry Ford. Says he, "If every man who manufactures an article would make the very best he can in the very best way at the very lowest possible price, the world would be kept out of war, for commercialists would not have to search for outside markets which the other fellow covets.

Advertised goods are good goods or they won't be advertised long.

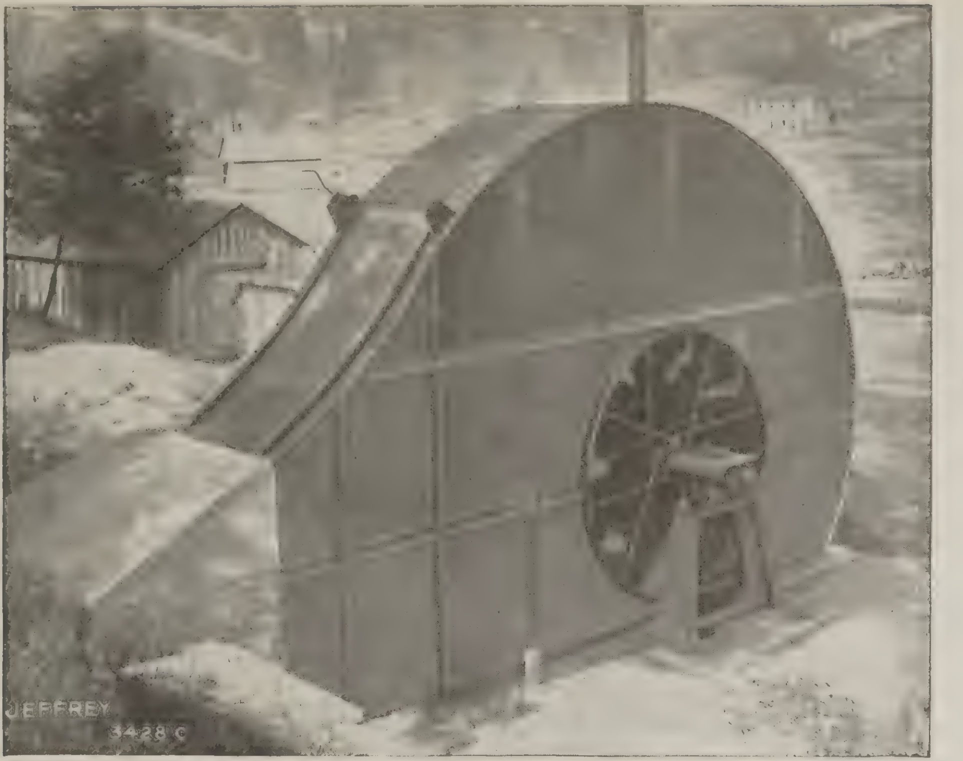
HAVE you ever come across the man who claims that he is never influenced by advertising? When such a person is encountered it is interesting to get beneath the surface of his statement in an endeavor to learn whether or not he actually holds to his cited opinion.

The writer met such a man the other day entering the subway.

Loudly proclaiming that he never paid any attention to advertisements, he took out a couple of subway tickets and was just about to drop them in the box when he discovered that they were green soda slips. Pressed for an explanation he acknowledged that he had purchased a dollar's worth of soda checks in order to get a thirty-five cent tooth brush which was thrown in as a special advertising offer. This was the man who had always claimed that advertising never influenced *him*!

Are you getting ALL the value from Coal Age? Are you reading the ads?

F. S. SEAGRAVE, General Manager of the Eldorado Coal and Mining Co., Eldorado, Ill., is a believer in advertising. He says: "We get much valuable information from the advertising pages of Coal Age, as well as from its news and editorial columns. We look over the advertising pages to see if we can find such articles advertised as we may be in the market for from time to time."



There's No Better Investment You Can Make

Than by Equipping Your Mine with a

JEFFREY STEPPED MULTI-BLADED FAN

It's a Safe Insurance against Accidents, and brings returns in the Increased Efficiency of Mine Employees, Increased Production and Lower Maintenance Costs.

If you are still using a wooden-housed fan, a constant source of danger, why not replace it with a fire-proof up-to-date equipment of Jeffrey design. Possibly a smaller fan than the one you have will do the work more efficiently and at much less cost.

For Dependability, High Efficiency, Low Cost of Installation and Maintenance, Minimum Power Consumption—**Jeffrey Centrifugal Mine Fans** stand at the top of the list.

Jeffrey Bulletin No. 126-A-12 is a very interesting book on the subject of Mine Ventilation that every mine operator ought to have. Send for a free copy.

The advice of our EXPERTS is free. Why not let them assist you in solving ventilation problems, as others are doing?

Jeffrey Mfg. Co., 912 North Fourth Street, Columbus, O.

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5-22-15

A Good Form of Mine Insurance.

By the use of permissibles you reduce the expense for timbering; you guard against the destruction of property; and you safeguard the lives of the men who work in your mine.

Many of the largest and most efficiently managed mines use **Red H** or **Xpdite,** the Hercules Permissibles.

Regardless of the conditions under which your mine is worked, or the nature of coal produced, some one of the different grades of these two Permissibles will meet your needs.

Prompt deliveries are made possible by the locations of our mills and magazines.

Write for our booklet "Hercules Permissible Explosives." You will find it interesting and instructive.

HERCULES POWDER CO.

Wilmington, Del.

COAL AGE

Vol. 7 NEW YORK, MAY 22, 1915 No. 21

Commissary Buying

Do you run a commissary or several of them as a necessity in connection with your mining operations?

WE say "as a necessity" because the best managers are learning that it does not pay in the long run to place the profits from the company store ahead of those derived from the main business of mining and selling coal.

But the commissary is a necessity in localities remote from towns in order to provide a place of trade for the mining community. Also many companies are forced to continue the policy of conducting company stores where the mining operations are in proximity to towns and cities. The reason for this is found in the fact that the average merchant has not yet learned the Golden Rule and persists in charging too much for life's necessities and then issuing garnishments to get it.

So the company store is still an institution of the mining industry. However, it is being conducted by every wise executive as a help to the employees and their families rather than as a money-maker for the company. The latter policy will not pay in the end; and we say it with pride that a goodly list of companies, large and small, could be noted here whose policy in the operation of commissaries is to make them purely self-sustaining community stores, furnishing the very best goods at prices that are right and fair to all. The conduct of such stores is a credit to the companies owning them.

But this kind of company store, much more than those that are operated only for profit, requires *real management.* Good business sense is essential to conduct a store in which the chief consideration is not to make money, but which still must in no sense savor of paternalism. At the same time the element of cost must be considered, and sound judgment demands that no more capital than is necessary be tied up in stock; for this after all, from a financial standpoint, is the chief asset and liability of any mercantile establishment.

To keep stocks of sufficient quantity without getting overstocked is a problem involving two big factors—*buying right* and *selling right.*

As to buying: Too many concerns allow their storekeepers to be buyers while at the same time maintaining a centralized purchasing department. The stores swarm with drummers and salesmen, some of whom could sell patent rights in washing machines to Hetty Green, much less the average commissary storekeeper. The first thing to do here is to centralize your commissary buying. Let the purchasing department do it all, and keep the drummers out of the stores. You'll be surprised how quickly the volume of orders will decrease and how fast your excess stocks will be depleted.

As to selling: When you've bought right, you'll find the selling problem is wonderfully simplified; in fact, it almost takes care of itself. When your storekeepers can't buy stuff they really don't need, the surplus simply isn't there to sell—and that's all there is to it.

This suggestion about buying is one with meat and money in it for any concern operating a company store. Try it and see.

Rotary Transforming Equipment for Coal-Mining Work

By Thomas Robson Hay*

SYNOPSIS—There are three types of rotary transforming or converting equipment. Each type has its own advantages and disadvantages, which are here discussed.

In considering the application of central-station power to coal-mining work it is necessary to use care in making the selection of the proper equipment to convert the alternating current supplied by the central station to direct current for use in the mine.

Three types of rotary transforming equipment are available—(1) rotary converters, (2) synchronous motor-generator sets and (3) induction motor-generator sets. The following is a comparison of the relative merits of the several types of equipment.

The overall efficiency of the synchronous motor-generator set is about 4 to 7 per cent. less than the overall efficiency of the rotary converter, while the overall efficiency of the induction motor-generator set is about 2 per cent. less than that of the synchronous motor-generator set. In fact, when the character of the load, which may vary from practically zero to more than full load almost instantaneously, is taken into consideration, it will be found that the difference in efficiency between the synchronous motor-generator set and the rotary converter with transformers will be slight.

In large installations where a great number of rotary transforming units are necessary it may be found that the theoretical difference in efficiency between the rotary converter with transformer and the synchronous motor-generator set may apparently have a considerable effect on the power consumption as indicated by the meter, but before making a definite selection careful consideration should be given not only to the theoretical full-load and fractional-load efficiencies, but also to the varying character of the load, with its consequent effect on the efficiency and regulation of the equipment, to the cost of upkeep and attendance and to the relative factors of simplicity and reliability.

The operation of the rotary converter on 60-cycle power is not as satisfactory as that of the synchronous motor-generator set or the induction motor-generator, except under unusually good regulation of the source of energy and when machines of comparatively small size are used. With the large machines it is necessary to select a slow speed equipment on account of the necessity of keeping the peripheral operating speed of the commutator within safe limits, and this necessity actually affects the comparative first cost.

A Substation Showing 2200-Volt Lightning Arresters of the Outdoor Type

Such limitations are not present in either the synchronous or induction motor-generator set and exist to a less degree in the rotary converter when operating on 25-cycle circuits. While the regulation of the voltage and frequency in most stations is good, it is not exceptionally so in long transmission systems operating under the severe conditions imposed in coal-mining work.

Synchronous Motor-Generators Are More Stable

Synchronous and induction motor-generator sets are considerably more stable, even when operating on wide ranges of voltage and frequency variations, than are rotary converters. Sudden overloads have a much greater effect on rotary converters than on synchronous and induction motor-generator sets owing to poorer speed regulation on varying voltages. The rotary converter is more apt to flash over, especially on high momentary overloads because of grounds and short circuits, and is also more likely to hunt than is the synchronous motor-generator set.

A more skillful class of attendant is required for the operation of rotary converters than for motor-generator

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*No. 4506 Fifth Ave., Pittsburgh, Penn.

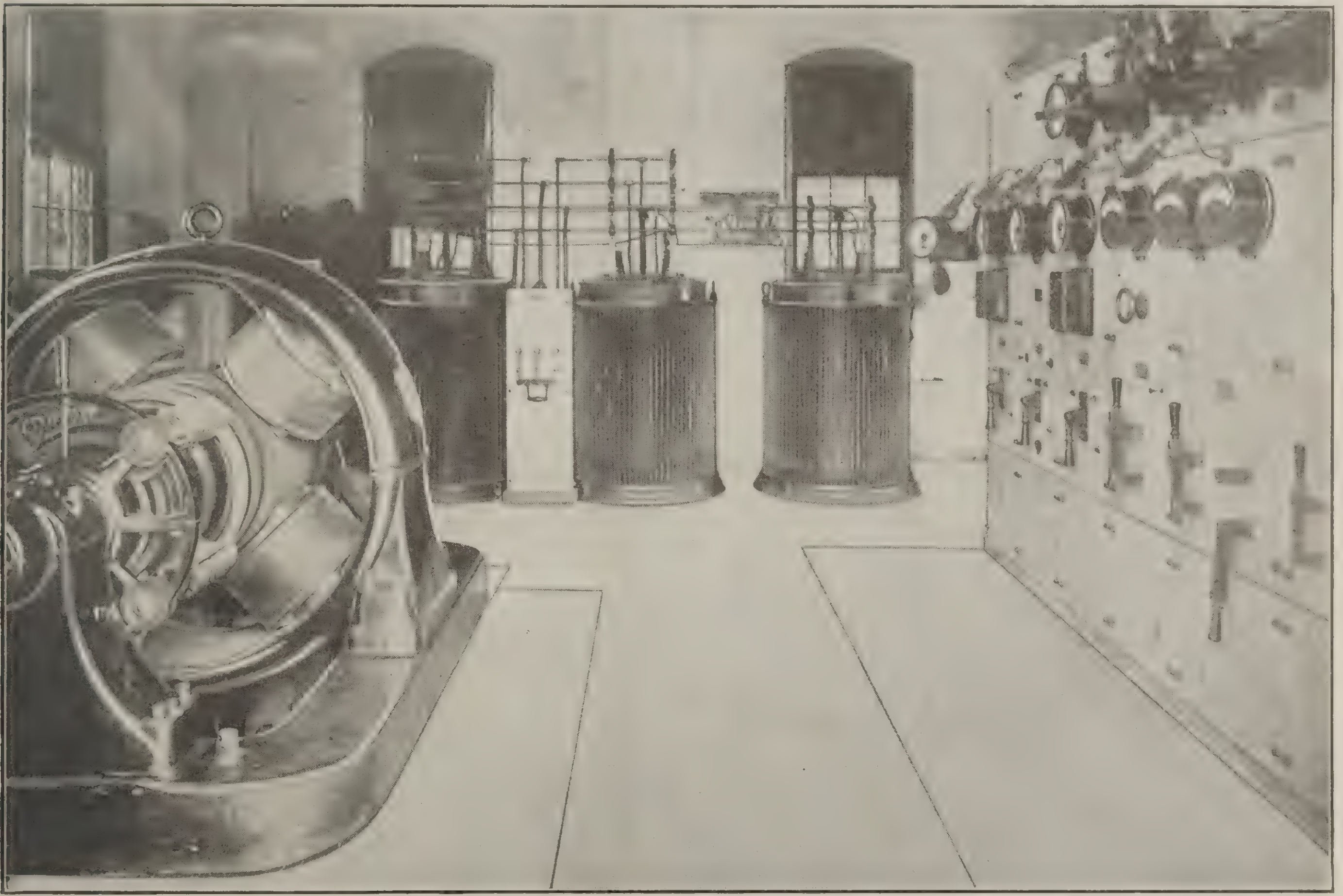
sets. This is owing largely to the operating characteristics of the machines, such as the necessity for synchronizing when starting and also on account of the peculiar features of the direct-current circuit when supplied from this type of equipment. The general absence of mechanical and electrical characteristics of simplicity and stability of operation under varying conditions of load, voltage and frequency are unfavorable features of rotary-converter installations. This is especially true when the sudden and more or less frequent and sustained heavy overloads that are too often present in coal-mining work are encountered.

The performance of the rotary converter when the supply circuit is subjected to transmission-line surges due to broken insulators and grounds is not nearly as satisfactory as that of the synchronous motor-generator set, and flashovers result, with consequent burning of the brush-holders and commutator. On account of the substantial design and construction of motor-generator sets and also on account of their much greater flywheel effect the adverse conditions brought about by grounds, heavy momentary or sustained overloads and line surges are much more efficiently and satisfactorily handled.

Rotary-converter equipment, including the rotary itself, transformers, starting devices, etc., is much more complex than are motor-generator sets, and a more experienced and intelligent operator is required. This matter of attendance should be given due consideration when the selection of the rotary transforming equipment is made. Satisfactory operators of any kind are scarce around most coal-mining operations, and efficient, intelligent ones are few, far between and hard to keep.

The regulation of the direct-current voltage of motor-generator sets is independent of the presence of motors on the alternating-current side of the power supply and has no appreciable effect on the power factor of the supply voltage if the available power-factor correction is applied. The regulation of the direct-current voltage of the rotary converter is possible, but change of the direct-current voltage causes change of power factor in a self-excited equipment.

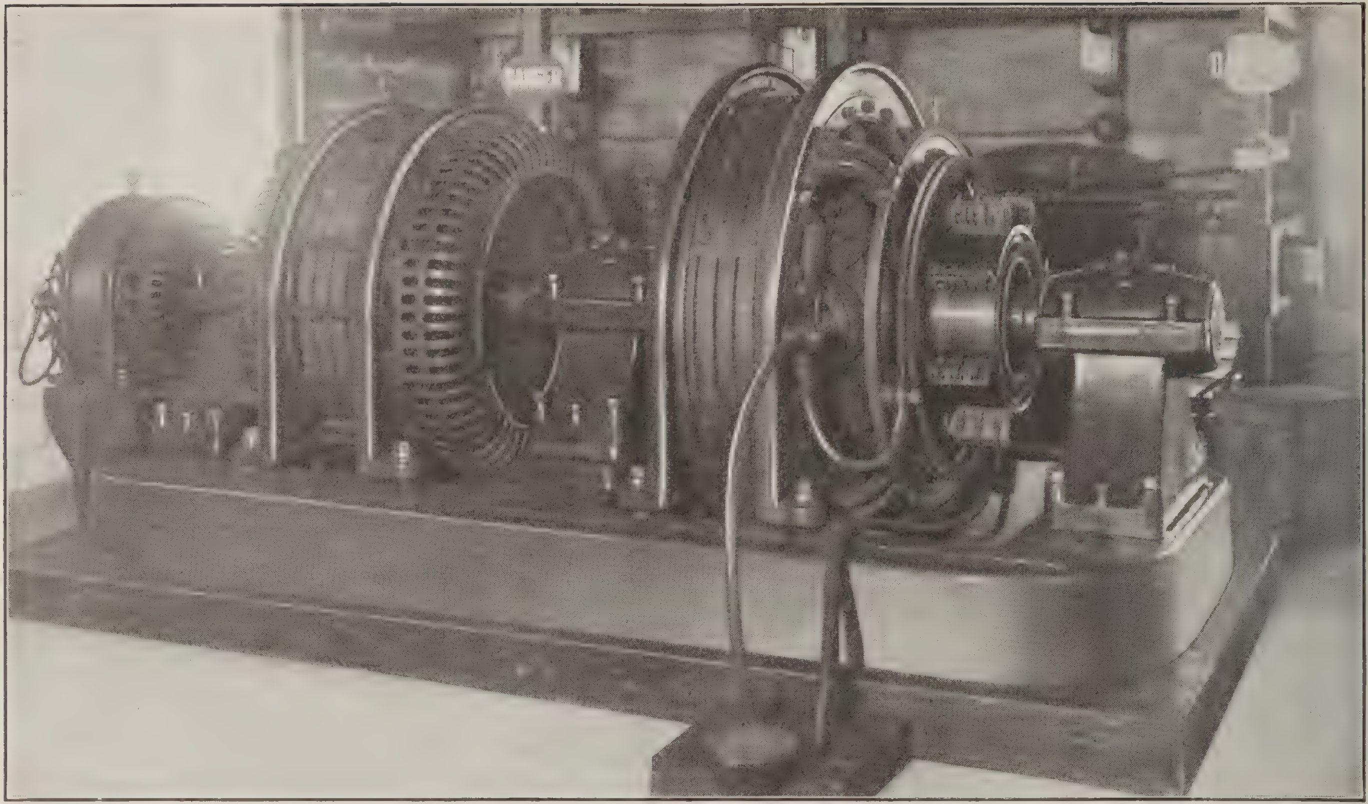
As a result the desired direct-current voltage may not at all times bring about the desired power factor in the alternating-current supply circuit. Except for the comparatively slight amount of compounding possible in a rotary converter, the direct-current voltage is directly dependent on the alternating-current voltage and is always in a definite ratio to it. The addition of a synchronous booster or of other methods of increasing the direct-current voltage acts to increase the initial cost of the installation and to further complicate the equipment.



AN ALLIS-CHALMERS ROTARY CONVERTER IN A SUBSTATION OF THE H. C. FRICK COKE CO.

ALTERNATING- AND DIRECT-CURRENT VOLTAGES ARE INDEPENDENT

Regulation of the power factor of the alternating-current supply can be effected with both the rotary converter and the synchronous motor-generator set, the power-factor regulation with the former causing changes in the direct-current terminal voltage, owing to the resulting change in line drop, while with the motor-gen-



Synchronous Self-Starting Motor-Generator Set, Meadowlands Coal Co., Arden, Penn.

erator set, the alternating- and direct-current voltages are entirely independent of each other.

Because of the electrical characteristics of the induction motor-generator set, this type of equipment will always have a varying, lagging power factor, which will in turn cause a lag in the power factor of both the transmission line and of the power-station equipment and will act to decrease the capacity of all apparatus from the source to the point of delivery of the power.

This unfavorable feature of the induction motor-generator installation is not inherently capable of correction. This statement would also be true of the synchronous motor-generator set did it not possess an electrical feature permitting of improvement of the power factor through overexcitation of its fields from a separate source of direct-current power. This power-factor improvement can be made as great as desired, but it has been found that an attempt to improve the power factor of the supply circuit when taken from a transmission line to a point much above 95 per cent. lagging is not economically desirable, as the cost of doing so is out of all proportion to the advantage gained.

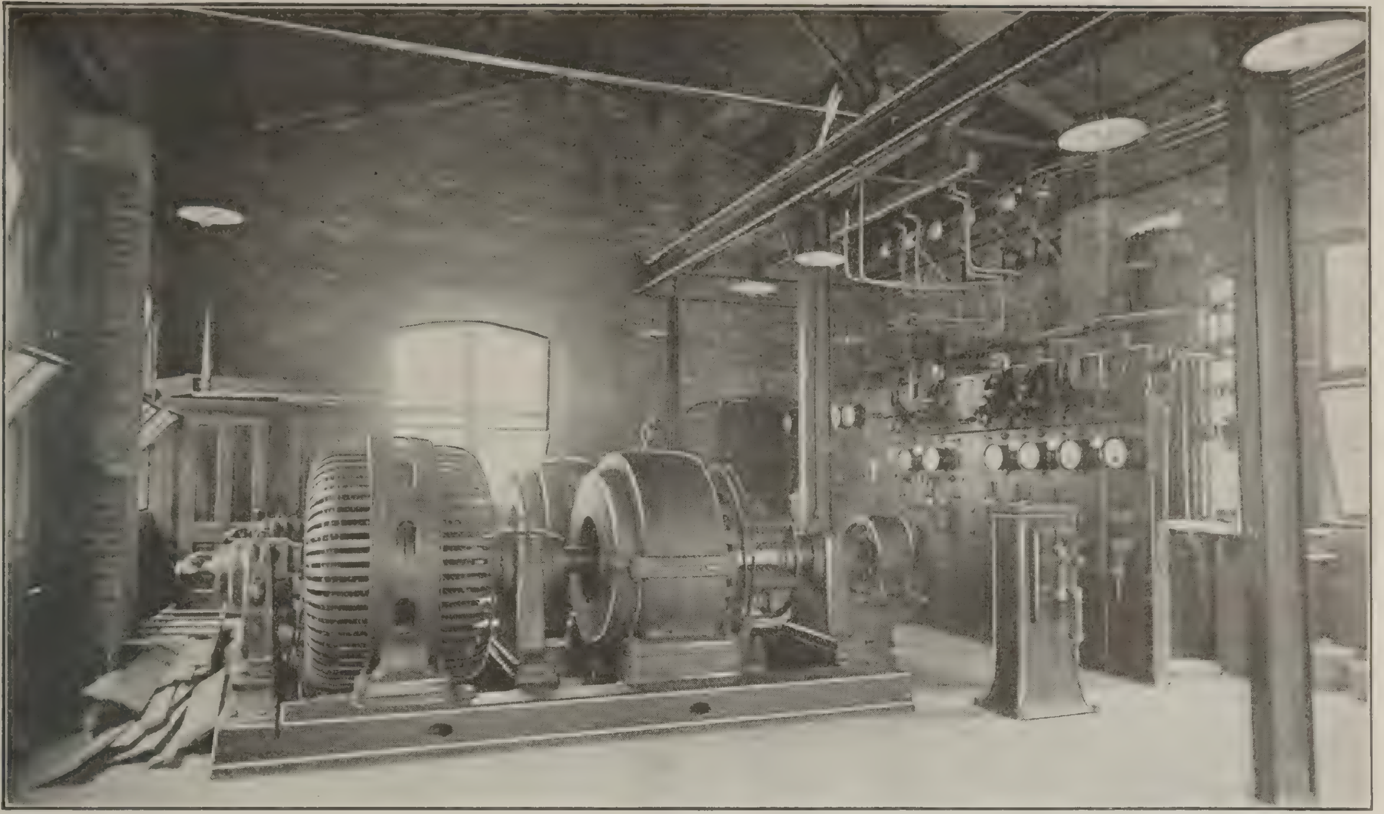
Power-factor correction as high as is economically possible is desirable because of the resulting increased overall efficiency of the equipment operating on the particular system and the increased power capacity of this equipment. By raising the power factor of a system the capacity of the transformers, transmission lines, and equipment operating thereon is materially augmented owing to the decreased flow of wattless current and consequent decreased losses, which increase as the power factor decreases.

Both the rotary converter and the synchronous motor-generator set can be made to operate at unity power factor, but it should be remembered that this is not the power factor of the system, but of the machine itself. The power factor of the system will depend largely on the compensating, or corrective, features available, the motor-generator set giving the best and most stable results. On account of the better compounding characteristics of the synchronous motor-generator set, this machine can be designed to furnish a leading power factor for all loads much in excess of the rotary converter, while at the same time retaining other desirable operating features.

The cost of the rotary converter complete, including reactance, transformers, oil and starting equipment, will be slightly less than that of the synchronous motor-generator set when the switchboard is included, but the cost of maintenance will be no less and if anything greater. If the operating characteristics of the installation, such as wide voltage and frequency variations, require the addition of accessory equipment to obtain satisfactory operation of the rotary converter the cost will be made to equal or exceed that of the synchronous motor-generator installation.

The cost of the induction motor-generator set would be about the same as the cost of the synchronous equipment, but it has not been favorably considered for coal-mining work, as it does not have sufficient points of advantage over the rotary converter and the synchronous motor-generator set to offset any decrease in first cost together with its less complicated operating characteristics.

The induction motor-generator set operates at an inherently constant speed under varying loads, but with a low power factor which decreases with decrease in load. Its power factor, as before mentioned, is not capable of alteration, and in starting it draws a large current from the line, which tends to affect the alternating-current distribution system clear into the power station.



Synchronous Motor-Generator Substation of the Clinchfield Coal Corporation

In the case of the rotary converter, the secondary alternating-current voltage of the transformers must be in a fixed ratio to the direct-current potential, which for mining service is usually 250 volts, and thus the transformer secondary voltage is not one that is standard for alternating-current motors and necessitates the use of a special voltage motor or an extra bank of transformers to furnish a standard potential for any motors that may be in use about the mine, such as on pumps, fans, tipple machinery, etc.

The impressed voltage for motor-generator sets can be a standard motor voltage for 4000-volt installations, Y-connected 2300-volt motors insulated for 4000-volt operation being used. If the transmission voltage is anything below 4000 volts it is of course possible to use a standard motor of the given voltage, whether a rotary converter or motor-generator set is selected. No additional transformers are required, however, when a motor-generator of a voltage of 4000 and below is employed.

It is of course permissible to use transformers with standard motor voltage secondaries by introducing reduced voltage taps to supply the proper potential for the rotary converter. This method of procedure, however, will affect the efficiency and regulation of the transformers, the resulting unstable regulation in turn affecting the voltage regulation of the rotary converter and the overall efficiency and cost of operation of the equipment.

Generally speaking, it is advisable, where the primary voltage exceeds 4000, to use two banks of transformers for rotary-converter installations, whereas only one bank, and sometimes none, is required for a motor-generator installation. Motor-generator sets operating on 6600-volt circuits and higher are possible and have given satisfactory results, particularly in the larger sizes, but the use of small- or medium-sized induction motors operating at such a comparatively high pressure is not satisfactory due to the excessive amount of insulation, with decreased motor efficiency, necessitated by the use of this voltage. It is better practice to make the transformed voltage of such a value as to enable the use throughout of standard and efficient equipment.

The features mentioned in the foregoing alter the several first costs and favor the motor-generator as regards space economy.

Independent Field Excitation Is Necessary

With the synchronous motor-generator installation, field excitation for the motor from an independent source is necessary. This source can be either the direct-current generator of the set, the synchronous motor fields in this case being wound for 250-volt excitation, or a belt-driven or direct-connected exciter delivering 125 volts. The former is to be preferred as it decreases the initial investment by the cost of the exciter and belt and economizes in space.

For equipment supplying energy to a 500-volt mine circuit, separate excitation of the field of the synchronous motor by means of a separate exciter is necessary. Most direct-current generators for mining work are compound wound with 10 per cent. overcompounding from no load to full load. By exciting the synchronous motor fields from the direct-current side of the set, the field strength automatically increases with the load, maximum excitation being obtained at full load. Setting the field rheostat for a given excitation at no load, that at full load, and therefore the power factor, can be closely predetermined and the correction made automatic for all percentages of load.

The 10-per cent. overcompounding, which is common on motor-generator sets for coal-mining service, is of decided advantage when the excitation is taken from the direct-current side of the set. The usual practice is to so proportion the synchronous motor that a 10-per cent. increase in field current will maintain approximately the same power factor at all loads, with resulting constant line voltage and frequency.

This feature has an interesting and valuable effect when the set is installed at the end of a long line on which there is more or less lighting. On such lines the transmission voltage is usually high at no load in order that it may not drop too low at full load or on overloads. Under these conditions the power factor of the motor-generator set will be unity or slightly lagging at no load or on light loads and will lead on the heavier loads. This action has a strong "steadying" effect, tending to decrease the no-load and to hold up the full-load voltage. With alternating-current induction motors installed for fans, pumps, tipple machinery, etc., this "steadying" effect is especially valuable.

The desirable features enumerated above are not possessed by the rotary converter to nearly as great an extent as by the synchronous motor-generator, since it is not possible to raise the direct-current exciting voltage in as automatic and satisfactory a manner on account of its dependence on the impressed alternating voltage. In fact overcompounding of the rotary converter has a bad effect on the power factor and is not generally considered advisable.

When it is decided to use a motor-generator set, the initial investment is capable of reduction to a minimum on account of the possibility of using the old direct-current generators in the isolated plant, providing they are of the belted type as the direct-current element of the motor-generator set. To this end they may be either belted or direct connected, preferably the latter.

Direct connection in most cases requires a comparatively slow-speed machine, as most belt-driven generators used in coal-mining work have a speed rating varying from 500 to 600 r.p.m. A synchronous motor of this speed is more expensive than a higher-speed motor of the same capacity, but in considering this application it must be borne in mind that a direct-connected set is more efficient on account of the elimination of belt losses and requires much less floor space than a belted set. The cost of a belt will be about the same as or more than that of a suitable flexible coupling. In either case the machines should be mounted on concrete foundations.

It may be found after a full investigation that the cost of a new two-unit direct-connected high-speed set will be but little more than that of a slow-speed synchronous motor with coupling for direct connection. Furthermore, besides obtaining all of the advantages of the made-up direct-connected outfit, the latter will possess the additional advantage of being new and decidedly more efficient.

The interruptions to service when the rotary converter is used will be greater than when motor-generator sets are selected, owing to the former's greater sensitiveness to suddenly varying loads and to prolonged overloads. In case of a burn-out on a rotary converter the whole machine is useless, whereas with a motor-generator set it is possible to make a temporary arrangement pending the repair of the damaged part on account of the fact that this equipment consists of two separate elements. This, in conjunction with the independent voltage and power-factor regulation, is usually considered of such an advantage as to more than offset any difference in first cost and operating efficiency and to justify the use of a motor-generator set.

This type of equipment also has the additional advantage that no collector rings carrying high currents and requiring careful insulation are present as is the case with the rotary converter. This feature will tend to decrease the upkeep on the alternating-current side of the motor-generator set. Such an installation is also somewhat more stable and satisfactory for parallel operation.

Fans and Pumps Should Be Driven by Alternating Current

In determining the necessary capacity of the rotary transforming equipment, it should be the business of the interested parties to install where possible alternating-current motors on such machines as fans, pumps, hoists, slope hauls, etc. The use of alternating-current motors taking power from the transmission line or from the secondaries of the high-tension step-down transformers obviates the transformation losses that occur in the rotary transforming equipment, thereby reducing the power bill to a minimum. This also reduces the size of the rotary transformer, and therefore the initial investment, and tends to make the overall cost of operation a minimum.

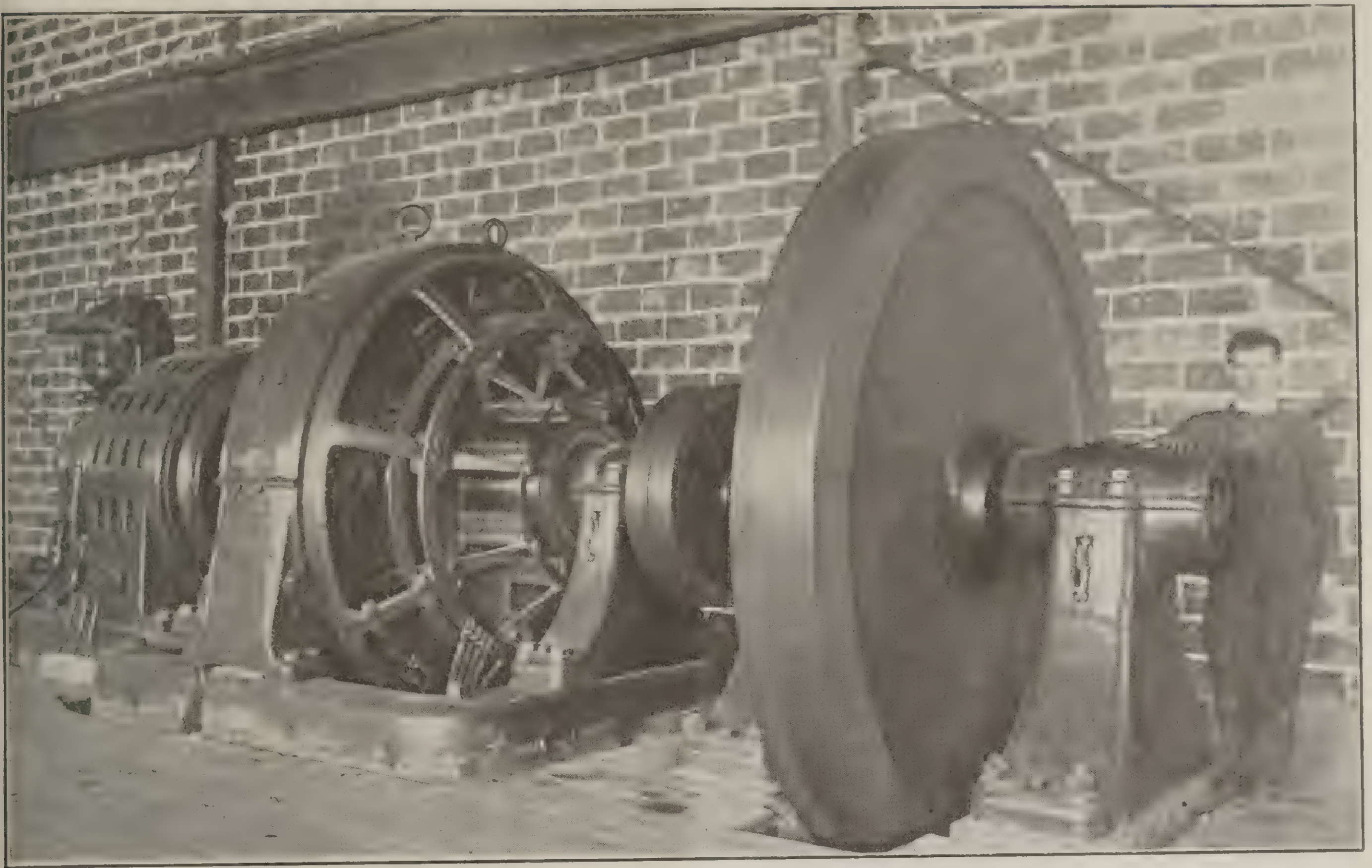
In cases where it is necessary to use motors for hoisting, either in shaft or slope, the use of alternating-current motors throws the wide fluctuations of current and voltage that frequently occur onto the transmission line, where they are more easily taken care of than when a direct-current motor is used taking its power from the direct-current side of the rotary transformer.

Inasmuch as the power is usually metered on the alternating-current side of the rotary transformer, a considerable saving in cost of operation can be made by placing as little equipment as possible on the direct-current circuit. This saving will usually be found to more than compensate for the increased cost of installation. The steadier the direct-current voltage, the fewer will be the burn-outs and the higher the efficiency of the equipment operating on the direct-current side.

In order to utilize central-station service to the best advantage and to keep the power cost to a minimum, the rotary transforming equipment should be located as near the center of distribution as possible. On account of the ability to place the rotary transforming equipment at any convenient point, such a condition can be obtained at minimum expense; and from time to time as the changing conditions seem to make it advisable the set may be relocated so as to give the most economic and efficient arrangement possible and at the same time accomplish the desired result.

If the cover is not too great it is usually best to select a surface location for the installation of equipment, taking the direct-current feeder wires down through bore holes to the selected point of distribution inside the mine. When the set is located on the surface it should be placed if possible so as to make unnecessary the devotion of the entire time of an attendant to its operation.

The set may also be located inside the mine, but such procedure is not generally recommended on account of



A Flywheel Induction Motor-Generator Set in Plant of the Christopher Coal Co., Christopher, Ill.

the dirt, the fire and water hazard and also on account of its general inaccessibility. If so located, however, the equipment should be installed in a moisture- and fireproof concrete room. Either solid or stranded copper cable wound with varnished cambric insulation of the proper quality and thickness and with a triple-braid, impregnated, weatherproof covering may be used to convey the current to the machine.

This wire will be suspended at the top of the hole on a tripod, set in a concrete foundation. The economics of the application will be largely determined by the conditions of roof and bottom, presence of water or gas, distances from the working-face, main parting and pitmouth, fire hazard, attendance, etc. No set rules can be laid down, but each case should be thoroughly gone over and the application made on the merits of the investigation.

The transmission and distribution system inside the mine should be made as efficient as possible. Rail-bonding should be in first-class condition with cross-bonding at intervals of 200 or 300 ft. All bonds should be inspected frequently. The feeder and trolley wires should be securely put up and care taken that there is no leakage and that the wire used is of ample capacity to handle the load without excessive loss.

The losses due to poor bonding and feeder-line construction may, and in many cases do, materially affect the efficiency and upkeep of the electrical equipment as well as the output of the mine and may make an appreciable difference in the power bill. Excessive use of sand by the locomotive drivers should also be guarded against as a considerable amount of power may be consumed in this manner.

Summary

In summation, it may be said that—

1. The synchronous motor-generator set, while slightly higher in first cost and lower in theoretical overall efficiency than the rotary converter, is simpler and more reliable in operation.

2. By means of the synchronous motor-generator set any desired power factor can be readily and satisfactorily obtained without the addition of any special features to the equipment.

3. With the synchronous motor-generator set, interruptions to service are a minimum, voltage and frequency variations are less harmful to the continued satisfactory operation of the set and the direct-current voltage can be adjusted to any desired value, irrespective of the fluctuations within reasonable limits of the alternating voltage.

4. The synchronous motor-generator set is easier to operate than the rotary converter and is more reliable under the severe conditions imposed by a coal-mining load.

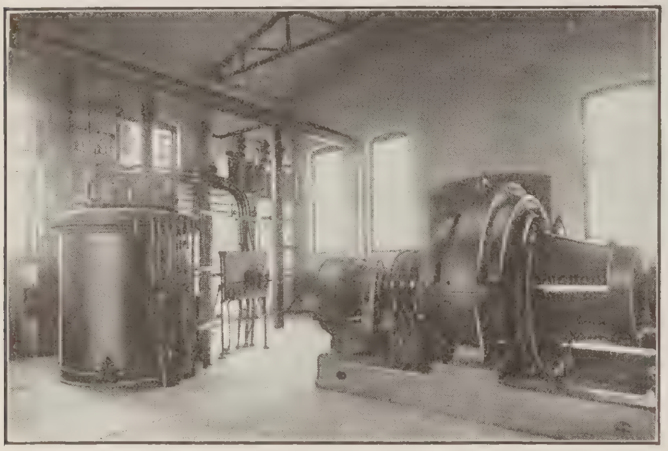
5. The use of the synchronous motor-generator set when taking power from the secondaries of high-tension stepdown transformers enables the use of standard alternating-current motors about the mine taking power from these same transformers and without any special features.

6. On account of the increased capacity of the equipment and the decreased line losses, because of the possibility of adjusting the power factor to any desired value, the central stations usually give a discount for the use of synchronous equipment. This feature, which is common to a greater or less extent in both the rotary con-

verter and the synchronous motor-generator set, enables the consumer to make a saving in the cost of operation, which in large plants may be considerable, thereby compensating for any increased first cost of installation.

It should be remembered that the power-station attendants available at most coal mines do not possess much technical information and that what they have is usually confined to direct-current equipment. Motor-generator sets which combine features of simplicity and reliability in operation, good economic and operating characteristics and practically fool-proof construction should therefore favorably recommend themselves to coal-mining operators.

Reliability and simplicity, combined with reasonable first cost and cost of operation, are the desired results. Selection and application of the equipment to be used should be made only after the proposition has been carefully considered in all its related phases and full and just consideration given to the various features favorable and unfavorable to be found in the different types of equipment available. Every application presents a problem in itself and requires its own individual solution. No hard and fast rules can be either laid down or followed.



A Westinghouse Six-Phase 25-Cycle Synchronous Rotary Converter

⁂

Burn Your Dynamite Cases

When dynamite is spread on the ground, so that as large a surface as possible is exposed, it generally burns peacefully on ignition and does not explode. The presence of metallic articles, such as wire and nails (and of course blasting-caps), makes an explosion likely. It is essential when destroying dynamite to remove it from the wooden case because of the nails by which the latter is held together.

Dynamite cases should be burned separately from the dynamite, because when they become saturated or stained with exuded nitroglycerin they almost always explode when burned; but if no dynamite is placed in the bonfire the explosion is generally not sufficiently severe to do any damage.

To set fire to the boxes, soak some excelsior or waste in gasoline and put one end of a piece of fuse in this, being careful to light the other end first. Have the fuse two or three feet long and the waste or excelsior under the empty dynamite cases. Or you can lay a train of excelsior and light one end with a match and run.

Dynamite cases showing any signs of being stained should never be used for fuel, but should be promptly destroyed in the manner described. If they blow up in the open, with everybody at a safe distance, they will do no harm, but if they blow up in the kitchen stove probably somebody will be badly hurt or killed and the house burned down. Don't take any chances.—E. I. du Pont de Nemours Powder Co.

⁂

Extracts from a Superintendent's Diary

The arrival of two salesmen at our camp today, loaded down with electric mine lamps for demonstration purposes, has recalled to my mind that styles have been changing even in miners' lamps. Leaving safety lamps out of consideration, the electric lamp is the fourth system of mine illumination to have a vogue during the 15 years that I have had occasion to keep posted on such matters.

First we had lamps to burn miners' oil, then "sunshine," then carbide and now electricity. Each change has called for a liberal supply of demonstrators, and there have been times when these salesmen added considerably to the income of our camp's boarding-house.

The methods employed by the manufacturers for the introduction of each of these systems have been very much alike. First the salesmen work on a few of the most progressive men until they get their curiosity aroused to a point where they are willing to make a trial. While the agent is on the ground the test is very satisfactory; after he leaves his pupils begin to have trouble, and finally so many of their associates have remarks to make that they decide pioneering isn't worth while. Shortly thereafter in some unaccountable manner the new system begins to make converts, and in the end everybody adopts it; the last ones to come over are the ones that first took an interest in the new light.

When I was young at the mining business I didn't take kindly to experiments, and the agents who tried to get me weaned from miner's oil had an interesting time of it. Fortunately they were not easily discouraged.

Some of my men were anxious to get a day off because of a circus that had been effectively advertised (I wonder if the demand for coal will ever again become so pressing that superintendents will resent a request from the men for an idle day), and because a lamp salesman saw the possibilities in such a situation, the men got the holiday and the lamp company worked into favor with its lamp.

Miners' oil had always been a rather variable product, and whenever the miners made a kick about the quality of a particular barrel, it was pretty difficult to discredit them. The lamp salesman realized this, and learning through inquiry that our commissary had just received a fresh shipment of oil the previous day, decided to stake his chances on a little plot.

The next day, the day of the circus, he got all of the drivers and some of the miners to come to the top about 10 o'clock declaring that the oil they had received from the commissary that morning made so much smoke that they could not remain longer in the mine. Then they all went home, and I sent a long telegram to the oil company telling them of our troubles and demanding an explanation.

They wired back that they would have another barrel at our commissary by morning and requested us to return the shipment that had given the trouble. This looked like an acknowledgment of crooked work on their part, and I decided to give the lamp salesman all possible encouragement, hoping to cut out the use of miners' oil altogether.

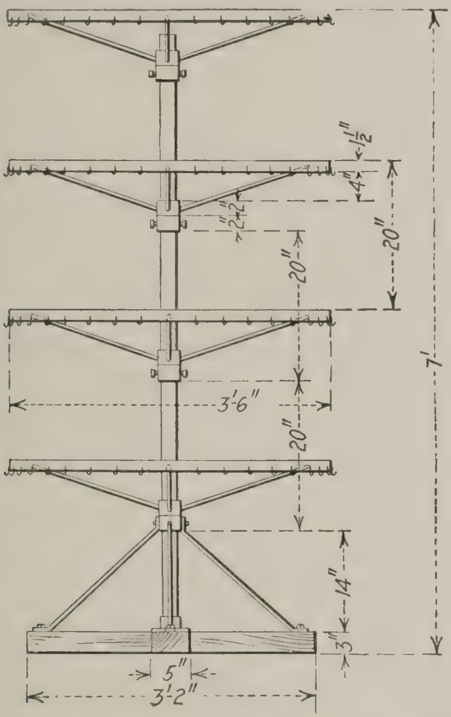
About a week later we received a report from the oil company informing us that they had traced our trouble to a shipping clerk who had shipped us a wrong grade of oil by mistake. They assured us that it would not happen again and begged for a continuance of our business.

* * *

A Safety-Lamp Rack

By M. D. Cooper*

A simple and easily made safety-lamp rack is shown in the accompanying sketch. It consists essentially of a piece of 2-in. pipe about 6 ft. 8 in. long; four pieces of strap iron ¼ in. thick, 1½ in. wide and 11 ft. 1 in. long; 24 rods for spokes, each of ½ in. diameter and 20¼ in. long, and four rods of ⅝-in. material and 24 in. long for braces.



A Simple and Practical Lamp Rack

The foundation of the rack is made up of two blocks of wood, each 38 in. long, 5 in. wide and 3 in. thick. Across the middle of each block a slot 5 in. wide and 1½ in. deep is cut, so that the two may be crossed and made to fit flush on top and bottom. A screwed flange to receive the pipe is attached to the center of the intersecting blocks. The pipe having been screwed into place, a loose sleeve of ½-in. material, drilled and threaded for four setscrews, is slipped over the pipe and made fast at a distance of 14 in. from the bottom, the braces being secured at the same time by the setscrews.

The straps are drilled at intervals of 3$\frac{1}{16}$ in. with holes of sufficient size to pass a 20-penny nail. Then the straps are bent into circular form and riveted, forming a circle 42 in. in diameter. The spokes, six in number, are riveted to the circular piece, the other ends being sunk into the hub. The hub fits loosely over the pipe and revolves around it, being supported on the clamp fastened by setscrews below it. Through the holes in the ring, 20-penny nails are placed and then bent over to form hooks.

The capacity of the rack is 36 lamps on each ring, or a total of 144 lamps. There is space enough beside each hook to stencil the number of the user of the lamp.

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*Ellsworth, Penn.

* * *

Russian Coal Supply

A recent decree authorizes the Russian Minister of Ways of Communication to take into his hands the supplying of fuel to the army and navy, the ways of communication and the manufacturing concerns producing supplies for the army, says Consul General John H. Snodgrass, of Moscow, in *Commerce Reports*. The minister is to unite and coördinate the activity of all concerns which up to now were engaged in supplying the country with fuel. Besides, the minister is authorized to request information from all persons and institutions concerning their supplies of fuel and to control all the supplies of fuel in possession of private persons and firms.

The reason for this decree is the fuel shortage that has made itself felt in Russia. During the last few months the output of coal at the Donetz mines has shown a considerable reduction. The beginning of the war caused a marked reduction, but the production soon assumed a more or less normal course, and the output of last November had almost reached the usual level. However, from the end of the year the output began to decrease and from 2,880,000 short tons produced in November fell to 2,574,000 short tons in December and to 2,432,500 short tons in January, 1915. At the same time the demand for coal had increased. The usual consumers had been joined by a number of concerns in the Baltic and some of the Polish provinces which had formerly used coal from the Dombrovsk district. In ordinary times the consumption of foreign coal in Russia reaches 540,000 to 720,000 short tons; that is, about one-quarter of the entire production of the Donetz district. A number of concerns that are now exceedingly busy furnishing supplies for the army used to work with foreign fuel. It is natural that the requirements of such concerns had to be satisfied first, and this reduced the amount available for the usual customers of the Donetz coal.

The chief reason why the existing supplies of coal are not available is the disorganization of railway traffic. The coal supplies at the mines reached 1,440,000 short tons on Feb. 1, but a considerable part of this quantity cannot be transported in consequence of the insufficient and irregular supply of freight cars.

Measures will perhaps be taken to attract more working hands to the mines. It has also been suggested that some of the railways and manufacturing concerns should replace coal by other fuel, principally oil.

To promote production at the coal mines, the Council of Ministers has approved the following measures: Free transportation of workmen contracted for the mines, admission of women and minors as workers in the mines and liberation of miners from military service.

Does Your Economizer Economize?

By James T. Beard, Jr.*

SYNOPSIS—The ratio of the number of square feet of heating surface in an economizer to the boiler horsepower determines the degree of economy obtained. For any boiler installation this point of maximum saving can be calculated.

The question of efficiency and economy is attracting the attention of managers in all lines of work, commercial as well as industrial. In power plants, especially, this question is of great importance; for the plant which can operate at the least cost can certainly sell power the cheapest, other conditions remaining equal.

The economizer is one of the means of reducing the cost of power-plant operation. Let it be understood, however, that the economizer does not always reduce expenses. Whether it will do so or not depends in a large measure upon the curve load factor, the cost of coal at the plant in question, the efficiency of the boilers and other considerations. In this article the author intends to show how to calculate the loss or saving involved in the installation of an economizer in a hypothetical plant.

Consider, first, the effects which such an installation will have on the conditions already existing. The economizer is placed in the path of the flue gases as they pass from the boiler to the stack. There will be greater resistance, therefore, to the flow of these gases than before. This means that, in order to obtain the same rate of combustion, it will be necessary to increase the draft. This can be done, either by building a higher stack or by installing mechanical apparatus which will supply the additional draft required.

Furthermore the temperature of the flue gases is decreased, owing to the fact that they give up some of their heat to the feed water as they pass through the economizer. This decrease in temperature has the effect of decreasing the draft available with a given stack. Hence, this fact affords an additional reason why the height of the stack must be increased or a mechanical draft system installed to furnish the extra draft necessary.

On the other hand, the feed water is heated in the economizer to a higher degree than is possible in a feed-water heater. Less heat is necessary under the boiler, therefore, to give the required evaporation. This means, of course, a saving in the fuel consumption. Besides this coal conservation, however, there is also a saving in the installed capacity of the boilers. Since one boiler horsepower is equivalent to the evaporation of 34.5 lb. of water per hour from and at 212° F., or 33,478 B.t.u. per hr., if less heat is required per hour, less boiler horsepower is necessary.

A 1000-Hp. Plant Is Assumed

Keeping the above facts in mind, let us assume that we are going to construct a power plant and wish to ascertain whether it will save us any actual dollars and cents to include an economizer in the installation. For the sake of discussion we will suppose that this plant will comprise 1000 boiler hp. and has a curve load factor of 0.8 on a basis of 365 days a year, 10 hours a day. Dry saturated steam is to be generated at 150 lb. gage pressure by boilers whose efficiency is 65 per cent. The calorific value of the coal to be used is known to be 14,500 B.t.u. per lb., and, in order to simplify calculations, we will assume that there is no ash. It should be noted, however, that in an actual determination of this sort allowance must be made for this refuse.

A feed-water heater is to be used at the plant, even if it is found inadvisable to install an economizer. The temperature of the feed entering the economizer, therefore, will be in the neighborhood of 208° F. The flue-gas temperature without the economizer will be assumed as 550° F.

Let us first see what the theoretical coal and steam consumptions in such a plant will be. A boiler horsepower has been defined above as the evaporation of 34.5 lb. of water per hour from and at 212° F. Now since it requires 970.4 B.t.u. to evaporate 1 lb. of water at this temperature 1 boiler hp. represents 970.4 × 34.5, or 33,478 B.t.u. per hr. Since the boiler efficiency is 65 per cent., the amount of heat necessary under the boiler to give 1 boiler hp. is equal to $\frac{33{,}478}{0.65}$, or 51,505 B.t.u. per hour. Hence, the coal consumption will be $\frac{33{,}478}{0.65 \times 14{,}500}$ or 3.55 lb. per boiler hp.-hr.

The total heat content of the steam generated above 32° F. is found from the steam tables to be 1195 B.t.u. per lb. The heat content above 208 F. will be, therefore, 1019 B.t.u. per lb. This value represents the amount of heat required to evaporate 1 lb. of water in the boiler at 150 lb. gage pressure. The water rate will then be $\frac{33{,}478}{1019}$, or 32.8 lb. steam per boiler hp.-hr.

Area of Heating Surface Is an Important Factor

It is evident that the area of the heating surface of the economizer exposed to contact with the flue gases is one of the factors which will govern the amount of heat that will be transferred from these gases to the feed water in a given time. Thus, the temperature rise of the feed will depend in part on the area of this heating surface. In selecting an economizer it is customary to so proportion the square feet of heating surface to the boiler horsepower that the ratio between these two quantities will lie somewhere between 1 : 3 and 1 : 5. For our case we will assume that this ratio is 1 : 4.

We are now in a position to calculate the rise in temperature that such an economizer will produce in the feed. In this calculation we will employ the formula in use by the Green Economizer Co., as follows:

$$T = \frac{y\,(T_1 - t_1)}{\frac{w}{U} + \frac{5\,w + GC}{2\,GC} \cdot y}$$

Where

T = Temperature rise in feed (deg. F.);

T_1 = Temperature of flue gas entering economizer (deg. F.);

t_1 = Temperature of feed water entering economizer (deg. F.);

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*Combustion Engineering Corp., 11 Broadway, New York.

w = Pounds feed water, per boiler hp.-hr.;

G = Pounds flue gas, per lb. of combustible (assumed as 20);

U = Rate of heat transfer per sq.ft. of economizer surface per hour per degree of difference between the temperatures of gases and water (asumed as 3.3 B.t.u.);

C = Pounds coal per boiler hp.-hr.;

y = Area in square feet of heating surface, per boiler hp.

Substituting values in the above equation we have

$$T = \frac{4\,(550 - 208)}{\dfrac{32.8}{3.3} + \dfrac{5 \times 32.8 + 20 \times 3.55}{2 \times 20 \times 3.55} \times 4} = 82.5°\ F.$$

That is, the feed-water temperature is increased 82.5° F. above 208° F., and enters the boiler at 290.5° F. instead of at 208° F., as before. On the entire plant we are thus saving 32.8 × 1000 × 0.8 × 82.5, or approximately 2,165,000 B.t.u. per hr. Expressed in boiler horsepower this saving represents $\frac{2{,}165{,}000}{33{,}478}$, or 64.6 boiler hp. In other words, we are saving 64.6 boiler hp. on the installed capacity of the plant; and, if we figure this at $20 per hp., we save 20 × 64.6, or $1290 on the first cost of the plant.

We must not forget, on the other hand, that we have also added to the first cost by buying this economizer. We can roughly estimate this additional cost as follows:

Total sq.ft. heating surface = 4 × 1000 =	4000
4000 sq.ft. @ $1 per sq.ft.	$4000
Cost to install @ $0.20 per sq.ft.	800
Total	$4800
Less saving in boiler hp.	1290
Net increased first cost	$3510

A yearly charge of 20 per cent. of this cost must now be made to take care of interest on the investment, depreciation, repairs, taxes, insurance, operation and general office expense.

It is evident, then, that, thus far, the economizer involves a yearly expense of 3510 × 0.20, or $702.

THE REDUCTION IN THE COAL BILL

In one of the preceding paragraphs it was stated that the extra heating of the feed water resulted in a saving of approximately 2,165,000 B.t.u. per hr. It follows, then, that the coal bill will be considerably cut. The extent of this reduction is readily calculated.

$$\textit{Lb. coal saved per hr.} = \frac{32.8 \times 1000 \times 0.8 \times 82.5}{14{,}500 \times 0.65}$$

$$= 230\ \textit{lb. per hr.}$$

$$\textit{Tons coal saved per yr.} = \frac{230 \times 3650}{2000}$$

$$= 420\ \textit{tons per yr.}$$

If we assume that in the locality where our plant is situated coal sells at $3 a ton, then the yearly saving represented by this reduction in fuel consumption is 420 × 3, or $1260.

There remains now for our consideration only the loss due to the fact that some device must be provided to supply extra draft for the plant. If the saving on our fuel bill is greater than this loss plus the yearly charge on the economizer, then our installation has been a success.

It was previously stated that the loss in draft could be made up either by increasing the height of the stack or by installing a mechanical draft system. In view of the difficulties and high extra cost involved in increasing the height of the present stack, however, it is cheaper and, therefore, advisable to install a mechanical draft system. Let us say that in this plant we will use an induced-draft fan. This does not mean that we are not going to have any stack at all. As a matter of fact, we have assumed that we will have a stack of sufficient height to take care of the draft required when the economizer is cut out. When the economizer is in operation it will be necessary to have this induced-draft fan to help the stack supply the proper draft.

$$\textit{Draft (in. water)} = H\left[\frac{7.64}{T_1} - \frac{7.95}{T_2}\right]$$

where

H = Height stack (ft.);

T_1 = Outside temperature (deg. F. abs.);

T_2 = Stack temperature (deg. F. abs.).

In order to calculate the height of stack necessary to supply the proper draft when the economizer is not operating, certain assumptions must be made in regard to the various draft losses. Thus,

Loss in furnace, in. water	0.10
Loss in boiler, in. water	0.30
Loss in flue and turns, in. water	0.15
Total, in. water	0.55

Besides these there is a stack loss which is generally considered as 20 per cent. of the whole. The whole loss, will, therefore, be $\frac{0.55}{0.80}$, or 0.688 in. water. Assume that the outside temperature averages about 70° F. In one of the early paragraphs we said that we would consider the stack temperature as 550° F. at the base. These assumptions enable us now to calculate the height of our stack.

$$0.688 = H\left[\frac{7.64}{460 + 70} - \frac{7.95}{460 + 550}\right]$$

Therefore,

$$H = 105\ \textit{ft.}$$

THE FLUE-GAS TEMPERATURE IS DECREASED

It is now time to investigate the drop in temperature of the flue gases due to the fact that they give up some of their heat to the feed water in the economizer. It is evident that the heat absorbed by the water per boiler hp.-hr. will be equal to that given up by the flue gases per boiler hp.-hr., assuming that there is no loss by radiation, etc.

The heat absorbed by the water per boiler hp.-hr. = 32.8 × 82.5 = 2710 B.t.u.

The heat given up by the gases per b.hp.-hr. = 20 × 3.55 × 0.25 × T.

Notice that we represent the fall in temperature of the flue gases by the symbol T. The specific heat of these gases is assumed as 0.25.

$$T = \frac{2710}{20 \times 3.55 \times 0.25} = 153°\ F.$$

Hence, the temperature of the gases at the base of the stack when the economizer is in operation will be 550 — 153, or 397 deg. F. Allowing 10 deg. F. for loss by radiation, the stack temperature will average 387 deg. F. The draft given by the 105-ft. stack will, then, be considerably less, as is shown below.

$$\textit{New draft} = 105\left[\frac{7.64}{460 + 70} - \frac{7.95}{460 + 387}\right]$$

$$= 0.526 \textit{ in. water}$$

Allowing for the added resistance of the economizer surface to the flow of the gases, the draft which ought to be supplied by the stack in order to obtain the proper rate of combustion is 0.688 + 0.150, or 0.838 in. water. As a matter of fact, it is not possible to supply more than 0.526 in. water with this stack when the economizer is running. For this reason, the difference between 0.838 and 0.526, or 0.312 in. water, must be made up by the induced-draft fan. This corresponds to a pressure of 1.62 lb. per sq.ft. Assume that the fan runs at 75 per cent. opening and that the mechanical efficiency under these conditions is 40 per cent. The horsepower of such a fan will be computed as follows:

$$Hp. = \frac{\textit{cu.ft. per min.} \times \textit{pressure in lb. per sq.ft.}}{33{,}000 \times \textit{efficiency}}$$

The maximum weight of gas flowing per hour will be 3.55 × 1000 × 20 = 71,000 lb. per hr. This weight corresponds roughly to 27,335 cu.ft. per min. Therefore, the maximum or installed horsepower of the fan will be,

$$Hp. = \frac{27{,}335 \times 1.62}{33{,}000 \times 0.40} = 3.35 \textit{ hp. about}$$

This type and size of fan, together with its engine and air ducts, will cost, installed, about $335. A yearly charge must be made against this value to cover the interest on the investment, depreciation, maintenance, taxes, insurance, etc., amounting to about 15 per cent. The yearly overhead charge on the fan and equipment will then be 335 × 0.15, or $50.20.

The Cost of Operating the Draft Fan

It remains now for us to compute, or rather estimate, the cost of operating this added unit of equipment. This we shall proceed to do on the basis of the average horsepower of the fan for the year and not on the basis of the installed or rated capacity. The average weight of flue gases flowing per hour is found to be 3.55 × 1000 × 0.8 × 20, or 56,900. Expressed in cubic feet per min., this becomes 21,800. This, then, is the average volume of gas that the fan has to handle. The average horsepower is found to be, therefore,

$$Hp. = \frac{21{,}800 \times 1.62}{33{,}000 \times 0.40} = 2.675$$

If we allow a steam consumption of, say, 70 lb. per i.hp.-hr., the weight of steam necessary to operate this fan will be 70 × 2.675, or 187.3 lb. per hr. The weight of coal burned under the boiler per pound of steam generated is $\frac{3.55}{32.8} = 0.108$. The coal required per hr. to operate the fan will, therefore, be 187.3 × 0.108 = 20.2 lb. Expressed in tons per year this becomes $\frac{20.2 \times 3650}{2000} =$ 36.9 tons per year. The operating cost of the fan equipment may then be estimated in this manner:

36.9 tons @ $3	$110.70
Lubrication, etc.	2.21
Total	$112.91

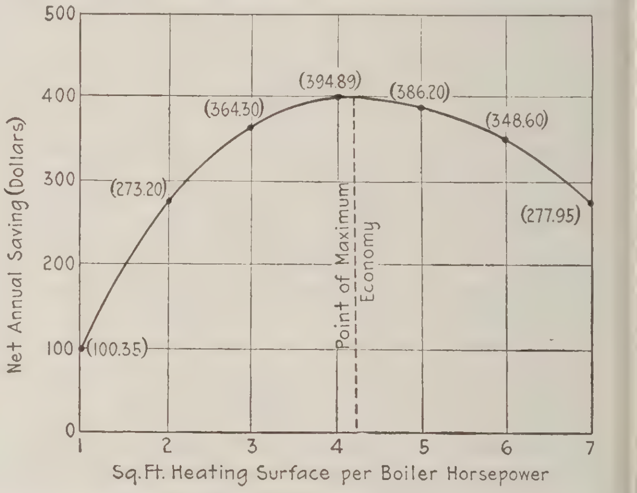
The various items of saving and expense may now be summed up as follows:

Item	Saving	Expense
Overhead Charges		
On first cost of economizer less saving in b.hp.	......	$702.00
On first cost of fan and equipment	......	50.20
Operating Charges		
Fan	......	112.91
Saving on main units (fuel)	$1260.00	
	$1260.00	$865.11
	865.11	
Net annual saving	$394.89	

We may conclude, therefore, that, granting the assumptions that have been made, if we so select our economizer that the ratio of the square feet of heating surface to the boiler horsepower will be 1 : 4, the net annual saving will be approximately $400 as we have calculated. On the other hand, if we select our economizer of such a size that we get a different ratio, it is only reasonable to suspect that we shall obtain a different result as our annual net saving.

The Point of Maximum Economy

Furthermore, we are led to believe that there might, not necessarily must, be some definite ratio betwen these two factors which would give a maximum annual net saving for the plant. This ratio would, of course, vary with different plants; but, for a given installation it would be fixed and constant.



CURVE SHOWING RELATION BETWEEN RATIO OF ECONOMIZER AND BOILER HEATING SURFACES AND NET ANNUAL SAVING

This amounts to saying that, for a given plant, there is one and only one size of economizer which will give a maximum annual net saving. To prove this theory it is merely necessary to calculate the net saving for different selected values of this ratio and compare them. The results of such a calculation are shown in the following table:

Sq.Ft. per Boiler.Hp.	Temp. Rise	Fuel Saving	Expense Economizer (Overhead)	Expense Fan Overhead	Expense Fan Operation	Net Annual Saving
7	111.0	$1760	$1212	$65.25	$144.80	$277.95
6	103.3	1580	1036	60.70	134.70	348.60
5	93.7	1435	868	56.20	124.60	386.20
4	82.5	1260	702	50.20	112.91	394.89
3	68.7	1050	545	43.70	97.00	364.30
2	51.6	790	398	36.90	81.90	273.20
1	29.4	450	268	28.50	63.15	100.35

The results as tabulated above, show without a doubt that this theory is correct. If we take these results and plot the net annual savings as ordinates and the square feet of heating surface per boiler horsepower as abscissas a smooth curve is obtained as shown in Fig. 1. By inspection of this curve, it is evident that there is a maximum point at about 4.25 sq.ft. per boiler hp. This means that, if we select our economizer of such a size that there are 4.25 sq.ft. of heating surface for each boiler horsepower, we will obtain the highest possible annual net saving at this particular plant. In other words, in the case assumed our economizer should have 4250 sq.ft. of heating surface. Under these circumstances the maximum economy is obtained and, according to the curve, an annual net saving of $405 should be realized.

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Powdered-Coal Fire at Burden Iron Works, Troy

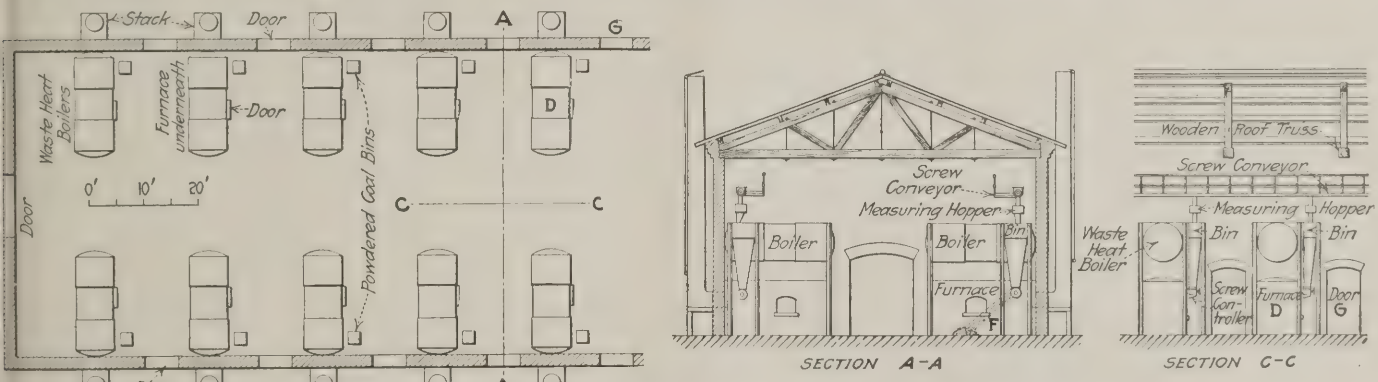
On Mar. 18, at 10 p.m., a fire occurred in the puddling-furnace building of the Burden Iron Co., at South Troy, N. Y. This the newspapers erroneously called an explosion due to powdered coal.

There were about 80 puddling furnaces, and about one-fourth were using powdered coal as fuel. There was the usual milling plant, containing pulverizers, crushers, driers and the necessary bins and elevators. The pulverized coal was carried from the milling plant to the several furnaces by screw conveyors. At each puddling furnace there was a 1-ton steel bin with the requisite motor and controller to inject the fuel into the furnace.

The plant was running night and day, and the powdered-coal plant (furnished and erected by the Quigley Furnace & Foundry Co., of Springfield, Mass.) had been in operation since last fall. There had been the usual troubles with new machinery, but these had all been successfully overcome except one. The powdered coal persisted in caking in the bins, so that at times there was none flowing into the controller. This compelled constant hammering on the bins. Some became so battered that this hammering was forbidden by the management a week or so previously.

On the night of the fire the operator at one furnace (*D* in the sketch) had removed the small slide from the foot of the hoppered steel bin, thinking, no doubt, that the coal would move more freely into the controller. But the coal dust was leaking out in small quantities upon the floor. There was a strong breeze blowing at the time, and as all the doors on the side walls were open, puffs of wind blew little clouds of this leaking coal dust in front of the furnace door (as at *F*). As the operator was pulling out a heat, with slag falling at his feet, the coal dust became ignited. Instantly, there was a flash and the flame darted upward into the roof trusses. These were wooden trusses with comparatively large surfaces, covered with fine coal dust which had settled there. The whole roof quickly became ablaze, and the men had to drop their tools and run for their lives.

The fire burned from 10 p.m. until 2 a.m., when the roof fell in on the furnaces. A part of the building had steel trusses and did not burn. The measuring hopper, screw conveyors and walkways came down with the roof, but there was no back-flash of coal dust through the conveyors, nor was there any explosion of coal dust. The destruction is to be charged to employees rather than to equipment.—*From Engineering News.*



Arrangement of Powdered-Coal Furnaces at Burden Iron Works

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West Virginia-Pittsburg Coal Co. Officials Confer

The "occasional conference" of the West Virginia-Pittsburg Coal Co. was held at the Hudson House, Wellsburg, W. Va., on Tuesday evening, Apr. 27, and was attended by all official employees of the Wellsburg and Collier mines of the company and also a number of the prominent citizens and coal men of the vicinity.

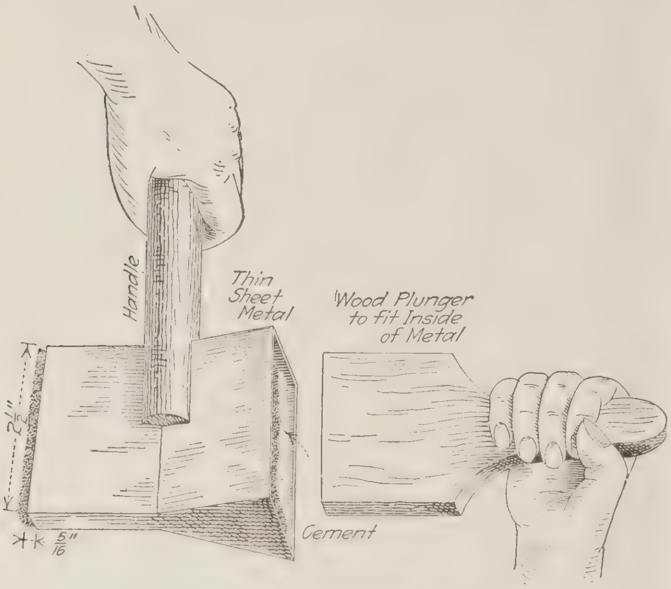
Among those present were several who were not employees of the company. Inspector Riggleman, of the First West Virginia Inspection District, spoke at length on the Safety First movement in West Virginia. He was followed by the Hon. Elmer Hough, who gave a brief history of Brooke County coal. Alexander Gilcrist told of his experience as a pioneer coal operator in Brooke County before the days of the Pan Handle R.R. Sheriff Patterson and Attorney Carter made interesting speeches. R. Z. Virgin, superintendent of No. 1 mine, spoke on "Mine Cars and Their Methods of Construction." S. M. McMahon spoke on "My Experience with the Shortwall Mining Machine." W. D. McCausland, general superintendent of the West Virginia-Pittsburg Coal Co., gave a brief outline of the extent of the company's coal-land holdings. Dr. Focer, company physician, spoke on "Sanitation in Mining Villages." L. H. McAmic, editor of the Wellsburg Herald, spoke on "How to Handle Coal Mine News." Captain Oakes of the steamer "J. O. Watson" spoke briefly on "River Traffic." Hefron Robison, general manager, acted as master of ceremonies.

At the close of the conference Samuel M. McMahon, superintendent No. 4 mine, making the presentation speech for the operating officials of the company (the speech being ably set forth in a poem written by Mr. McMahon, "The Humorous and Genial Scotchman"), presented a token of the esteem and appreciation in which Mr. Robison is held by his officials.

Boiler-Room Repairs

Most engineers and firemen are not very skillful in laying brick, says George C. Abbe in *Power,* but there are times when a few minutes spent in pointing up loose brick with cement or fireclay when the fires are out will develop a good job well done.

Getting fireclay or cement in between brick is not always as easy as it might seem. The illustration shows a sort of a square squirt gun with which you can fill up the most obstinate crack or hole, and you don't have to be a mason to do it either.



"Gun" for Pointing Up Side

Always keep on hand a little cement, and whenever a crack shows up and needs attention it takes only a few minutes to fix it, and the job is better than that usually done with the time-honored trowel. Our original model was made from a small tin can and a piece of a barrel stave, which was used until worn out, when we had something suitable made by a tinsmith.

⁂

Coal Situation in Spain and Italy

Spain is rich in coal lands, says Consul Robertson Honey, of Madrid, in *Commerce Reports.* The area of carboniferous tracts approximates 4900 sq.mi., which is nearly double that of France and only one-third less than that of England. Of this area, however, only about one-fifth is worked—from which it is evident that the development of the coal industry in this country has not reached a high mark.

The causes for this lack of development are to be found in insufficient capital, high wages, high freight rates and the fact that many industries use electric current generated by water power. It has been estimated that the electric power employed in this manner would require 400,000 tons of coal annually for its generation, or between 5 and 6 per cent. of Spain's total consumption. The cost of hydro-electric power is about one-half that of the same amount of energy developed by use of coal.

English coal competes readily with the domestic and undersells it at seaports; only in the northern provinces of Spain, such as Asturias, where water transportation is available, can domestic coal meet the competition of English fuel. Thus it is that 60 per cent. of the domestic coal used in Spain is supplied by that province; on account of freight rates other provinces of Spain, quite as rich in coal as Asturias, consume their own output, but do not ship. In this situation are found the mines of Puertollano, Penarroya, Leon, Seville and Palencia. In 1913 (the latest year for which details are available), Asturias produced about 2,750,000 short tons of coal; Ciudad Real, 410,000; Andalusia, 387,000; Leon, 360,000; and the total for all Spain was approximately 4,161,500 tons, valued at $13,750,000.

During the past eight months imports of English coal have fallen off and the output of Spanish coal has increased 20 per cent., but the demand for foreign coal continues. Before the outbreak of the European war Spanish coal sold at wholesale for about $7 per short ton at the coal yard; the price now is $14.25. Similarly, freight rates by water from Gijon to Barcelona, for instance, have been raised from $1.60 to $4.50 per short ton. A leading wholesaler in Madrid states that eight months ago he sold English coal at 70 to 72 pesetas per metric ton of 2204.6 lb.; to-day he receives 100 pesetas (the silver peseta equals $0.205 at exchange of this date).

From the facts set out above, American coal exporters can make a rough estimate as to the availability of Spain as a market and can determine whether the question is worth taking up in detail. As of interest in this connection, the figures of Spain's imports of coal and coke in 1913 are given below:

	Coal		Coke	
Imported from	Tons	Value	Tons	Value
United States	37,250	$176,000	1,916	$12,200
Belgium	1,130	53,500	7,300	46,500
France	21,500	101,400	12,150	98,300
Germany	183,700	868,500	34,650	220,400
Netherlands	45,800	216,700	.....	.....
United Kingdom	2,682,000	12,680,000	360,000	2,230,000

(Prior to Apr. 7, 1915, foreign coal was subject to both an import duty and a transportation tax, but by a decree of that date these levies were suspended.)

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Coal Mining on the Bonus System

In view of the animated discussions that have taken place in coal-mining circles in Britain with regard to the successful institution of a profit-sharing or bonus system in the coal-mining industry, it is interesting to get particulars of a system in vogue in Sardinia and which has been tested for some years. The mining business employs some thousands of men and has been based on the principle that those workmen who have been employed for a certain time are entitled to a share in the profits of the business and that capital has a right to its wages in the same way as labor has a right to its wages.

The workman receives a bonus in the wages earned by him during the year equivalent to the percentage paid to the shareholders above the rate fixed as the wages of capital, which may vary according to the nature of business. Thus assuming 5 per cent. as the wages of capital and 10 per cent. dividends to the shareholders, the bonus to which the workman would be entitled is 5 per cent. on the wages earned.

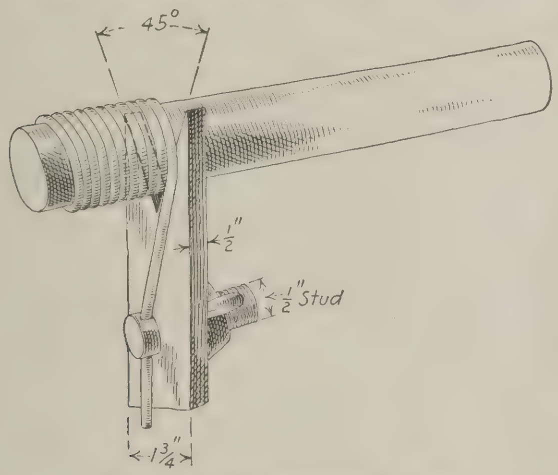
This bonus is not distributed, but is accumulated for him at 5-per cent. interest and cannot be withdrawn until after he leaves the company's service. A modification has recently been introduced in the regulations governing the bonus scheme that constitutes a further step in the direction of labor copartnership.

When the capital standing to the credit of a workman reaches a certain sum it will receive interest at the same rate as the bonus in wages, with a minimum of 5 per cent. interest. This interest is paid out every year, instead of being passed as hitherto to the workman's credit. The effect of this provision is to make the workman a sort of preference shareholder.

The third and final step toward labor copartnership by which the workman as a shareholder acquires a voice in the management may come later on. Real progress toward the desired end can only be attained by gradual steps. The introduction of such a system in British and American mining companies could be done without negotiating with trade unions or consulting the men, and in it might be found a more real solution for the labor troubles which now seem to be so prevalent.

Spring-Winding Fixture

The illustration shows a spring-winding fixture, says F. L. Young in *Power.* Regardless of the diameter of the rod the spring is to be wound on, the tension is adjustable and the stress is taken up by the fixture itself.



Position of Fixture in Use

It is made from a piece of machine steel ½x1¾x14 in. long with a 45-deg. notch in the end, and drilled to receive a ½-in. stud and a standard ½-in. wing-nut. Drill a hole, say ¼ in., in the stud close up to the head, and the fixture is complete. To wind an open spring the tool is held in the tool post, getting the lead required by the lead screw, the same as for any other purpose. Closed springs are wound with the fixture held in the hand, and the wire will give its own lead.

Coal Trade at Palermo

The amount of coal received at Palermo annually, says Consul Samuel H. Shank, in *Commerce Reports,* is something over 200,000 tons. The greater part of it has come from England, being Cardiff and Newcastle coal. Small amounts were received from the United States in the past, but since the war commenced several cargoes of Pocahontas, New River and Fairmont coals have been imported. Some anthracite has been brought from Scotland, but thus far none from the United States. The demand for anthracite is steadily growing. There are no coal mines in the island of Sicily. The prices before the war compared with the present quotations, c.i.f. Palermo, are: Cardiff, usual price $6.08, present price $13.13; Newcastle, usual price $4.86, present price $11.55; anthracite, usual price $7.80, present price $14.60.

Coal received by dealers is stored in warehouses having a capacity of about 25,000 tons and located close to the docks. The state has a supply for the use of railways and mail boats, but this is piled in open yards at the docks and railway station. The government usually has about 15,000 tons on hand, and private stocks at present are probably somewhat smaller. It is estimated that there are 25,000 to 30,000 tons now on hand in Palermo. Coal is delivered to the ships in lighters of 8 tons' capacity, being passed in baskets by hand into the ship. No machinery is used. Usually four lighters and 40 to 50 men are employed. In 12 hours 300 tons can be loaded at a cost of 68c. a ton, laborers receiving 97c. a day.

Recent Legal Decisions

Liability for Freight Charges—A coal dock company does not become liable for freight charges on a shipment of coal merely through its receipt of the coal for storage and forwarding for the owner. (United States Circuit Court of Appeals, Eighth Circuit; Seither Transit Co. vs. Great Lakes Coal & Dock Co., 220 Federal Reporter 28.)

Employment of Minors; Liability Concerning Simple Appliances—When a coal operator employs a boy who is above the statutory age limit he is entitled to assume that the boy possesses the intelligence usually possessed by boys of the same age, so far as concerns the duty of instruction against dangers incident to his work. An employer is not liable for injury resulting from a defect in a simple appliance which could have been easily and speedily repaired by the injured employee. (West Virginia Supreme Court of Appeals, Martin vs. Carter Coal Co., 84 Southeastern Reporter 574.)

West Virginia Safety Requirements—Even if the West Virginia statute which requires elevators to be safeguarded to avoid injury to employees can be said to be applicable to mine cages, it cannot be construed as making a coal operator liable for injury to an employee working near the bottom of a shaft caused by fall of an object down the shaft while it was being loaded on a cage, due to space left between the platform and the edge of the shaft. The statute was designed only for the protection of employees while in or near elevators. (West Virginia Supreme Court of Appeals, Ferguson vs. Middle States Coal & Coke Co., 84 Southeastern Reporter 573.)

The Optimist

By WALT MASON

(Written expressly for "Coal Age")

The optimist is one who knows that life has many kinds of woes; he doesn't say, for our relief, that there is no such thing as grief. He doesn't whoop around and swear that there is no such thing as care.

The "sunshine" fakers talk that way, and bore the world from day to day.

The optimist who saws the wood knows life has much that isn't good; he doesn't fool himself with bunk, nor try to gold-plate pewter junk; he doesn't say that black is white, or see a dozen moons at night. He sees conditions as they are, yet ties his wagon to a star.

Progressiveness his watchword is; it animates his life and biz. If times are dull and business slack, he doesn't weep and wail, "Alack!" His mind is stored with useful facts which help and guide him in his acts, and so he knows just what to do, to keep his trade from falling through. A hundred useful hints he's read, and he has kept them in his head, and he can draw on that supply when business seems to wish to die.

For knowledge is the stuff that wins; it beats all optimistic grins. Most any gent can smile and smile, when things jog on in splendid style; most any gent can sing and dance when he has roubles in his pants; but when all things are going wrong, the unread critter cans his song, and pulls his hair and wags his ears, and says this is a vale of tears.

When things are going doubly wrong, the optimist then looms up strong—the optimist who stores his mind with all the knowledge he can find.

The Labor Situation

SYNOPSIS—The ending of the strike in eastern Ohio does not insure the immediate reopening of all the mines, as the coal has partly lost its market during the long strike. The Federation of Labor in Colorado protests against the conviction of Lawson. The Industrial Relations Commission publishes the Rockefeller-Lee correspondence.

The ratification of the new wage scale by the joint committee of operators and miners representing the eastern Ohio district and the signing on May 13 of the document by Charles J. Albasin, C. E. Maurer and S. H. Robbins, the former for the Union and the latter for the Pittsburgh Vein Operators Association, formally ends the 13½ months' strike in that coal region.

But in the meantime eastern Ohio operators have lost a portion of their market, and it is doubtful if they will ever be able to regain it. Despite the slack demand for coal some of the mines are being put in condition for operation. Others will not be opened until the operators see their way clear to sell their product. So the feeling in eastern Ohio is not one of elation, but rather of expectancy. The companies hope that something will be done this summer which will enable them to regain their lost position in the markets of the country.

Mines Will Be Inspected before Being Reopened

J. M. Roan, chief deputy of the Industrial Commission of Ohio and safety commissioner of mines, with his deputies started out in his mine-rescue car as soon as the agreement was ratified. They will inspect all the mines in eastern Ohio, and none will be allowed to start operation without the examination of the agents of the commission.

Last week it was said that the Moore's Run mine of the Hutchinson Coal Co. and several operations of the Youghiogheny and Ohio Coal Co., the Rail and River Coal Co. and the Pursglove-Maher Coal Co. were ready for reopening. Only a small percentage of the striking miners will be furnished work at this time.

The miners' representatives headed by Senator Green have appealed to the governor to veto the Gallagher amendment, but so far he has taken no action on the bill. The miners' officials threaten to defeat the amendment by a referendum vote in case the governor fails to veto it.

State Senator William Green, secretary-treasurer of the United Mine Workers of America, declared at Wheeling, W. Va., that the Industrial Workers of the World had been largely responsible for the delayed settlement of the eastern Ohio strike and condemned those who tried to belong both to the union and the I. W. W.

Colorado Federationists Bring Charges against Judge

The executive board of the Colorado State Federation of Labor has brought charges against Judge Granby Hillyer, who has just tried John R. Lawson, the international board member of the United Mine Workers of America in Colorado and Louis Zancannelli, a union miner. Both have been found guilty of murder.

The board alleges that excessive bail has been required and that trial has been denied except in a few instances. It states that the first jury was so in doubt as to the guilt of J. R. Lawson that 8 out of 12 voted for acquittal. Then the open venire system was followed and "notorious partisans of the coal companies were brought in as jurors. Coal company doctors and managers, kin-people of coal-company managers and men who had participated in battles with the striking miners were selected and before this jury Lawson and Zancannelli were convicted."

Alleges that a Company Attorney Was Specially Appointed

It is also asserted that the judge is a coal-company attorney and has been employed in cases against the miners. The executive board of the State Federation of Labor also states that a special act was passed by the legislature for the appointment of a judge in the district and that as a result the operators succeeded in getting their own attorney appointed. Affidavits were made setting up facts by which the judge was shown to be disqualified, according to the same board, but without causing him to withdraw.

The following statement is also made: "On the trials he refuses to permit jurors to be asked the question as to whether or not they could give the defendants the benefit of the rule of law which provides that a man accused of crime shall at the outset of the trial be presumed to be innocent. In one of the cases he even permitted a juror to serve who, according to the undisputed affidavits, had a gambling wager on the result of the verdict."

Correspondence between John D. Rockefeller, Jr., and Ivy L. Lee

On May 16 the United States Commission on Industrial Relations made public the correspondence between John D. Rockefeller, Jr., and Ivy L. Lee relative to a publicity campaign undertaken by Mr. Lee at Mr. Rockefeller's request. By this campaign it was hoped to put a more correct idea of the Colorado situation before the public than that which had hitherto been circulated.

In what has been published of these letters there is really nothing worthy of republication. Apparently Mr. Rockefeller sent Mr. Lee many letters and papers for his information in conducting the publicity campaign. In one letter he speaks of "an excellent article from the 'Coal Age' which outlines a plan for a broad educative campaign of publicity, such as you and I have talked of."

Mr. Rockefeller lent $2000 to Mr. Lee to assist him in his publicity work. This money was to be returned by Mr. Lee as soon as he began to receive checks from the Coal Operators' Committee.

Dates of First-Aid Meets

The following meets have been organized largely as a result of the energetic work of the American Mine Safety Association and the Bureau of Mines. Some, as will be noticed, have already been held.

Apr. 15, Fort Worth, Tex.
May 1, Butte, Mont.
May 1, Canton, Ill.
May 12-14, Huntington, W. Va.
May 14-15, Pineville, Ky.
May 18, Fort Smith, Ark.
May 22, McAlester, Okla.
May 25, Pittsburg, Kan.
May 29, Birmingham, Ala.
June 1, Moberly, Mo.
June 5, Des Moines, Iowa.
July 2-3, Big Stone Gap, Va.
July 23-24, Billings, Mont.

The American Mine Safety Association needs and should receive the financial support of all coal companies because of the valuable work it is doing to develop the first-aid and mine-rescue service of the country. It is at least entitled to have as members every coal corporation in the neighborhoods where it holds organized meets, and still more justified is it in anticipating that all the participant companies will assist by applying for membership. The fee is only $10 per year. Admission blanks can be obtained on application either to H. M. Wilson, secretary-treasurer, 40th and Butler St., Pittsburgh, Penn., or to COAL AGE, 36th St. and 10th Ave., New York City.

Coming Meetings

M. O. I. Coal Association annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland.

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

The Mine Inspectors' Institute of the U. S. A. will hold its annual meeting June 8, 9, 10 and 11, 1915, at St. Louis, Mo. Secretary, J. W. Paul, Pittsburgh, Penn.

The American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

The American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, inclusive, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

The Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel DuPont. The first two days of the convention will be devoted to business, including exhibition of coal-handling machinery in action, supplies and motor trucks. The U. S. Bureau of Mines will show by motion pictures every detail of anthracite mining, accompanied by a lecture by Charles Enzian, of Wilkes-Barre, Penn. The "Queen Anne" has been chartered to take the members and their friends on June 17 down Delaware Bay.

Editorials

A Great Opportunity, But--

Since Aug. 1, 1914, there has been a decided demand for American products in the markets of the world. This demand, so far as we are concerned, came without seeking or effort. As has been pointed out time and again in the public press, the present is a season of opportunity for American business unprecedented in the annals of history.

During the past few months American coal has found a ready market in countries which formerly used only European fuels. Italy, Spain, Egypt and the great republics of South America have made purchases of coal from this country where German and English fuel had been previously employed.

For obvious physical or rather geographic reasons it is to Brazil and Argentina that the United States may look with greatest hope for a foreign outlet for our surplus coal production. Both countries are rich naturally. Each produces a superabundance of many commodities which this country might well absorb. Wheat, beef, wool, goatskins, coffee, chocolate, sugar, rubber are but a few of the products of a soil of great fertility and a climate well adapted to their production.

It is useless for one people to attempt to trade with another unless there is a mutual interchange of commodities. Furthermore, in order to secure and maintain beneficial commercial relations each party should so far as possible cater to the needs and wishes of the other. The mine commissary manager who insists on keeping only the best grade of creamery butter when the miners and their families ask only for oleomargarine will soon discover that he has but few customers. In like manner it will be disadvantageous for American producers to ship run of mine and demand cash on presentation of bill of lading when prepared sizes and six months' credit are necessary in order to suit the customer's needs. American exporters and coal producers are "green" at meeting and filling the requirements of foreign consumers, and they might to advantage study well the needs and desires as well as the acknowledged necessities of prospective customers.

Of all phases of the situation, however, probably the most difficult to overcome immediately is the lack of adequate transportation facilities. With our coal mines idle or working on scant time, with many foreign countries anxious to secure American fuel and offering prices which would yield our producers handsome profits, we suffer from a lack of ships to transport our coal to foreign countries and bear back in return their products to our shores.

One hundred years ago or thereabouts, America in large measure monopolized the carrying trade of the world. Clipper-built ships, barks and schooners all flying the flag of the United States were to be found in all quarters of the globe, and the American merchant marine was the mightiest on earth. Today we as a nation are reaping a bitter harvest, the fruit of criminal shortsightedness on the part of our past lawmakers and so-called statesmen. The American merchant marine is, or at least was a few months ago, extinct so far as foreign freight is concerned.

The field of opportunity is ripe for the harvest. America lacks neither skill nor incentive to meet the occasion. Successful entrance into and the retention of any considerable portion of the world's fuel markets, however, would mean big business, and many of our people are obsessed with the idea that big business is "pizen." If this idea can be eradicated and our big coal-producing organizations allowed to enter the field untrammeled by petty legal restrictions and persecutions or the fear thereof, we as well as our customers in other lands may reap a lasting benefit.

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Doing Less Than Nothing

Some men are so placed industrially that they tend to prevent and retard rather than to help in the performance of useful work. Those of our readers who were born in England will remember the man with a red flag who went ahead of traction engines to warn the vehicular traffic and help to control restive horses.

This yokel served admirably to prevent the development of the auto car and auto truck, for if the speed had to be kept down to suit the man's slow rate of travel, there could never be an economical operation of the motor truck.

But it seemed wiser to the British Parliament to require that the men be hired than that the farmers be asked to break the horses and make them tractable in the presence of steam-driven vehicles. Besides, who could foresee that trackless propulsion would reach its present stage, and had anyone foreseen it he would have schemed up a way by which such a dangerous hustling along public roads might be made illegal.

In Colorado there is a law requiring a boy or a man to be placed at every mine door. If these doors were made self-acting such an attendant could be dispensed with. But the law did not contemplate the introduction of such doors, and so the boy had to be employed. In no other state is there a provision requiring an attendant at all doors.

State Senator Tong, of Denver, drew up a bill making it possible to dispense with door-tenders when automatic doors were provided, and he presented it to the legislature in February of the present year, but no action has so far been taken. This bill should be passed, for the old law requires the mine to be worked inefficiently.

A man engaged in opening and closing a door is a lost economic unit till he is moved to some other place, whether he is a flunkey in a uniform or a less gorgeous individual sitting on a soapbox. We talk glibly about the conservation of human life. No one can better conserve it than by keeping it at useful labor and such labor only.

Where men work at an unnecessary occupation, not only do they degenerate mentally and morally, but they consume the product of real workers while they contribute nothing to the welfare of mankind. Many an individual of admirable qualities fills a useless office or none at all, and such men may well be said to be effecting less than nothing.

A door-tender is less reliable than an automatic door. He may leave it open or may fail to open it when such opening is necessary. He is as fallible as a signalman and may be even more likely to fail, for rarely are the better grade of men chosen for the work. Why, then, keep in operation a law by which his services are compulsory?

Uncertainties in Statistics

So few are the states that are securing statistics of the nationality of mine workers and such a considerable service is being rendered by those that are doing this work that criticism may well be avoided lest it discourage others from following such a worthy lead.

The men being enumerated cannot, for the most part, speak English, and some of them are not able to read or write. As a result it is hard to make clear to them whether a national, ethnological or linguistic statement is desired. In fact, is the inquirer himself quite clear as to the information he is seeking?

Some men, for instance, declare they are Poles. This may be true ethnographically, but it does not state whether they should be classed as inhabitants of Russia, Austria or Germany. Other Poles might say they were Russians, Austrians or Germans and thus muddle up the record if Poland were regarded as being of such ethnological importance that people of that race should be segregated in the record.

The Bohemians largely speak German, and as they are more friendly to Germany than to Austria, in many cases are likely to class themselves linguistically and by sympathy rather than nationally.

The only safe plan is to ask the man when employed what country he comes from and who is the ruler of the country. From his two answers it will be possible to tell his nationality without uncertainty. If it is desirable to divide the inhabitants of the British Empire into Englishmen, Scotchmen, Irishmen, Canadians, Australians and so forth, that can well be done because the inquirer will be dealing with clearly defined units. But any such attempt in central Europe will result in overlapping schedules and resultant uncertainty.

At best, however, our statistics will never be really accurate. It will be impossible to iron out the Balkan muddle. No man of Bulgarian race would declare he was a Serbian even if the Serbian ruler reigned over the village in which he was born. This is true of all Serbia, but especially of that area where the Serbians have recently dispossessed the Turks and annexed large numbers of Turkey's Bulgarian subjects.

The problem should be settled by some authority on European conditions when the present war is over and the national lines are newly defined. Then we may be saved from divisions like Horwat, Granish and Slavish, the former classes not having recognition in a dictionary and the latter being so large a term that it includes citizens of Russia, large parts of Austria, Serbia, Bulgaria, Montenegro, Turkey and Roumania.

How Coal Operators May Spend Their Money

We shall not discuss whether coal operators have money to spend. Profits are small; in many cases there are none, but the men who operate mines have money, whether they have made it in coal mining or in some other way.

Many of them are admirable citizens where they live, giving their money freely to every public work and trying to make their home towns desirable places for rich and poor to live in. But surely if they are bestowing their largess on any worthy object they may well spend much of it in making their coal towns desirable. If they are spending money, as many of them are, for the benefit of people who have no claim on them, why not spend some on the villages where they have a large responsibility, even if from the industries of those villages they do not receive a large return?

Just as Washington gives its millions for fine buildings and a magnificent station and then begrudges a country village a decent post-office, so a man will build a fine church or endow a splendid hospital in a city for people who never had any relations with him and will leave the village where his workmen live without any of the institutions which dignify life and remove suffering.

We are not concerned with the argument whether the man who mines coal or the man who buys it is most entitled to the bounty of the rich man who happens also to be a coal operator. The important question is, Why should his favors go to the city and few or none to the village, for if he has money to spare, it will go further in the mining camp than in the large city?

Doubtless no one will appear extremely grateful to him for his generosity should he give of his bounty to improve his mining towns, and some will say it was done to curry favor with the workingman or to increase efficiency or for any other reason than the true one—generosity; but the condition is similar in cities. In a large city there are like innuendoes wherewith it is customary to assail benefactors. In fact, wherever money is given, men of little mind who never parted with a penny without physical violence will invent a thousand reasons to explain away a generous instinct.

It was Ruskin who said that the architects of earlier centuries spent as long and loving attention on the rear of the monastery as on its facade, and it would be well if we, today, tried to make a democracy of towns instead of having on the one hand magnificent cities and on the other villages that are no credit to us. Mining villages may never be stately and magnificent, but they can be sweet and dwellable; and with the delights of the country to aid the human comforts provided, the village may be made more attractive than the city.

Can Someone Enlighten Mr. Le Baron?

The manager of Coal Age, William Le Baron, has asked the editorial staff why it is necessary for the coal industry to be always in a strike turmoil.

The editors unfeelingly declared the question extremely stupid, but finally offered to put the query to the readers of the paper. They may, in their united wisdom, be able to answer it. The editors cannot.

Sociological Department

The Short-Cut to Safety First

By C. Rae King*

SYNOPSIS—Though many accidents will still occur to temperate men, yet the Safety-First movement will never attain its greatest efficiency till men working in and around the mines reduce their consumption of alcohol. No propaganda for safety are complete till a temperance movement is made a part of the attempted reform.

Mining journals for the past year or so have been well filled with articles telling us about "safety first"—how to elevate the foreigner by welfare work and how to reduce accidental suffering by first aid. Many of these articles have been descriptive of methods so expensive and elaborate as to be out of the reach of the smaller coal-mining corporations.

Moreover, while many of the safety, welfare and first-aid plans have been carried out with more or less success, in most cases the workers in charge have failed to realize that so long as the managements of coal companies, particularly of those which own their own towns, permit the unrestricted sale of liquor to the workmen in their employ, welfare work is being undermined, first-aid treatment made more necessary and safety is put last instead of first.

A Street in Greenwald with Concrete Ditches

Hall of the Greenwald Temperance Society

Legitimate Merchandise Excluded and Yet We Fear to Restrict a Dangerous Trade

The question promptly arises, Can this excessive distribution of liquor in mining towns be prevented? We smile at this question when we think how recently the common practice of coal companies was to keep all outside merchants dealing in the necessities of life from coming into their towns and selling to their workmen in competition with the company store. In fact, if I remember correctly, the practice was so unjust that legislation attempted to divorce the company store from the coal operation and thereby lift the embargo thus placed on the outside merchants. With this knowledge before us is it not reasonable to assume that, if it was possible to keep out those who sold necessities of life, it is now also feasible to exclude those who sell an article which puts life in jeopardy?

As a matter of fact the amount of intoxicating liquors furnished a mining town can be regulated if the management so desires. Of course, if any of the officials connected with the coal company have a pecuniary interest in the traffic the restriction becomes more difficult.

A Village Relieved of an Overload of Liquor Will Make Progress in Safety

We assume that it will be readily granted that if the overload of liquor furnished the foreigner—that is, the amount in excess of what is "enough" (which of course will vary with each individual's point of view on the liquor question)—was kept out of the mining communities, the too frequent murders, riots and accidents would proportionately decrease, and immorality and uncleanliness largely disappear. Let us also admit, for the sake of argument, that under these improved conditions welfare work would find a more fertile soil in which to develop. The necessity for first aid would be lessened, as some causes of accidents and sickness would be at least partly eliminated, and safety first would become a reality.

Let us be honest and also admit that it stands to reason that if dealers in the necessities of life can be prevented from soliciting or trading in coal-mining towns, then agents, solicitors, representatives of the breweries, or whatever we may desire to call them in order to shade the law, may also be prevented from soliciting and otherwise promoting the liquor traffic in mining towns if we, as managers, so desire. We are all ready to admit freely that if this could be done it would result in conditions such as we have long sought in vain.

We hear some coal operator arise and protest in a loud voice that " 'it can't be did,' that the labor situation would not permit of any such action, and that the foreigners, in spite of all which any coal-company management can do, will not stay where they cannot have their intoxicating drinks"—also, I may add, their murders and riots. Just as the coal operator makes this profound observation the advocate of personal liberty makes a loud noise and says, "Amen."

To all those who believe that the alcoholic curse cannot be controlled the following method is submitted, with

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*Mining superintendent, Donahoe Coke Co., Greenwald, Penn.

Even When It Is Wet the Children Can Play in Open Air and Without Annoying Parents

the assurance that if it is liberally and consistently applied it will make possible that which they believe cannot be done and will make efforts in welfare, safety and first aid more worth while.

Hire Your Own Liquor Agent and Make It Worth His While to Restrict Sales

Select one of your trusted workmen—one who is willing to take the regulation temperance pledge, minus the "touch and handle"—and have him act as the brewers' representative or agent. This will only interfere with his regular work for one-half day each week.

He assumes this responsibility with the direct understanding that he is employed by the brewery, but as the wages paid him by the coal company are to increase as the quantity of intoxicating liquors consumed in the town decreases, and as from the first the wages he receives from the coal company are to be increased over what they formerly were, he agrees to donate to a temperance society all the salary or commissions he may receive from the liquor interests.

After you have secured control of the liquor agent, keep all the other salesmen of intoxicating beverages out of your town just as you used to expel the other agents or possibly as you are even now excluding the hucksters and peddlers. Have the agent in your control furnish you with a record of the liquor ordered by each house for the week, and you will then be in a position to regulate the amount of liquor going into your town.

Children's Playground at Greenwald, Penn.

See that the agent obeys the law. Require of him that he "gather up" the orders on a certain day of the week and at a time when the men are working. Thus he will obtain his requisition from the women. He must refuse orders from anyone who is not a renter.

Temperance Clubhouse, Supported by Liquor Agent

Have a building constructed, if you do not have one, measuring say 24x75 ft., with a basement of the same size. Heat and light it, put in hot and cold water, baths, showers, etc., and then send out word to your employees that the building will be turned over to a temperance society for its exclusive use, provided it can secure a charter membership of at least 25 men and will operate the building under rules and regulations satisfactory to the company. The building and all its equipment will be free to the members of the society.

Also circulate the information widely that the society will not be without funds as the liquor agent has stated that he will donate all his liquor commissions or salary to the cause. After the society has been formed and is in operation, the agent voluntarily donates his liquor commissions or salary, and with these funds the society furnishes its rooms with pool and billiard tables, music, bowling alleys, card and reading tables and other forms of innocent amusement. It also proceeds to prepare articles of incorporation and to secure a charter.

A Greenwald Garden with the Mining Plant in the Rear

The membership will grow rapidly; your employees will have a free place of recreation; the agent will be satisfied as he watches the liquor business decrease and his wages grow larger; the foreigners will associate with your better class of Americans, will absorb their ways, learn their language and methods, and greatly improve themselves in every way. The wives and children will be happy because "dad" has cut out the "booze" and begun to save money.

His associates will be of a better class, and it will soon be apparent that his supply of profanity and vulgar talk is decreasing and that he is becoming a cleaner and better man and also a more desirable workman. Each member becomes a personal worker for temperance in your town, and you will soon find that this temperance society will develop into a self-running machine, separating the lump from the slack among your employees. Once in motion it is automatic, managed directly by the better class of workingmen and lubricated indirectly by liquor money.

Plan Will Stand the Test of the Courts

Some ask if this plan will not conflict with the liquor laws. No, it will not. All you have to do is to follow the methods of the liquor interests; let them find the way—and you can rest assured that they will. Even though there were a shade of doubt, would it not make an interesting case to observe the commonwealth prosecuting a temperance society for violating the liquor laws, having as its sole evidence that the system had reduced sales?

The next question comes from the "dollar and cent" man. He wants to know where the company comes in? How will it be reimbursed for the extra wages it pays the workman who acts as the liquor representative and for the temperance hall and other expenses in connection with the same? This reimbursement cannot be proved on paper in dollars and cents, but anyone who has ever been closely connected with the management of a coal company and mining town would not ask such a foolish question. Sober and industrious workmen mean prosperity and wealth.

The following are the rules which have been adopted by one such society and are given at length as a sample from which a draft of rules can be made to suit the requirements of any particular plant.

RULES REGULATING GREENWALD TEMPERANCE SOCIETY

The purpose of the Greenwald Temperance Society is to encourage temperance among the workmen of the Donohoe Coke Co. and to oppose all influences tending to promote or create intemperance, also to provide a place for social gatherings, recreation and amusement, and to create a moral atmosphere tending toward the elevation and bettering of the members.

DONAHOE MINE NEAR GREENSBURG, PENN.

Election of New Members

To become a member of this organization it shall be necessary, in addition to the other requirements herein stated, that the applicant shall be over 18 years of age, of good character and have taken a pledge before a priest, notary public or justice of the peace to abstain from the use of intoxicating liquors for a period of one year. This pledge, together with a deposit of $5 as additional evidence of good faith, shall be presented to the secretary of the society, who will provide the new member with a membership card entitling him to all the privileges of the association.

Previous to the pledge and deposit a vote shall be taken on the application at a regular meeting of the society. Any candidate receiving over five black balls shall not be eligible to membership. In the event of his election he shall continue to be a member so long as he violates no pledge and is not for other causes, as herein provided, removed by the society or its official board.

Withdrawal and Expulsion from Membership

In the event that any member in good standing for any reason wishes to withdraw from the society he may so notify the president, who at a regular meeting of the official board, shall secure his money deposit for the member.

When any member is removed from membership he shall forfeit the money he has deposited. He cannot apply for reinstatement within a period of one month and shall pursue the same course as a new member, except that he shall be required to deposit $10 as evidence of good faith.

Only employees of the Donohoe Coke Co. or of John P. Donohoe & Co., Ltd., shall be eligible to office or membership. The following officials of the Donohoe Coke Co. shall be ineligible to office: The superintendent, mine foreman, chief engineer, coke-yard foreman and the chief clerk. An officer's term of service shall be one year unless terminated at an earlier date as herein provided.

The membership of any officer or member shall terminate at the time he leaves the employ of the Donohoe Coke Co. or of John P. Donohoe & Co., Ltd. Should an officer withdraw or be removed the vacancy shall be filled at the first regular meeting.

Duties of Officers

The officers of this society shall consist of a president, vice-president, secretary, treasurer and assistant secretary. They shall be elected by the members of the society at the regular annual meeting to be held on the first Monday of March of each year. Candidates receiving the highest number of votes shall be elected. All elections shall be by roll call.

The officers, in adition to their regular duties, shall act as a jury before which all cases, not otherwise provided for herein, shall be decided. Thus they shall place fines, provide for their collection, remove members for violation of their pledges, disorderly conduct or other causes herein stated and investigate charges made against any member. They shall have the power to summon before them any member for the purpose of obtaining evidence or information relative to the cases on trial or for the welfare of the organization.

A majority vote of the members of this board, which vote shall not be revealed to those not on the board, shall be final in all cases not otherwise provided herein. This official board shall hold its regular meetings on the second and fourth Mondays of each month.

Rules for Meetings

Standard parliamentary rules shall govern all meetings. Upon petition of 10 members the president shall call special meetings, the same to be well announced among the members. Upon petition of 10 members presented at a previous regular meeting a vote shall be taken for the removal of any officer. A two-thirds vote by roll call shall remove the officer from office and the vacancy shall be filled at the same regular meeting.

The regular meetings of the society shall be held at their rooms on the first and third Mondays of each month, beginning at 8 p.m. The meeting-rooms of this society are not to be kept open later than 10:30 o'clock on any evening other than Saturday; on Saturday evening they shall not remain open later than 11:30 o'clock.

The rules of this society shall not be changed or altered except by the consent of the Donohoe Coke Co. and a two-thirds vote of the members present at a regular meeting, notification of proposed changes having been given at the previous regular session.

Disciplinary Rules

No profane or obscene language will be permitted, nor gambling or rowdyism. Each offense, until more drastic action, which may be removal from membership, is taken by the official board, shall be penalized by a fine of 10c. for each offense, to be paid to the treasurer no later than the first regular meeting.

No one other than a member shall be permitted in the society's rooms except a visitor from out-of-town accompanied by a member who shall assume all responsibility for the visitor's behavior. The only exception to this rule shall be on special occasions after the society at a regular meeting so decides by a two-thirds vote. It may then, if permitted to do so by the Donohoe Coke Co., arrange to entertain its families and friends.

Breakage or damage of any equipment or furnishings or the meeting-rooms shall be paid for by the members responsible for same. No books, papers or any furnishings or equipment of any kind shall be taken from the rooms.

Provisions for Support

The building, with its heat, light and water and connections thereto, will be furnished without charge by the Donohoe Coke Co., and the amusements and fixtures will be donated by the welfare committee without charge. The use of the building and the equipment will be furnished to the Greenwald Temperance Society with the direct and positive understanding that it is to be used for no other purpose than that provided in the rules and regulations governing the society, and should it be used for other purposes not in accordance with the said rules and regulations or against the wishes of the Donohoe Coke Co., the latter reserves the right to close up the building without notice.

Discussion By Readers

Recognition of Bravery

Letter No. 14—I have been greatly interested in the discussion of the question of the recognition of bravery on the part of mine workers who attempt to rescue their fellows in peril. I was particularly impressed with Letter No. 13, Coal Age, May 8, p. 819, by Sim. C. Reynolds, in which he refers to the sad death of his friend and companion, John Lyle, when they both risked their lives in the attempt to save others entombed in the fated Harwick mine, Jan. 29, 1904.

The incident calls to my mind a similar one in my own experience when a brave miner gave up his life in an effort to rescue two fellow-workers who had been entombed behind a heavy fall of roof. Although he was warned that it would be unsafe to attempt to reach the entombed men through the old abandoned workings that had been sealed off as they were full of blackdamp, he disregarded these admonitions, replying that God would be merciful to him in his attempt to save the lives of those in danger. His sacrifice was not without avail, however, as he succeeded in tearing down two brattices, which permitted fresh air to reach the men behind the fall and keep them alive until succor was afforded.

The sad sequel of this incident is that while one of the rescued men has since become wealthy, having quit mining and gone into a mercantile business, the wife and four children of the man to whom he owes his life are suffering today for the lack of support. It is sad to think that, while that man is living in comparative luxury, his brave rescuer lies in a grave unmarked save by a wooden slab and his poor family are deprived of the comforts of life.

I hope to see this discussion continued until some adequate and practical plan shall be developed whereby brave men who take chances and face death without a thought for their own safety will receive due recognition. The writer of Letter No. 12 suggested that such recognition should take the form of suitable mention in some good mining paper such as Coal Age. This is very good and the idea of conferring a medal is well enough, except where the rescuer is incapacitated for work or loses his life in his attempt. It would seem then that there should be more adequate provision made—something that would be more practical and of greater assistance to those who have been deprived of their support.

I am inclined to believe that the state or national government might well establish a fund having for its purpose the support of the widows and orphans of these brave, big-hearted men who willingly give up their own lives in an attempt to save the lives of their fellows in peril. Attention has been drawn to the fact that such a provision for loved ones would relieve the mind of the rescuer and enable him to go forward with a braver heart and with greater assurance of success. The thought of the loved ones who would be left without his support is the one burden he now carries and which should be taken from him.

As I said before, I hope that the discussion of this question will continue and that we shall have one or two letters each week bearing on this matter, until some good is accomplished and effective means adopted that will greatly assist in the work of rescue.

Ostel Bullock.

Cleaton, Ky.

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The Mine-Car Question

Letter No. 1—I read with great interest the article by R. Z. Virgin, Coal Age, May 1, p. 752, relating to the question of suitable mine cars. This is an important question, and I presume from the tone of the article that Mr. Virgin, like some of the rest of us, has been up against a serious proposition in that regard. Mr. Virgin's comments on the changes that have taken place in coal mining in this respect during the past few years are important, and coming from a man of his experience, cannot fail to attract the attention of all mine superintendents.

It frequently happens that mine managers and directors who are not personally acquainted with mining conditions often regard the suggestions of their superintendents as calling for improvements in equipment that are unnecessary. At times they may even conclude that owing to their lack of intimate knowledge of practical mining conditions they are being imposed on by the superintendent in charge who advocates such changes in equipment as Mr. Virgin has pointed out, as for example the adoption of a lighter and a cheaper mine car.

Recently I have advocated to the management of our company replacing the old style of cars now in use in our mines with modern, uptodate, roller-bearing cars of size and capacity suited to the seam that we are working. At the present time we have a 2-mi. haul underground, which will gradually increase as the mine develops. It is important that the cars should be built strong and durable to avoid the necessity of frequent repairs and the delays incident to breakdowns and wrecks that are unavoidable in the use of poor equipment. Such cars will also reduce the cost of operation, not only by reducing the power required for hauling, but by increasing the ease of handling the cars at the face.

My mining experience of 30 years in the coal fields of Alabama, Kentucky, Pennsylvania and Tennessee, which includes work in all the departments of mining and in all classes of mines, has taught me that it is economy to build a car suitable for the work and adapted to the size and nature of the seam and the haulage system employed. After 15 years of service as superintendent and engineer of mines I realize that this is a matter of more importance than is generally supposed by those not in touch with the daily operations underground.

All practical mining men realize that the further the mine workings advance into the mountain the more necessary it is to provide for an additional expense in relation to the haulage of coal, ventilation of the mine, upkeep of roads and airways, and drainage. More pumps and pipe lines, larger and heavier rails, more copper wire and other items too numerous to mention are required because of the greater development of the mine.

Under these conditions, in order to maintain a low cost of production it is absolutely necessary to employ improved methods and equipment that will reduce the cost of operation as much as possible. An important factor in this consideration and by no means the least is the style, size and capacity of the mine car.

I hope to see this question thoroughly discussed in Coal Age. I want to say that I have been greatly interested in the practical discussions that have taken place in this paper since its publication first began. I am personally acquainted with many of the men who have taken part in these discussions, but have refrained from doing so myself, which perhaps I should not have done.

P. F. Lynch, Superintendent,
Cross Mountain Coal Co.

Briceville, Tenn.

Stopping Payroll Leaks

Letter No. 3—For a long time I have been an interested reader of Coal Age. There have been many important things mentioned, but it seems to me there is not enough attention given to the small and apparently insignificant points in coal mining. Some time ago Coal Age invited a discussion of the leaks that occur in coal company accounts, Vol. 6, p. 2. Since that time I only remember seeing two articles regarding the matter, and these both referred to the handling of the accounts by the mine foreman and the payroll clerk, but made no reference to the many leaks that occur through improper management of the work underground.

I want to call attention to a few of these small items, and while I do not claim that these are lost sight of by many mine foremen, I must say they are often neglected to a great degree. It is these *small* leaks underground that increase the cost of coal production.

On visiting many mines it is common to find a lack of proper drainage on the haulage roads. Almost every mine has some swamps and low places where water will accumulate unless a proper system of drainage is provided. I do not mean to say that mine officials generally do not understand the importance of keeping the roads well drained, but they allow this work to be set aside for more important matters.

I recall one instance of a mudhole on a motor road that lubricated the rails for a distance of ½ mi. and caused a loss of 10 min. in the time required to make a trip, besides necessitating the use of a half-bushel of good sand each day and the waste of much power. In addition to all this, the roadbed in such places becomes soft and requires much attention to keep the track in repair. I recall another instance where the tracklayer, upon starting to clean out a short drain, was called away to another job. Later, upon his return, he was obliged to put in two full shifts, lining and leveling the track under two 40-lb. switches from beneath which the motor had squeezed the fireclay. Had the drain been kept clear, this labor would have been saved.

Another trifling loss occurs through the frequent grounding of the electric wires carrying power into the mine. Any one of these grounds, taken singly, is hardly worth considering, but taken together, the loss is considerable, as shown by the ammeter.

Upon taking charge of a plant some time since my attention was drawn to the ammeter registering 75 amp., after the work in the mine had ceased. I first supposed that this was due to some pump in operation, but I found later that there was no machinery of this kind on the line. Investigation showed that about 25 of the trolley-wire hangers were grounded in the sandrock roof. When these were replaced with new hangers, the ammeter read zero after the cessation of work.

A simple calculation will show the loss from this leakage of 75 amp. under a pressure of 275 volts, being continuous for the time the switch on the supply current is open, which is 16 hr. a day. This loss in six months of 125 working-days of 16 hr. each, or say 2000 hr., would amount to $(75 \times 275 \times 2000) \div 1000 = 41,250$ kw.-hr. At a cost of 2c. per kw-hr., the loss would be $41,250 \times 0.02 = \$825$ in six months. In the present case, the loss being due to the leakage of current by the grounding of 25 trolley-wire hangers, the loss is $825 \div 25 = \$33$ per hanger in six months, or $5.50 per hanger per month—an amount that is almost inconceivable. However, it shows the importance of carefully testing an electric circuit for grounds and locating and stopping the leak. Besides this direct loss of current, there is the danger from fire where the hangers are in the coal roof or insulator pins are used instead in the entry ribs.

I do not want to convey the impression that a mine foreman, assistant or fireboss has overlooked these points where losses occur, but because I believe they are of sufficient importance to deserve prompt attention. It may be of even greater importance than the shooting of a hill or grading of a swamp to enable the motor to put out more coal in less time and with the use of less sand and less power, to say nothing of less wear and tear on the motor. These little leaks are of vastly more importance than the installation of an improved pump or motor to cut down the expense for power. As a rule, these larger jobs require very little thought on the part of the foreman, because they originate and are carried out by the men higher up. They assume the responsibility for these greater changes, but the mine foreman and his assistants must watch the small leaks that do not commonly show until the end of the year.

F. M.

Washington County, Pennsylvania.

Co-operation in Coal Industry

Letter No. 2—The question of coöperation on the part of all interested in the mining of coal is an important one. It has many sides, and there is as much need for coöperation underground in the actual mining of the coal as there is in the marketing of the product, which was referred to in Coal Age, May 1, p. 777.

I attended a meeting not long ago that was called by a local union for the purpose of discussing with the mine officials the question of loading dirty coal in the mine. I was greatly surprised at the position taken by the men of this local. The company was represented in the meeting by the general superintendent, his assistant and the mine superintendent. Letters were read that had been received by the company complaining of the character of the coal as being "very dirty."

After the reading of these letters the officials talked to the men from a *practical* standpoint—not as a blacksmith would attempt to tell a cobbler how to mend shoes. They showed the men that they had spent the greater part of their lives in the mining of coal and its preparation for the market. Their knowledge had been gained by practical experience. They made it clear that unless some measures could be adopted for putting out cleaner coal the company would soon be unable to operate its mines. It was proved by statistics that 95 per cent. of the men in the valley produced their coal by what is known as the "snubbing system."

In response to this appeal, however, no effort was made by the men or the officials of the union to remedy the trouble and coöperate with the officials in this matter, which was as much to their own interest as to that of the company.

To explain, the "snubbing system" of mining coal consisted in removing the binder that formed the lower layer of the coal seam, before attempting to shoot down the coal. The removal of this binder would permit the coal to be shot down more easily and allow it to roll over in readiness for being broken up for loading.

The "snubbing" also permits the miner to separate the binder from the coal in large slabs so that the coal loaded into the cars is much cleaner than it would be otherwise. When the binder is not thus removed before shooting the coal, it is practically impossible to clean the coal thoroughly as the binder is very similar in appearance to the coal.

Furthermore, to shoot the coal before removing the binder requires a heavier charge of powder, which breaks up the coal and makes much of it unfit for the market, besides creating a great quantity of fine coal and dust, which endangers the operation of the mine. If the charge of powder used is so small as to prevent the breaking up of the coal in this manner the result is what is termed a "standing shot." The miner must then undermine the shot and remove enough of the binder to permit the coal to fall or roll over. This not only requires much extra labor, but is dangerous, as the coal is liable at any moment to fall on the miner at work beneath.

When this matter had been presented to the men in a most friendly way, a few of them voiced the sentiments of the majority. One man said: "When you snub the coal, it just slips down before a shot can be fired, and it is hard then to roll it over. On the other hand, the shot does the work and throws out the coal ready for loading." This argument would seem to declare that a *square block* would roll over more readily than a *ball*. It may be asked, If this claim is true why have 95 per cent. of the miners in that vicinity used the snubbing system of mining the coal for 25 years and not discovered a better method?

Another man stated that before shooting his coal he "blocked it up with cap-pieces and ties." In other words, he practically closed up the space made by the machine, which had the same effect as "shooting the coal off the solid." The argument amounted to saying that in order to upset a house the first step would be to brace it with supports.

Another man said: "The dirty coal sent out is due to the method of distributing the cars in the mine. The turn of *two* men working in two places is seven cars having a capacity of 1½ tons each, while the turn of a *single* man is four cars, in an 8-hr. day." He did not attempt, however, to show in what manner this operated to produce the dirty coal.

This discussion was without any practical effect, as no attempt was made by the officials of the union to induce the men to load cleaner coal. In my opinion, the result was very discouraging to the officials of the company and showed a great lack of coöperation on the part of the men.

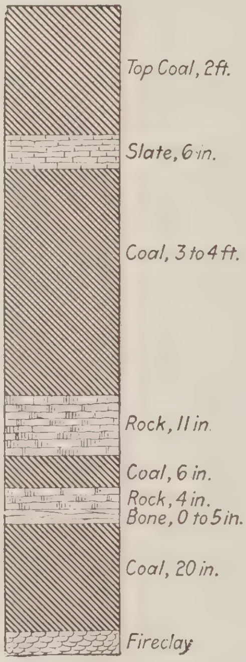
A Timberman.

Caldwell, Ohio.

Labor in Mining

I want to add a few comments, in connection with the labor trouble described in Coal Age, Apr. 17, p. 687. Reference is there made to the demand for a reduction of 10 per cent. on all day labor and 5c. on each ton of coal at the No. 2 plant of the Atlantic Coal Co., near Meyersdale, Penn. I thought a few items would be of interest in this connection.

The mine is located in the Somerset County field, and the seam being worked is so close to the surface that there is no solid roof above the coal, as far as I could see. In a few places there is a sandstone that comes in, but this has many cracks that make it dangerous when mining the coal. The accompanying sketch shows a vertical section of this seam. The 2 ft. of top coal is generally left in because it serves as a good roof while mining the coal in the middle seam. The middle seam of coal is from 3 to 4 ft. in thickness and has a high commercial value. The top coal can be taken down in some of the rooms, and this also has a good heating quality. These two seams of coal are separated by 6 in. of slate parting. Underlying the middle seam of coal is a 11-in. rock binder, beneath which is 6 in. of coal, then a second 4-in. binder underlaid with a seam of bony coal, varying from almost nothing to 5 in. in thickness. Below this is 20 in. of bottom coal, with 1 in. of bony in the center. The miner is compelled to shoot this bottom coal with dynamite, as powder becomes too wet before the shot is fired. This means 25c. extra for every shot fired at the bottom.



Owing to the bad roof, the miner is compelled to set crossbars at least 4 ft. apart. These crossbars are 10 ft. long and from 6 to 8 in. in thickness. It is necessary to set these crossbars in every working-place.

Six handpumps are used to drain the mine, which makes considerable water. The mine cars have a capacity of 2 tons each, and a 42-in. track-gage is used. Mules are employed for the gathering haul in the inside workings, while a gasoline locomotive hauls the cars from the inner parting to the mine entrance. On the outside a dinkey engine is used to haul the cars in 20-car trips from the mine to the tipple, a distance of about 3 miles.

The reader can judge for himself whether the company was justified, under these conditions, in demanding the reduction in wages paid for labor in the mine. Briefly stated, the facts are about as follows: The Atlantic Coal Co. paid its miners 60c. per ton for pick-mined coal and

50c. for each crossbar timber set in a room or heading. The working day was 10 hr. Tracklayers were paid $2.75, drivers and all inside laborers $2.50, while outside men received $2, and men working on the tipple $3 a day.

Last fall it was found to be necessary to reduce expenses in the mine. Accordingly, the price for setting crossbars was reduced to 25c., and all daymen were cut from 5 to 30c. a day. The result was a strike that lasted but a few days, when the men returned to work.

Again, last winter, owing to the low selling price of coal, another cut was made, and this time the price of mining was reduced 5c. a ton, but no cut was made in the wages for daymen. This caused dissatisfaction, and the miners came out, but returned after two days of idleness.

Following this, on Apr. 1, the president of the company, Frank Black, issued a notice of a still further reduction of 5c. per ton in the price of mining, making a total reduction of from 60 to 50c. per ton. A notice also stated that no payment would be made for crossbars in rooms, crossbars in headings remaining at 25c. each. All daymen suffered a 10-per cent. reduction, which made their wages $2.22½ inside and $1.80 outside the mine. As a result, all the miners came out on a strike.

I might add that the mine entries ran into a fault, which extends across the whole property. The company paid eight men good wages that ran from $2.45 to $3 a day to cut through this fault. All extras were furnished by the company.

Immediately following the strike, Mr. Black came down to the mine and held a brief conference, in which he stated that, were the company to pay the former wage scale, they would soon be in the sheriff's hands. The result was that many miners left the place, while the remainder returned to work.

Much credit is due Mr. Griffith, mine foreman and superintendent, who thoroughly understands general mine practice and is quick to adopt suitable methods in the operation of the mine. Many miners view conditions from their own standpoint and are prone to think that a company should not start to open a mine under the conditions they frequently find to exist in underground workings. They blame the company for not thoroughly prospecting the entire ground and preparing beforehand for the conditions that may be expected. Under the bad-roof conditions that exist in this mine, it would no doubt have been better to adopt a narrow track-gage and use smaller cars that one man could handle readily and that would have enabled them to do away with crossbars and eliminate that expense.

JOHN MAJER.

Garrett, Penn.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

Causes of Mine Explosions—The causes of mine explosions may be generally stated as the ignition of gas or dust by one of the following causes:

1. By the use of **open lights** or **defective safety lamps** in mines where the air current is charged with gas or dust, or where gas has accumulated in void or abandoned places in sufficient quantities to be dangerous.

2. By the use of **mixed lights** in mines generating gas.

3. By the **inexperienced** or **careless use** of a safety lamp, or by **fooling** or **tampering** with the lamp, or **exposing it to gas** too long or to a **strong gas blower** or **strong current** or blast of air, or carrying **too high a flame.**

4. By the use of a **dirty lamp** or one that has been improperly assembled or injured by a fall or other accidental cause.

5. By the **explosion of powder** in blasting or the accidental explosion of a keg of powder, or the flame of a **blownout shot** or a **windy shot.**

6. By the use of matches or other means of lighting.

7. By the sparking of **electric wires, switches** or **brushes,** or the blowing out of an **electric fuse,** or the breaking of an **incandescent lamp.**

8. By the **spontaneous ignition** of oily waste carelessly thrown aside, or of fine coal or slack in the gob.

9. By the fall of certain hard roof **rock striking sparks,** as claimed in the Bellevue mine explosion (1910), Alberta, Can.

10. By the possible **generation of heat** due to concussion of the mine air in contracted workings in thin seams.

Prevention of Mine Explosions—No means has yet been devised that will insure absolute freedom from mine explosions. But the tendency to explosion and the frequency of these occurrences can and has been greatly reduced by studying their causes and adopting measures to remove them.

The following points are of chief importance:

1. Effective mine regulations and discipline.

2. Operation in accordance with the state mining law.

3. Enforcing by suitable penalties all mine regulations.

4. Thorough frequent inspection by competent men.

5. Education and training of all men employed in any capacity in the mine, in respect to the proper performance of their duties, the dangers to which they are exposed and the mining law and mine regulations in force.

6. Eternal vigilance of mine officials and a regard for safety greater than the desire for increasing the daily output of the mine.

7. Coöperation of employers and employed in increasing the safety of mine work.

8. Coöperation of all coal companies in respect to mining requirements.

Aside from the above general outline there is the necessity for each company to study carefully the conditions existing in its own mines, and to adopt a system of inspection and methods of ventilating the mine and mining and hauling the coal that will produce the best results and insure the greatest freedom from accumulations of gas and dust on the roads and in the workings. Immunity from explosion can only be secured by removing the cause.

The Coal Age Pocket Book

Mixed Lights in Mines—By "mixed lights" is meant the use of **open lights** in one or more sections of a mine in which gas is generated in other portions of the mine in sufficient quantity to require **safety lamps** being employed therein. The expression does not refer, however, to the use of open lights by drivers, triprunners or motormen whose duties are confined to the main intake haulage roads and shaft or slope bottom of a mine worked on safety lamps, provided there are lamp stations beyond which these men may not pass.

The use of mixed lights is a **dangerous practice.** The danger does not consist wholly in a man carrying an open light into the safety-lamp section, or to a foreman or fireboss forgetting that he has an open light on his head while carrying a "safety" at his side. These are possibilities that can be prevented by properly safeguarding the entrances to the gaseous section.

The real danger lies in a heavy fall of roof occurring in the safety-lamp section and driving out the gas into other parts of the mine where open lights are in use. Or, a squeeze may develop in any part of the mine and permit the gas to find its way without warning into an open-light section and cause an explosion.

Electric Mine Lamps—Any installation of electricity in a mine worked on safety lamps is necessarily accompanied with more or less danger. Whether the installation is for the purpose of lighting, hauling, coal cutting or drilling, pumping or ventilation, it should be made by a competent electrician. The entire system of wiring should be closely inspected at frequent intervals and tested to insure freedom from short-circuiting or grounding of the current, which are not only wasteful of power, but may start combustion and result in an explosion of gas.

The use of **incandescent lamps** in mines has become so common that the Bureau of Mines has made a careful investigation to determine their safety. Their experiments show that **ignition of gas** may follow the breaking of the glass bulb of a lamp in an explosive mixture. The experiments also seem to indicate that the liability of ignition increases with the cross-section of the filament of the lamp. In the breaking of an incandescent lamp **two conditions** may arise that materially affect the possibility of the ignition of the gas. The same blow that breaks the bulb may or may not break the filament.

The result in either case may be briefly explained as follows:

1. If the **filament is broken** and its parts do not short-circuit the current ignition of the gas is not likely to occur. If the broken parts, however, fall across each other in such manner as to again close the circuit their burning out in the air will generally ignite any gas present.

2. If the **filament remains intact** when the bulb is broken it will burn out more or less rapidly, according to the manner of fracture and consequent inrush of air and gas. A small hole due to the breaking of the tip may admit the air so slowly that the gas is consumed without explosive violence. In that case there may occur a slight explosion within the bulb, which is not broken but only pierced. This feeble explosion, however, is not communicated to the outside gas.

Inquiries of General Interest

The Mine Car Question

I want to ask if it would not be a good idea to discuss the conditions that determine the size and capacity of mine cars in American coal-mining practice. It seems to me this would form a very interesting question for discussion.

In visiting different mining camps one is impressed with the great variety of mine cars in use, differing in size, capacity and form. While these are for the most part the result of practical experience in the particular section or district where the cars are used, in many cases the cars are ill-adapted to the existing conditions, but have been adopted more or less blindly without regard to the actual requirements for the economical and safe operation of the mine in question. These cars are of all sorts and sizes, including the dilapitated "hay-racks" that scatter their contents from the coal face to the dump. Many are large and cumbersome, making it difficult for the miner to handle them at the face and resulting in an unnecessary loss of time and a consequent reduction in the output of coal.

Too often in adopting a form or style of mine car, little or no consideration has been given to the thickness of the seam and the nature of the roof and floor. These features, together with the general inclination of the seam and the method of mining employed, greatly modify the style of car that should be adopted in order to insure the economical operation of the mine and the greatest safety of the workmen.

Permit me to suggest that a practical discussion of this subject in respect to the style, size and capacity of cars and the advantages and disadvantages of different track-gages for use under different conditions, would be of the greatest interest to all practical mining men. In order to unify the ideas and suggestions that may be offered in such a discussion, I would further suggest considering three thicknesses of seam in level formations and on inclinations where the haulage roads have 5-per cent. and 10-per cent. grades, respectively, as indicated by the following table:

Thickness of Seam	Haulage Road
3 ft.	Level
6 ft.	Level
10 ft.	Level
3 ft.	5-per cent. grade
6 ft.	5-per cent. grade
10 ft.	5-per cent. grade
3 ft.	10-per cent. grade
6 ft.	10-per cent. grade
10 ft.	10-per cent. grade

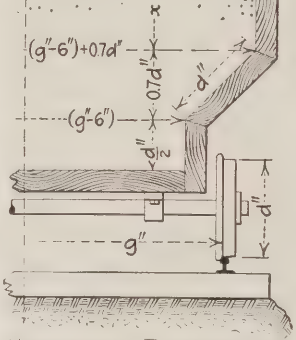
This will represent fairly well the different conditions under which cars must be handled in the mine. Reference should also be made to the character of the roof as being strong and permitting a good width of roadway, or frail and requiring a narrow track-gage and cars. While, as is well understood, a thin seam or a soft bottom that is liable to heave will often necessitate the adoption of a low car and the capacity must then depend on increasing the width and length of the car, it is also true that a frail roof will often require a narrower and longer car.

It would be interesting to know the size and capacity of the mine cars used in the longwall mines of Illinois and elsewhere, together with the thickness and inclination of the seam in each case.

SAMUEL DEAN, Mine Inspector,
The Victor American Fuel Co.

Delagua, Colo.

We are glad that Mr. Dean has drawn attention to this interesting question. His letter lays out a very simple, complete and practical plan. As a further suggestion that may assist those who will take part in the discussion and help to illustrate their ideas and make clear their meaning, we have prepared the accompanying figure or diagram illustrating one common style of mine car used in the bituminous region, in different sections of the country. In the figure, g = track gage; d = diameter of wheels and x is the vertical height of the coal above the spreading sides. The diagram is only suggestive, but enables the several dimensions of the car to be calculated for any capacity, track-gage and wheels. Assume a long ton of anthracite or a short ton of bituminous coal (mine run) occupies 1 cu.ft. Divide the desired tonnage capacity of the car by 40 to find the necessary cubic capacity. Assume a suitable inside length and calculate the other dimensions.



SECTIONAL DIAGRAM OF MINE CAR

*

Capacity of a Mine Locomotive

Is a 10-ton mine locomotive being operated at its full capacity or rating when drawing 150 amp. from a 250-volt circuit and running at a speed of only 6 mi. per hr.?

MOTORMAN.

Pittsburgh, Penn.

Before attempting to answer this question, it is well to estimate the power required to operate this locomotive at a speed of, say, 6 mi. per hr. (528 ft. per min.). Calling the coefficient of traction expressing the adhesion of the driving wheels to the rails 0.16, or say the tractive effort of the locomotive is one-sixth of the weight on the drivers, and taking the efficiency of the motors as 0.90, the current required to operate this locomotive at its full capacity at a speed of 6 mi. per hr. (528 ft. per min.) is

$$C = \frac{10 \times 2000}{6} \times \frac{528}{33,000} \times \frac{746}{0.90\,(250)} = say\ 175\ amp.$$

Therefore, since the question states that the motor is drawing only 150 amp., the locomotive is evidently not working at its full rating.

Examination Questions

Pennsylvania Anthracite Mine Inspectors' Examination, Held at Wilkes-Barre, Apr. 20-22, 1915

(Selected Questions)

Ques.—(a) How is the electric current generated before it is transmitted? (b) How is the transmitted electric power utilized? (c) Express the equivalent of 4.35 hp. in watts.

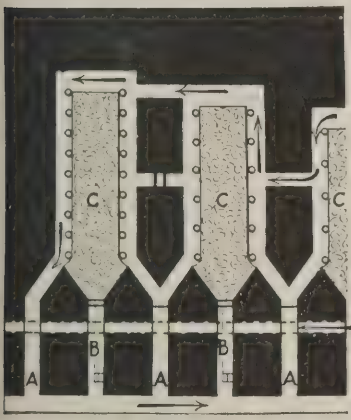
Ans.—(a) An electric current is generated at the power house by means of an electric dynamo called a "generator," which is driven by an engine at a very rapid rate. The rapid revolution of the armature of the dynamo between the poles of a magnet creates the current.

(b) The transmitted electric current is converted into mechanical power by an electric motor which is the same as the generator, except that the action is reversed, the current here acting to turn the armature.

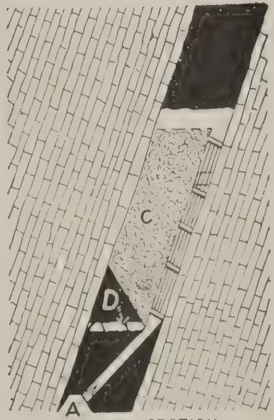
(c) $4.35 \times 746 = 3245.1 \textit{ watts.}$

Ques.—When the chutes leading to the breasts pass under the airway, what is done to restore ventilation to the rest of the breasts, in case the manway is closed by a cave-in? Show by plan and section.

Ans.—In the mining of steep inclined seams in the anthracite region, it is customary to drive a crosscut from the manway up to the airway above, as shown in the accompanying vertical section at *D*. The airway is commonly called the "monkey airway." By this arrangement it is possible to short-circuit the air at any point by carrying it through the crosscut on the intake side of the fall and allowing it to pass through the monkey airway, returning to the breast beyond through the crosscut at that point. The air current is thus carried over the breast in which the fall took place.



ELEVATION



VERTICAL SECTION

Ques.—The airways in a certain mine are 10x10 ft. and the rubbing surface 39,000 sq.ft.; the quantity of air required, 200,000 cu.ft. per min. (a) State the pressure, in inches of water gage, using $k = 0.00000001$. (b) If the diameter of the fan is 15 ft. and the volumetric ratio 200 per cent., what is the width of the fan, and at what speed must it run? (c) What is the horsepower on the air, and what should be the horsepower of the engine if the former is 70 per cent. of the latter? (d) What is the mechanical efficiency of the fan? Assume the actual water gage to be 60 per cent. of the theoretical water gage and the weight of air to be 0.076 lb.

Ans.—(a) The first step in the solution is to find the water gage required to pass 200,000 cu.ft. per min. in this airway, which has a sectional area of $10 \times 10 = 100$ sq.ft. and a rubbing surface of 39,000 sq.ft.; thus,

$$W.g. = \frac{0.00000001 \times 39{,}000 \times 200{,}000^2}{5.2 \times 100^3} = 3 \textit{ in.}$$

(b) Assuming, as stated in the question, that this actual gage on the air is 60 per cent. of the theoretical gage due to the action of the fan, the fan gage is $3 \div 0.60 = 5$ in. The peripheral speed, in feet per second, as calculated from this theoretical water gage, is

$$u = 47.25 \sqrt{w.g.} = 47.25 \sqrt{5} = 105.6 \textit{ ft. per sec.}$$

The diameter of the fan being 15 ft., the speed in revolutions per minute is

$$n = \frac{105.6 \times 60}{3.1416 \times 15} = 134.5 \textit{ r.p.m.}$$

The volume of the fan at this speed is

$$Vol. = 134.5\,(0.7854 \times 15^2)\,b = 23{,}770b \textit{ cu.ft. per min.}$$

Now, assuming, according to the question, that the volume of air delivered is twice the volume of the fan, in cubic feet per minute (volumetric ratio, 200 per cent.) $200{,}000 = 2(23{,}770b)$; and for the width of the fan,

$$b = \frac{100{,}000}{23{,}770} = 4.27 \textit{ ft., say 4 ft. 3 in.}$$

(c) The horsepower on the air in this circulation is

$$H = \frac{200{,}000 \times 3 \times 5.2}{33{,}000} = 94.5 \textit{ hp.}$$

Assuming the general efficiency of the fan and engine as 70 per cent., according to the question, the horsepower required of the engine to drive this fan is $94.5 \div 0.70 = 135$ hp.

(d) It is impossible to calculate the mechanical efficiency of the fan alone, from the data given. The general efficiency in this question is assumed to be 70 per cent.

[The above question is a difficult one in examination, and the ability to answer such a question correctly does not prove the capability of the candidate to act as mine inspector. Further, the solution given above, which is the only one that can be applied to answer the question. involves a wrong principle in fan ventilation. Practically, there is no such thing as "volumetric ratio," as the volume of a fan, in cubic feet per minute, bears no fixed relation to its yield.

It is important to notice, also, that the water gage due to the peripheral speed of a fan is only realized when the mine potential is such as to develop that gage, allowing for the efficiency of the fan, which varies with the speed, but not in the same proportion.

As a matter of fact, a fan that will pass 200,000 cu.ft. of air per min. against a water gage of 3 in., at a speed of 134.5 r.p.m., would require to be 16.5 in. in diameter and 6 ft. 5 in. wide. The diameter of the double intake of this fan should be 10 ft. 3 in.—EDITOR.]

Coal and Coke News

Harrisburg, Penn.

At the hearing on May 11, before the Senate committee on corporations, J. H. Torrey, representing anthracite interests, asked that the workmen's compensation bills be so amended that the earning capacity of the miner would be based on the amount actually received by him after deductions for oil, squibs, powder, blacksmith work, etc., have been made.

He also asked the committee to restore to the bill provisions that would permit the coal companies to offer common law defenses in all actions for damages instituted by employees who elect not to accept the provisions of the proposed act. There is little chance of this change being made, in fact there is small prospect of the measure being changed to any great extent.

Various other amendments were offered by bituminous interests and manufacturers, such as limiting the total liability to $4000 on all claims, whether for total or partial disability; eliminating non resident foreigners from benefits; limiting the number of weeks under which employees could secure compensation to 400 instead of 500. It was also suggested that employees pay 10 per cent. of the insurance funds.

A striking phase of the compensation situation is, that the acts will not become effective until July 1, 1916, or only six months before the General Assembly of 1917 convenes. As originally drafted the bills were to go into effect Jan. 1, 1916, or 12 months before the convening of the Legislature. Somewhere along the line this very significant and important change was made in the bills. This feature, just discovered, may or it may not turn out to be a veritable snake.

With the new law in operation only 6 months before the Legislature meets, then with proposed amendments to the constitution approved by the people this fall, that Legislature can make the compensation act compulsory. Under the Constitution at present the bills cannot be made compulsory, only elective.

Another point is that the interim between July 1, 1916, and the convening of the Legislature of 1917, may be wholly consumed in litigation over the constitutionality of the bills about to be passed. In that event workmen's compensation may not become finally effective, irrespective of the action of this Legislature, until the Legislature of 1917 shall have passed new bills, in accordance with the terms of the Constitution as it is about to be amended. And these new bills may not be made effective until some time after the Legislature of 1917 shall have adjourned.

A Conference Committee Has Been Appointed

The Senate refused to concur in the amendment made by the House in Section 8 of the Catlin Bill No. 160, and the House and Senate have named a conference committee to consider the amendments. The committee comprises Senators, Beidleman, Catlin and Crow, and Representatives Powell, Schaeffer and Ramsey.

As this committee is composed of the men who have made the battle for the miners it is presumed by some that the latest move is engineered to put back into the measure some of the things that had been eliminated in the Senate Committee. It is likely that an agreement will be reached to make the bill effective next January, although it was agreed to have the bill become effective when the compensation bills went into operation, although the bill reads that it shall take effect immediately.

The victory of the miners in putting this bill which is of vital importance through both branches of the Legislature is the most complete achieved by the miners of the anthracite region in many years.

The bill as passed not only brings the men under the compensation act, but also defines the word "miner".

The bill as passed by both houses now reads:

> Be it enacted that the act of 1901, etc. . . . . . Section 1. It shall not be lawful, neither shall it be permitted for any person to act as mine foreman or assistant mine foreman of any coal mine or colliery unless he is registered as a holder of a certificate of qualification or service under this act, or unless in the judgment of the employer he is a person possessed of qualifications which make him equally competent to act in such position.
>
> Section 6—No mine shall be operated for a longer period than 30 days without the supervision of a mine foreman. In case any mine is worked a longer period than 30 days without a mine foreman the owner, operator or superintendent thereof shall be subjected to a penalty of $20 per day for each day over the said 30 days during which the mine shall be operated.
>
> Rule 1, The owner, operator and superintendent of a mine or colliery shall use every precaution to insure the safety of the workmen in all cases, whether provided for in this act or not and shall have supervision, direction and control of the mine foreman and all other employees.
>
> Due notice of an intended inquest to be held by the coroner shall be given by the coroner to the inspector, and at any such inquest the mine inspector and any representative shall have the right to examine witnesses and read the law governing the case to the coroner's jury.
>
> The mine foreman, assistant mine foreman, fire-boss and any person placed in charge of the works or any part thereof shall be the agent of the owners and operators and such owners and operators shall employ them and discharge them at will.
>
> Article 18. . . . . The term "miner" means the person who cuts or blasts coal or rock at the face of a gangway, airway, breast, pillar or other working-place, also any person engaged at general work in a mine and qualified to do the work of a miner.

The bill introduced by Senator Crow, amending Rule 18, of the Bituminous Mine Code of 1911, and over which there has been considerable litigation, was signed on May 14, by the Governor. Rule No. 18 now reads:

> In the cutting of clay veins, spars or faults in entries or other narrow workings going into the solid coal in mines wherein explosive gas is generated in dangerous quantities, a bore hole shall be kept not less than 3 ft. in advance of the face of the work or 3 ft. in advance of any shot hole drilled for a blast to be fired in.

A bill to regulate the use of safety lamps in certain bituminous coal mines and providing a penalty has been introduced by Senator Stewart and was referred to the Committee on Mines and Mining. The bill reads:

> That on and after Apr. 1, 1916, it is unlawful to use in any bituminous coal mine generating explosive gases, and employing 10 men or more, any lamp other than a portable electric lamp of the style or type tested by the Federal Bureau of Mines and approved by the Pennsylvania Department of Mines.
>
> An ordinary gas testing lamp known as a safety lamp may be used when approved by the Chief of the Department of Mines, only for the purposes of examining working places and for testing the gaseous conditions of air currents in the mine.
>
> Each mine owner shall provide the employee in the mine with a portable electric lamp at or near the entrance of the mine when the workman reports for duty. Such portable electric lamp shall be in good operating condition and no repairs shall be made to a lamp, nor any adjustment made while the lamp is in the mine.

The bill carries a penalty of $25 for the first offense and $100 for the second offense.

A bill similar to this was introduced during the early part of the session, but the committee on Mines and Mining in the House reported to the Speaker with a negative recommendation, which killed it.

PENNSYLVANIA

Anthracite

Pittston—Two men were killed at the Barnum mine of the Erie Co. recently by a fall of rock, while two others were injured at the same time. The men were robbing pillars in the Checker Vein and the removal of the coal let down the roof.

Wilkes-Barre—The introduction of a new system of checking mine workers at Stanton and Empire collieries of the Lehigh and Wilkes-Barre Coal Co., as they enter and leave the mines, under which severe penalty is imposed should the mine workers lose their small brass checks, has resulted in a strike of about 1000 employees at these collieries. Final settlement of the grievance is being awaited with interest by mine workers of the Wyoming Valley as the dispute is a novel one and it is believed by many of the men that officials of other coal companies intend placing the brass check system in operation. The men allege it is an easy matter to lose a brass check, an occurrence which they claim in most cases is beyond a man's control. It is planned to take the case before the Conciliation Board.

Mauch Chunk—The strike of the Lehigh Canal boatmen employed by the Lehigh Coal and Navigation Co. is at an end and the men have gone back to work without receiving the increase of 10 cents per ton, which they demanded. Many of the men and their families lived in the boats, and as the company was about to sink the boats to prevent them from drying out, the men decided to go to work.

Shenandoah—The cylinder head of a 100-hp. hoisting engine blew out at the Lawrence Colliery, operated by the Maderia Hill Coal Co. recently. Three cars were pulled over the slope head, demolishing the structure and part of the engine house and all the electric wires, supplying power and light to Frackville, Girardville and Gilberton.

Carbondale—Eighteen hundred mine workers went on strike May 15, at the Coalbrook colliery of the Delaware & Hudson Co., because of a disagreement over a scale. The mine workers charge that the scales are in bad condition and that they have been losing credit for about 2000 tons of coal a day as the result. Operations at the Wilson Creek colliery are also halted as the coal from that mine is prepared for market at the Coalbrook breaker.

Bituminous

Uniontown—With all 400 ovens of W. J. Rainey's Allison plant in blast, 200 new ovens partly completed and an additional 200 just started, the indications for a return of good times with the Rainey interests at least are certainly the best. All the old ovens at the Allison plants are running full blast and have been for several days. The system at this plant is to add ovens as the mine develops and as a result additional ovens will be needed in the near future. Ninety-three of the new ovens are well under way and will be completed in August when it is expected that they will be fired immediately. One hundred and seven more are in process of construction and will be completed during the early part of 1916 while the 200 just started will be completed later in that year. The work of building these ovens is being done by the company under the supervision of J. H. Dunn, chief engineer at Allison. Eighty-two per cent. of the Rainey company's ovens throughout the region are now in operation and it is quite probable that this percentage will be increased within the next few weeks.

It is predicted that every available coke oven in Fayette County will be in full blast and that the coke plants will be working six days per week within a short time. The Pennsylvania R.R. is making arrangements to handle the heaviest traffic in years, and it is believed that barring war between Germany and the United States the coke region will see the greatest prosperity in its history.

Roscoe—Orders were recently issued closing down the Eclipse mine of the Pittsburgh Coal Co. indefinitely. The reason given is the low stage of water in the Ohio River, which prevents shipments. This is rather unusual for this time of the year. It is rumored that the Alice mine of the same company, located across the river from the first, may be closed down within a few days.

WEST VIRGINIA

Huntington—Permanent annual contests between expert mine rescue teams throughout this state and possibly includig eastern Kentucky and parts of Ohio are planned for Huntington in connection with the annual fall festival. It is expected to conduct local elimination contests at mining centers throughout West Virginia, winners of which will come to Huntington every fall to compete for state honors and prizes. A day to be known as Mines and Mining Day will be set aside during the fall festival of each year, on which the contests will take place.

Bluefield—Coal shipments on the Norfolk & Western R.R. went over the two million ton mark in April for the first time since September of last year. These shipments put the business of the field back to normal, or almost normal, and it is expected that the output will continue to grow.

Moundsville—A force of men has been put at work by the Mound City Coal Co. making an excavation for an enlargement of the hoisting shaft at the Mound mine. This enlargement is made necessary in order that the company may increase the output of the mine. Some extensive repairs will also be made to cages and outside of the shaft. These improvements are only part of those contemplated in the future.

Charleston—Coal operators in West Virginia are handicapped as a result of a scarcity of miners, and it is believed that the eastern Ohio operators will have difficulty in manning their mines. Many mine workers are also wanted in eastern Kentucky, and field agents have been at work for some weeks trying to get men.

Grafton—The Maryland Coal Co. expects shortly to increase its operation to full capacity at the Wendel plant. About 800 men will be employed, and the output will be between 3000 and 4000 tons per day.

ALABAMA

Birmingham—Thousands of people participated in the celebration of the formal opening of Lock 17 on the Warrior River, recently. The opening of this lock gives the coal belt of the South an outlet to the sea. At a cost of $12,000,000 the river has been made navigable all the year around from Cordova to the Gulf. In the coal fields on the Warrior River, within three miles, it is estimated that there are 770,000,000 tons of workable coal available for barging down the river. Practically all of the coal of Jefferson, Tuscaloosa and Walker counties, which is about three-fourths of the total production of Alabama, may be shipped if desired by the Warrior River. Present freight rates on coal from Birmingham to New Orleans when coal is not for export use, is $1.10 per ton. It is estimated that the cost of barging coal down the Warrior from the mines will not exceed 50c. per ton. The Warrior is now the longest canalized river in the United States if not in the world. Lock 17 was built at the cost of $3,750,000. The dam raised the bed of the river 63 ft. and backs water of a minimum depth of 6 ft. at any period of the year as far north as Cordova. The work of construction was begun in December, 1911. The completion of this lock marks one of the greatest epochs in the industrial history of the state, and means more for the development of the vast resources of coal in the state than any other achievement in the history of Alabama.

KENTUCKY

Lothair—The Kentucky Jewel Coal Co. is now operating its mines full time—every day in the week. Orders from the Great Lakes region will keep them operating full time the remainder of the year. These mines are now shipping about 2000 tons daily; this is to be increased June 15.

Whitesburg—The Elkhorn Mining Corporation is preparing to resume its operations at Haymond on the Potters Fork branch of the Lexington & Eastern, after an idle period of six months or more. Much improvement is noted in the mining operations in this section.

Louisville—Kentucky operators having mines on the Louisville & Nashville R.R. as well as mines located suitably for water shipment, have been much interested in the statements in the papers to the effect that Spain wants coal and is preparing to guarantee payment for purchases made in this country. The mines on the L. & N., it is believed, can ship via Tampa and quote prices f.o.b. that port which will be attractive to the foreign consumers. At least operators are looking into the proposition, feeling that whether it proves practicable or not, the trade that may develop with Europe will divert other American coals from competitive markets.

OHIO

Martins Ferry—The Connor No. 2 mine of the Wheeling & Lake Erie Coal Co. at Connorsville is the first mine in the Belmont district to load coal following the 14-month strike. This mine employed 350 men when shut down, and only 50 men are now at work, but as soon as the mine can be gotten in condition, the full force will be employed.

Alexander Chimbrook sued the Youghiogheny & Ohio Coal Co. for $25,000 for injuries sustained in the mine. Before the suit was begun in Common Pleas Court, however, he agreed to accept $700 for the injuries sustained.

Athens—The Sunday Creek Coal Co., through J. H. Winder, general manager, has announced that it has purchased platform scales for all of its mines not heretofore equipped with them, in order to enable the weighing of coal at the bottom of the shafts as a temporary means of determining the run-of-mine weight of coal.

New Lexington—The announcement is made by the Peabody Coal Co. that it has abandoned operations at the Jobe mine, near New Lexington, Ohio. The equipment is being shipped to Illinois where the company is developing a large coal tract. When the mine is abandoned the switches will be removed. Fully 100 men have been thrown out of employment by the move.

Big Run—The Rail & River Mine No. 3 was recently inspected and found to be in first-class condition with the exception of a few minor falls and some repair work to be done in the bottom all of which may be completed within 10 days. It is believed that when this mine goes into operation again it will probably be the largest in the state. When in operation at full capacity it will employ about 500 loaders and 150 day men, and will have a daily output of 2500 to 3000 tons. It is believed that the company will later open a new shaft below Pipe Creek.

ILLINOIS

Coffeen—The Clover Leaf coal mine has closed down and will remain idle for possibly a month. It is said there is no market for lump coal, but slack can be sold in considerable quantities. This mine has been running better than almost any other operation in this section of the state.

Belleville—Twenty-six coal mines located on the Illinois Central R.R. expect to sell their coal in St. Louis through a central selling agency. It is said that operators along other lines are organizing on the same general plan in order to stop ruinous competition. This will not materially change prices.

FOREIGN NEWS

Nanaimo, B. C.—Classes in first aid have been held during recent months at nearly all the coal-mining centers in British Columbia. While this is by no means a new departure in some parts of the province the movement has been more general lately than in other years. Doubtless this is in large measure due to the persistent interest taken in mine rescue training and first-aid instruction by the chief inspector of mines for the province, Thomas Graham, and the members of his staff. While not nearly all those who attend the classes for instruction afterwards present themselves for examination, a fair percentage of them do. During recent weeks examinations were held and passes made, as follows: Vancouver Island, at Ladysmith, 20 passed; Nicola Valley, at Merritt, 17; Crowsnest Pass, at Michel, 22. Other classes on Vancouver Island, and at Coal Creek and Fernie in the Crowsnest Pass district are yet to be examined. An effort will be made to send a first-aid team from Crowsnest district to participate in the first-aid competition at the Panama Pacific International Exposition at San Francisco, next September.

TRADE CATALOGS

The Turbo-Gear Co., Baltimore, Md. "The Turbo-Gear." Three pages 8½x11 in.; illustrated.

The Guarantee Construction Co., New York. "Retail Coal Pockets." Thirty-two pages, 6x9 in., illustrated.

Scranton Steam Pump Co., Scranton, Penn. Bulletin No. 101. "Duplex Piston Pumps." Illustrated, 16 pp., 6x9 in.

Mine Safety Appliance Co., Pittsburgh, Penn., "Koehler Safety Lamps." Twenty-three pages, 11½x8 in., illustrated.

The Lagonda Mfg. Co., Springfield, Ohio. Catalog W-1. "Lagonda Locomotive Arch Tube Cleaners." Illustrated, 12 pp., 6x9 in.

The Spray Engineering Co., Boston, Mass. "Sprays for Cooling Condensing Water." Fourteen pages, 6x9 in., illustrated.

The Standard Underground Cable Co., Pittsburgh, Penn. "Thirty-three years of Progress." Sixteen pages, 3½x6 in., illustrated.

The Link-Belt Co., Philadelphia, Chicago, Indianapolis. "Wagon and Truck Loaders." Forty-eight pages, 6x9 in.; illustrated.

Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. "Class O Steam and Power Driven Compressors." Illustrated, 36 pp., 6x9 in.

The Hazard Manufacturing Co., Chicago, Pittsburgh, Wilkes-Barre, New York. "Wire Rope." Twelve pages, 3½x6 in., illustrated.

The Spray Engineering Co., Boston, Mass. "Washing and Cooling Air for Steam Turbine Generators." Eight pages, 6x9 in., illustrated.

The Perolin Co. of America, 1112-1132 West 37th Street, Chicago, Ill. "It Doesn't Affect the Water." Twelve pages, 4x8 in.; illustrated.

Fort Wayne Electric Works (Rock Drill Dept.) Madison, Wis. Bulletin No. 1143. "Electric Rock Drill, type A." Illustrated, 20 pp., 8½x11 in.

The Standard Underground Cable Co., Pittsburgh, Penn. Bulletin No. 201-1. "Standard C. C. C. Wire." Leaflet of four pages, 6x9 in., unillustrated.

The Jeffrey Mfg. Co., Columbus, Ohio. "General Catalog No. 83." Cloth bound volume of 384 pp., illustrating and describing the various products of the Jeffrey Mfg. Co.

Ingersoll-Rand Co., 11 Broadway, New York. Form No. 3015. "Portable Air Compressors." Illustrated, 32 pp., 6x9 in. Form No. 4032. Jackhamer mounting, type JM-6. Illustrated, 4 pp., 6x9 in.

PUBLICATIONS RECEIVED

Report of the Topographic and Geologic Survey Commission of Pennsylvania, 1913-14. Cloth bound volume of 232 pp., 6x9 in., illustrated.

University of Texas, Bureau of Economic Geology and Technology, "Potash in the Texas Permian," by J. A. Udden. Fifty-nine pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey; Bulletin 581-E. "The Coalville Coal Field, Utah," by Carroll H. Wegemann. One hundred and eighty-seven pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey; Water-supply paper 345-I. "Gazetteer of Surface Waters of Iowa," by W. G. Hoyt and H. J. Ryan. Fifty-six pages; 6x9 in.; unillustrated.

Department of the Interior, Bureau of Mines, Bulletin 80. "A Primer on Explosives for Metal Miners and Quarrymen," by Charles E. Munroe and Clarence Hall. One hundred and twenty-five pages; 6x9 in.; illustrated.

Geological Survey of Georgia, Bulletin No. 30. "A Preliminary Report on the Feldspar and Mica Deposits of Georgia," by S. L. Galpin. Cloth bound volume of 190 pages; 6½x10 in., with many illustrations, maps, etc.

Department of the Interior, U. S. Geological Survey; Bulletin 594. "Some Mining Districts in Northeastern California and Northwestern Nevada," by James M. Hill. Two hundred pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey; Water-supply paper 354. "Surface Water Supply of the United States, 1913, Part IV, St. Lawrence River Basin." One hundred and thirty-six pages; 6x9 in.; illustrated.

Illinois Coal Mining Investigations, State Geological Survey, Department of Mining Engineering, University of Illinois. Bulletin 10. "Coal Resources of District 1." By Gilbert H. Cady; 149 pp., 6x9 in., with many illustrations and maps.

Department of the Interior, U. S. Geological Survey; Water-supply paper 353. "Surface Water Supply of the United States 1913, Part III, Ohio River Basin," by A. H. Horton, W. E. Hall and H. J. Jackson. Two hundred and sixty-four pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey. "The Production of Spelter in the United States in 1914," by C. E. Siebenthal. Eight pp., 9x10½ in., unillustrated.

Department of the Interior, Bureau of Mines. Bulletin 88, Petroleum Technology 20. "The Condensation of Gasoline from Natural Gas." By Geo. A. Burrell, Frank M. Siebert, and G. G. Oberfell. One hundred and six pp., 6x9 in., illustrated.

PERSONALS

C. L. Scroggs, for many years commissioner of the Illinois Coal Operators Association, has been placed in charge of the Coal Mining Department of the Rockwood-Badgerow Co., general agents for the Travelers and the Aetna Accident & Liability Insurance Co.

James W. Eaton, mine foreman of Hecla No. 2 mine, Trauger, Penn., has been teaching mining school for the past 8 years, having 65 successful candidates for certificates as mine foreman and fireboss. Mr. Eaton's class of 1915 consisted of 10 students, of whom 8 were successful candidates.

A. H. Wood, of Petros, Tenn., president of the Petros Coal Mining Co., spent a few days recently in the Harlan, Ky., field on business connected with a new company he is organizing to develop a coal lease there. He was accompanied by parties who expect to become interested with him in the proposition.

Francis Glover, mining engineer of the Princeton Coal & Land Co., Princeton, B. C., has been appointed agent for the claim holders of the Roany placer claims situated between Princeton and Coalmont, B. C. The Lost Creek Mining Co. is operating this property. Chester Lee, mining engineer of Seattle, is engineer for this firm.

Patrick Hennessey, formerly superintendent of the Libby mine, has leased the C. A. Smith coal mine at Henryville, near Marshfield, Coos Bay, Ore., and 25 miners are now employed. Hennessey will market the coal in Marshfield and at Myrtle Point and in addition has a contract to supply the Smith-Powers logging locomotives operating in that district.

OBITUARY

Thomas Sweeney, 59 years old, a mine superintendent at the William Penn Colliery and a noted temperance advocate and member of many church and fraternal societies, died at Shenandoah, Penn., May 15.

H. J. McDermott, for many years chief shipping clerk of the Philadelphia & Reading Coal & Iron Co., died recently at his home in Philadelphia. His geniality and long familiarity with the anthracite business won him a host of friends, particularly throughout New England.

John Birkinbine, a noted mining and mechanical engineer, died recently at his home in Philadelphia at the age of 71 years. Mr. Birkinbine was consulted in many engneering problems throughout this country. He developed schemes for utilizing the water power at Niagara Falls, and devised the use of blast furnaces in the Lake Superior copper region. He was former president of the American Institute of Mining Engineers, and was for many years chairman of the Pennsylvania Water Supply Commission.

INDUSTRIAL NEWS

Portsmouth, Ohio—Ground has been broken for the first section of the new line to be built between Portsmouth and Columbus by the Chesapeake & Ohio R.R. Co.

Charleston, W. Va.—The Kanawha Mine Car Co., Charleston, W. Va., has changed its name to the Kanawha Mfg. Co. There will be no change in the policy or administration of the firm.

Birmingham, Ala.—It is stated that the American Steel & Wire Co. has a sufficient amount of orders on its books to provide for operations during the entire summer, and that probably operations will be increased.

Columbus, Ohio—Upon the application of Charles Cohenour, the receiver for the Maple-Gallia Coal Co., the receivership has been closed by Judge Rogers. The property in Athens and Vinton counties has been sold to a new concern.

Harrisburg, Penn.—Joint resolutions calling for an investigation by a State Commission of increases in prices of coal alleged to be in excess of the anthracite tax, were recently adopted in the House by a vote of 171 to 5. They have now gone to the Governor.

Greensburg, Penn.—Suit has been entered by the Girard Trust Co. of Philadelphia against the Bolivar Coal & Coke Co., to collect on a mortgage of $60,000 with interest from May 6, 1913. It is declared the company has mined coal but failed to pay the interest on the loan.

Wheeling, W. Va.—A number of mines will resume operations in the eastern Ohio field shortly. Among these will be the Roby-Somers, Purseglove and Gaylord mines, as well as many others. The majority of the operations will not be started, however, until on or about June 1.

Pittsburgh, Penn.—Work was recently begun on the United States Bureau of Mines building to be erected at Forbes and Boundary St. The building will be a three-story concrete structure and will be the first of its kind in the country. It is expected the work will be completed by June 1.

Bluefield, W. Va.—H. M. Waugh, of Orange, Va., has been awarded the contract for the construction of main line and side tracks to Leckie mine from the Williamson & Pond Creek Ry. The excavation is estimated to be 100,000 cu.yd. of steam shovel work. It is understood that this work will be begun at once.

Fayetteville, W. Va.—The coal loading for April in the Guyan district totaled 461,020 tons, a decrease of 22,675 tons for the month of March, and 34,530 tons less than the loadings for April of 1914. For the first four months of the current calendar year, however, 1,915,415 tons have been loaded as compared with 1,752,860 tons loaded within a similar period of last year, or an increase of 162,555 tons.

Bluefield, W. Va.—There was recently recorded in the county clerk's office a deed from the Burkes Garden Coal & Coke Co., to the United Pocahontas Coal Co., on which were placed $170.50 in war revenue stamps. This is one of the largest collection of stamps to be sent out from the county clerk's office since the war revenue was put in force, and seems to be a considerable sum to be paid when we are not at war with any country.

Coalwood, W. Va.—Geo. L. Carter, president of the Carter Coal Co., Coalwood, W. Va., recently awarded a contract to the Roberts & Schaefer Co., Chicago, for the complete designing and building of a large steel "Marcus" patent coal tipple, complete with screening and picking facilities and three "R and S" shaking loading booms, for installation at the large shaft mine recently sunk on the property of this company at Coalwood, W. Va. About $60,000 was involved in this contract.

Huntington, W. Va.—It appeared to be the consensus of opinion among about 20 operators from southwest West Virginia, assembled at the mine rescue and first-aid contest, that business conditions were showing remarkable evidences of resumption to normal conditions. Mines are opening up throughout the southern part of the state, and the operators agree that there are indications of a steady increase in the volume of tonnage and the amount of business in the coal regions of the state.

Mabscott, W. Va.—Through the medium of the Raleigh County Business Men's Association, the Carper Foundry & Machine Shop may soon be transformed into a manufacturing plant employing from 100 to 125 men. While this shop with its present capacity has never been anything but a repair shop, it is now planned to enlarge it for the manufacture of mine cars, fans, haulage equipment and all kinds of mine machinery for which there is considerable demand throughout the immediate vicinity.

Morgantown, W. Va.—The Roberts & Schaefer Co., Chicago, recently secured a contract from the Elkins Coal & Coke Co., Morgantown, W. Va. (J. B. Hanford, general superintendent), for the designing and building of a "Marcus" patent coal tipple with screening and picking facilities, and equipped with "R and S" patent shaking loading booms, for installation at Bretz, W. Va. This plant will be electrically operated throughout, and is the second structure installed by the Elkins company using horizontal screens.

Washington, D. C.—Notice was recently given by the Interstate Commerce Commission that it would begin upon its own motion an investigation into the rate, divisions, rules, regulations and practices governing the transportation of railroad fuel and other coal by rail originating on the Carolina, Clinchfield & Ohio Ry. in Virginia. The object of this investigation is for the purpose of issuing an order demanding that the roads, cease making rates, divisions and rules favoring coal and other fuel transported for carriers.

Birmingham, Ala.—The contract for the fourth unit of the coal washers of the Woodward Iron Co., was recently awarded through the General Machinery Co., to the Link Belt Co. of Chicago. The price for the fourth section is said to have been $30,000. It is said that when this fourth unit is added to the Woodward plant that the facilities there will be among the best and most capable in the United States. The washer will be of concrete and steel and the plant is expected to be ready for operation within the present year.

Uniontown, Penn.—Two hundred and fifty ovens were fired May 13 by the Consolidated Connellsville Coke Co., at Mt. Sterling and Grays Landing. This gave employment to about 300 men. The order for resumption followed the blowing in of a furnace in the Ohio Valley. The Consolidated Connellsville company has received an order from this furnace for 12,000 tons of coke per month for the remainder of the present year. The entire plant of 310 ovens at Mt. Sterling will be in operation and there will be 220 ovens at Grays Landing in blast. Both plants will be operated six days a week.

Uniontown, Penn.—Following all sorts of prosperity predictions emanating from various sources during the past few months, a published statement from F. P. Truesdale, division freight agent for the Pennsylvania R.R., states that tabulated statistics received at his office indicate that of all the steel mills in the United States 95 per cent. are in full blast with every reason to believe that within a short time operations will increase to 100 per cent. This statement, if true, means much to coal and coke operators and employees as the operation of these steel mills on such a scale means many increased orders for coke together with better prices.

New York, N. Y.—As a result of the absorption of the William A. Jepson Coal Co., of Boston, by the Skeele Coal Co., of New York, William A. Jepson will represent the latter company in the Eastern territory with the title of General New England Manager. He will have his headquarters at No. 85 Devonshire St., Boston. Mr. Jepson has been identified with the coal trade in and around Boston for upwards of 30 years and will no doubt make the New York company a big factor in the New England market. E. J. Skeele, president of the Skeele Coal Co., is the son of J. W. Skeele, for many years identified with the Lehigh Valley Coal Co. and later, until his death, president of the Lehigh Valley Coal Sales Co.

Coal Trade Reviews

General Review

Heavy curtailment by the anthracite companies. Effects of the increased export bituminous business felt in all sections but trade continues dull. Lake shipping increasing but still light.

A drastic curtailment program on the part of the leading hard coalers, the Lehigh Valley Coal Co. having suspended operations for an indefinite period, is the feature of the anthracite situation. The smaller dealers are apparently stocked up to the full limit of their storage capacity and the wholesale business will continue quiet until the consumers begin taking coal. While the combine is maintaining the regular company circular as rigidly as ever, the individuals are attempting to force business with heavy cuts, but with only indifferent success. The slowing up is characteristic of this season of the year, but it has attained to proportions entirely too large for comfort.

That the closest attention is being focused on the off shore export trade in all parts of the country is evidenced by the fact that reports from the Pittsburgh district are to the effect that foreign shipments are being made from that section in spite of its geographical handicap, while Chicago is getting scarcely any of the Pocahontas and New River grades, owing to the heavy demand at Seaboard. The rapid increase in this business is further indicated by the recent announcement of the leading ship brokerage firm to the effect that they are negotiating twice as many coal charters as in normal times. There is no doubt that the British embargo against coal exports from that country is proving a tremendous stimulant to our foreign trade.

Although Eastern bituminous prices are now steadier than for several months, internal consumption continues light and the current market discouragingly dull. There are still a good many large contracts to be closed but the heavy export demand is causing buyers to show more interest.

While Lake shipping from the Pittsburgh district is increasing steadily, the volume moving is still relatively small, and confined entirely to permanent consumers such as railroads; other consumers are still apparently drawing on their surplus stocks. While the regular circular on Lake coal is nominally maintained, it is understood in reliable quarters that substantial concessions can be obtained on large tonnages. The final arranging of the Ohio labor difficulties will no doubt see a heavy increase in the tonnage but the market stituation continues quiet with prices maintained only with the greatest difficulty. Buyers are apparently convinced that they will be able to obtain cheap coal in the prompt market for some time to come, and few contracts are being closed.

Conservative interests in the Middle West regard the situation there as even worse, although there are many who believe that the present stagnation presages an active business after mid-summer. The heavy overstocks of Lake coal are exerting a particularly depressing effect on the market, but on the other hand the industrial situation is showing slightly more activity and a great deal is being anticipated from the various coöperative movements on foot to maintain prices.

BUSINESS OPINIONS

Business hesitating, pending diplomatic developments. Rumors of crop losses discounted. Iron trade apparently slowing down.

Financial Chronicle—Obviously, the occasion is not opportune for the rearing of bubbles of any kind, at a moment when the whole world appears to be becoming topsy-turvy, and no one can tell what startling thing is going to happen next and what far-reaching consequences it may involve. It is only proper to say, however, that ordinary financial and mercantile affairs are receiving very little attention for the time being, and scarcely any one cares a fig about what is happening on the Stock Exchange.

Modern Miller—Eight counties in southern Kansas report Hessian flies in considerable numbers, while their presence is not confined to these counties. Elsewhere they appear scattered, thus localizing their effect. It is impossible to measure the extent of damage which will not be fully apparent before June 1. Because of the big forecast of the Government, May 1, the scattered damage so far reported since then is minimized.

Boston News Bureau—At the moment, people are merely awaiting the outcome of the pending diplomatic negotiations. There is anxiety, but no fear. Money continues abundant and is still accumulating. We are increasing our foreign credits steadily. There have been some efforts to advance wheat prices by reports as to damage to the winter wheat by the Hessian fly. But the same reports were circulated at this time a year ago and yet we harvested a bumper crop.

Dry Goods Economist—The new international complications have had surprisingly little effect on the markets for dry goods and allied lines. In some quarters there are decided evidences of optimism.

Dun's—The developments of the week afford new proof of the essential stability and power of the financial and business structure. While there is uncertainty as to the final outcome, there is faith in the ability of the nation to adapt itself with financial readiness to every contingency that may arise. Outside of the stock, cotton, and other equally sensitive markets, the effect of the new war developments has not materially changed the generally favorable aspect of the trade situation.

Bradstreet's—Possible international political complications affect sentiment and prices in speculative markets, particularly securities, grain, and cotton, and perhaps throw shadows over optimistic expectations of a boom in trade, but thus far foreign developments have failed of especial untoward effect upon domestic trade or industry.

Iron and Steel—The feature of interest in the iron trade was the order placed by the Pennsylvania R.R. for 25 locomotives and the later announcement that contracts had actually been closed for 6400 cars. This interest is likewise figuring on about 30,000 tons of rails in addition to its order for 160,000 tons which will go to Eastern mills. In general, the iron trade has been dull and far less active than in several weeks. This extends through all branches of trade, and has been noted more especially in the pig iron market. A falling off in the demand for munitions of war is likewise observed, but this is of little consequence for the moment, for the orders placed within the last month have been of such magnitude that they taxed the capacity of the shops of the country.

ATLANTIC SEABOARD

BOSTON

Firmer tone in Pocahontas and New River, due to increased trade off-shore. Some small contracts closed recently, but still quite a tonnage to be covered. No change in Georges Creek or Pennsylvania grades. Water freights easy, with sail tonnage chartering off-shore. Anthracite shipments continue in fair volume.

Bituminous—Prices on the Hampton Roads coals are rather steadier than for several months. A better tone is observed, especially on f.o.b. business, and there is now practically no fear that prices will recede to any material extent so long as there continues a demand for export. The trade off-shore is in good shape. The volume of coal dumped at the piers is increasing and compared with a month ago there is much more inquiry. Coastwise, there is improvement in the contract demand but no spot business of any consequence has yet developed. At the same time, the agencies are encouraged over general prospects.

Only a few contracts have been closed the past week, and these practically all with private corporations. There is still some locomotive fuel to be bought, and at least one of the street railway systems is still holding aloof from the market. Some of the consumers who ordinarily take Georges Creek have been interested in getting covered in view of the volume of export business which the shippers of that grade have undertaken. The Pocahontas and New River shippers are still actively canvassing and it may be that some of those who have stayed out of the market in the expectation of lower prices will be induced to close before many weeks. Prices at distributing points like Providence and Boston are somewhat higher.

Very little Georges Creek is available at any point other than Baltimore where there are still a number of foreign bottoms awaiting cargo. There is no change in the Pennsylvania grades. Prices are still at a minimum and so far as this market is concerned there is very little doing on coal of this character at Tidewater.

Water Freights remain easy at 70 to 75c., Hampton Roads to Boston, inquiry still being light. Sailing vessels continue chartering off-shore. Rates on anthracite barges from Philadelphia are 80c. to Boston points.

Anthracite—Domestic sizes are coming forward in fair volume. There were spells of adverse weather in April and that has carried the heavy shipping season farther into May than was anticipated. Most of the smaller dealers have now taken on liberal supplies and not much wholesale business is looked for until coal begins to move to the consumer. Meanwhile, some of the smaller New York shippers are striving hard to move their receipts at the loading ports.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.75@2.80
Boston†	....	....	....	3.55@3.78
Providence†	....	....	....	3.50@3.73

* F.o.b. †On cars.

NEW YORK

Slightly better tone to bituminous though conditions are still dull. Mines generally on half schedules except those in the export trade. Drastic curtailment in anthracite operations. Market heavy in all directions.

Bituminous—The bituminous coal market continues weak in many respects although there has been a slight improvement in the general tone. Operators have been curtailing production which has prevented over-stocking of the docks. This has prevented a slump in prices which would surely have come had the market been flooded. On the other hand there is plenty of coal on hand to meet all immediate demands.

The export situation continues to improve and inquiries are increasing. Although the order of the English government prohibiting the export of coal has been in force but a little more than a week, local exporters say the situation has improved considerably. One inquiry received this week was for 50,000 tons of high volatile coal. Exporters look for an increase in shipments to South American ports as well as to European countries. Bona fide inquiries have been received from Italy and France.

At the local harbor there has been a slight increase in demurrage coal nearly all in the cheaper grades. Shippers are having very little trouble with the better grades and little of these coals has been offered in spot sales. Line trade is fair. Some of the poorer grades were offered at $2.15.

Quotations on the various grades are as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek	$3.00@3.10	$3.00@3.10	$3.00@3.10	$1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.50@2.65	....	1.10@1.25
Ordinary	2.45@2.55	2.40@2.50	....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	....	....	1.35@1.50
Nanty Flo	2.75@2.80	....	....	1.20@1.25
Barnesbore	2.65@2.70	....	....	1.10@1.15
Somerset County:				
Quemahoning	....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.55@2.70	2.45@2.65	2.45@2.65	1.10@1.15
Latrobe	2.40@2.50	....	....	.90@1.00
Greensburg	2.60@2.70	....	....	.90@1.00
Westmoreland	2.90@3.15	....	....	1.15@1.60
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	.70@ .80
Steam		2.60@2.70	2.60@2.70	.80@ .90
Western Maryland		2.25@2.40	2.25@2.40	.80@ .90

Anthracite—The effects of the mild winter and the light demand for anthracite coal this spring have already become apparent and the companies are now curtailing production. What may be the first steps in this direction were taken last week by the Lehigh Valley Coal Co. when operations were suspended at its collieries for two days and a drastic curtailment program was started this week. It is expected that other companies will take similar action shortly.

Demand has fallen off considerably the past week and the shippers find themselves well supplied with all sizes. To save the situation it is necessary to cut down production and this it is believed will be done.

Nut coal is longest of the prepared sizes with stove and egg close seconds. Pea is much in evidence with few takers except on standing orders. The small steam sizes appear in greater abundance. The suspension of mining, however, will put these coals in a strong position. Some grades of pea coal have been disposed of as low as $3 during the week, while a few buyers have been able to pick up bargains in demurrage steam coals at lower figures than have prevailed in the hard coal market for some time.

Current quotations on anthracite are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.65		$4.70	
Egg	4.90	$4.80	4.95	$4.85
Stove	4.90	4.80	4.95	4.85
Chestnut	5.15	5.00	5.20	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	2.00@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

BALTIMORE

Bituminous slightly stronger and prices stiffer. Export tonnage continues large.

A slow but sure betterment is noted here in the bituminous trade. The prices for Pennsylvania coals are moving upward; ordinary grades that some weeks ago could be bought at around 85 to 90c. are not offering at present below $1, and are growing scarcer at that figure. So-called best Pennsylvania coals sell around $1.25 to $1.30, while certain specialized fuels command as high as $1.40 to $1.45.

West Virginia and Maryland coals hold their own, but show no special advance for the most part. Lower grade Maryland coals are offered around 80c. at the mines and Fairmont mine-run sells at 80 to 85c. Three-quarter gas at 90 to 95c. is steady.

Export movement continues strong. Last week approximately 48,000 tons was loaded for foreign ports from Curtis Bay and Port Covington piers. The May tonnage is expected to run considerably above 200,000 tons. The foreign vessels carrying coal also absorbed 16,000 tons for bunker supply the past week.

The charters for the past week included the following:

Vessel	Nationality	To	Rate	Vessel	Nationality	To	Rate
Luigi Ciampi	Italian	Italy		St. Winifred	British	Plate	
Harmattia	British	Italy		Cronchie	British	Italy	$10.80
Chiverstone	British	Montevideo	$9.60	Francisco	Italian	Italy	9.60
				Megree	Dutch	Plate	9.36
Semantha	British	Italy	9.60	Strathbeg	British	Sicily	9.60
Kerriemoor	British	Plate	9.60	Antigone	British	Plate	9.12
Holtye	British	Italy	9.60				
Anto. Accame	Italian	Italy					

OCEAN FREIGHTS

Coal charters twice as heavy as in normal times. Spanish shipments show a particularly rapid increase.

This country's export coal trade is growing daily, and instead of our chartering one or two steamers per day, as in the past, we are now chartering two or three steamers daily for this trade.

Mediterranean—Rates to West Coast of Italy are unchanged. and remain firm owing to the increased demand for steamers to take coal from this country to Spanish ports. Rates to Spanish ports are about $9.96 to $10.20, with 500 to 700 tons a day for discharging, consignees paying Spanish dues on cargo. (We believe that the Spanish dues were recently abolished by the Spanish Government.) These Spanish shipments are increasing materially owing to the recent English embargo. To Marseilles rates are about $10.20 for single trips, or $9.60 for a number of trips.

South America—To the Plate and Brazil we continue to charter almost daily at about 36c. per ton less than boats are being closed in London for similar voyages.

Cuba and West Indies—These rates are a trifle firmer.

The market is now quotable as follows:

To	Rate	To	Rate
Havana	$2.25@2.50	Bermuda	$3.50@3.75
Cardenas or Sagua	3.25@3.50	Vera Cruz	**3.50**
Cienfuegos	3.25@3.50	Tampico	**3.50**
Port au Spain, Trinidad	3.75@4.00	Rio	9.00@9.12
St. Lucia	3.50@3.75	Santos	**9.12**
St. Thomas	**3.25**	Montevideo	**8.40**
Barbados	3.75@4.00	Buenos Aires or La Plata	8.40@8.64
Kingston	3.00@3.25	Rosario	8.64@8.88
Curacao	3.75@4.00	Mediterranean*	**10.80**
Santiago	3.25@3.50	Spain**	**10.08**
Guantanamo	3.25@3.50	Valparaiso†	**6.72**
Demerara	5.50@6.00	Marseilles	**10.20**

Note—Rates noted in **bold face** type are only approximate.
* To a direct port on the West coast of Italy.
† With 800 tons per day discharge.
**Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

HAMPTON ROADS

Export movement fair. Government colliers loading during week greatly decrease accumulated cars.

While the export movement has not been as heavy as anticipated it has been fairly good. Shipments for Italian ports have dropped off considerably, only one cargo having cleared between May 8 and 15. The largest amount of coal moving to any one port has gone to Montevideo, the tonnage being approximately 15,000. Shipments to Brazilian ports have amounted to about 18,000 tons. Coastwise shipments have as usual been heaviest to Boston, Providence, and Portland while other New England ports have taken some small cargoes.

In addition to coal shipments there have been some small quantities of coke moving to Havana in connection with parcel shipments of coal to that port. Various grades of high volatile and nut and slack have been moving coastwise and there is perhaps at this time less accumulation of nut and slack at Tidewater than has been the case for some months.

Vessels loading coal from Hampton Roads port for export during week of May 7 to 14, inclusive:

Norfolk

Vessel	Destination	Tons
Guildhall[2]	Havana	3424
Christoforo Vagliano	Montevideo	3737
Bowden[3]	Port Morant	1200
Sophie H[4]	Montevideo	4180
American Transport	Montevideo	6400
Annie[1]	Pernambuco	888
Sedgwick[1]	Maranhan	758
Windermere	Vera Cruz	3800
Silverton	Rosario	3430
Albert Hall	Rio de Janeiro	6532

Norfolk

Vessel	Destination	Tons
Phineas W. Sprague	St. Michales	963
Henry Lippitt	Maranhao	1205
Warren Adams	Maranhao	835
Tordenskjold	Canal Zone	5500

Newport News

Vessel	Destination	Tons
Merity	Rio de Janeiro	5000
Apsley Hall	Tarante	6200
Sark	Port Castries	5100
Denis	Para	2751
Europe	Havana	3000

Note—Steamers are indicated by **bold face type**, all others being schooners. Shippers—[1] Smokeless Fuel Co. [2] New River Coal Co. [3] Crozer-Pocahontas Coal Co. [4] Castner, Curran & Bullitt.

Railroad Tonnages—Dumpings over the local piers for the past several weeks were as follows:

Railroad	Week Ending May 1	May 8	May 15
Norfolk & Western	....	208,179	151,113
Chesapeake & Ohio	60,967[1]	88,609[2]	80,045
Virginian	65,099	45,116	57,903
		341,904	289,061

[1]Week ending Friday. [2]Nine days.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Flixton	British	Philadelphia	Buenos Aires	2705	$9.12
Harmattan	British	Baltimore	Italy	3046	
Luigi Ciampa	Italian	Baltimore	Italy	2603	
Silverton	British	Norfolk	Rosario	1723	9.12 2.16
Antigone	British	Baltimore	River Plate	1495	9.12
Alioth	Dutch	Baltimore	River Plate	1298	9.36
Megrez	Dutch	Baltimore	River Plate	1662	
Francesco	Italian	Baltimore	Italy	2160	
Antoinette Accame	Italian	Baltimore	Italy	1982	
Strathbeg	British	Baltimore	Sicily	2808	
Malm	Norwegian	Baltimore	Guantanamo	893	
Adelaide Barbour		Philadelphia	Porto Rico	1171	
St. Winifred	British	Baltimore	River Plate	2884	
William H. Clifford		Hampton R'ds	Azores	1378	
Monkshaven	British	Baltimore or Virginia	River Plate	2097	8.88 2.16
Nellie W. Craig		Philadelphia	Kingston	488	3.00
Columbia		Philadelphia	San Francisco	1188	
Semantha	British	Baltimore	Italy	1811	
Holtye	British	Baltimore	Italy	2714	
Matelot	Italian	Baltimore	Italy	2057	
Chiverstone	British	Baltimore	River Plate	1889	
Albert Hall	British	Virginia	Rio Janeiro	2737	
Olaf	Norwegian	Philadelphia	Havana	1021	
George E. Warren		Philadelphia	Bangor	1616	
Bradford C. French		Newport News	Brazil	920	
General E. S. Greeley		Baltimore	Mayport	1198	

Note—Steamers are indicated by **bold face tupe**, all others being schooners.

COKE

CONNELLSVILLE

Only modest inquiry for furnace coke. Active contracting for foundry coke for six and twelve month periods. Prices and output unchanged.

There are two or three inquiries for furnace coke for shipment over the second-half, but the inquirers are certainly showing no anxiety to close. Prompt furnace coke continues in poor demand. Contracting for foundry coke has increased further and is now at a rather lively rate. One of the large interests making a specialty of high-grade foundry coke is entering contracts freely at $2.40 for the twelvemonth beginning July 1, while another is trying where possible to restrict contracts at this figure to six months and two others are reported as firmly maintaining the position of selling for only six months. There is lower grade foundry coke to be had for any period desired at lower figures. We quote: Prompt furnace, $1.50@1.55; contract, to July 1, $1.60; contract to Jan. 1, $1.75; prompt foundry, $2@2.40; contract, $2.20@2.40, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 8 at 299,166 tons, an increase of 6275 tons, and shipments at 290,015 tons, a decrease of 13,362 tons.

Buffalo—The trade is quiet, the late reports of growing activity not being indications of any real stir. There is a little more coke moving, but the increase will have to be considerably more before there will be a better price. Iron works are doing a trifle better, but they do not show much sign of returning to a normal activity right away. Prices remain on the basis of $4.15 for best 72-hr. Connellsville foundry and $3.15 for stock coke.

Chicago—No change can be reported in the coke situation from last week. The demand is nil, although prices are well maintained, probably due to less production of byproduct sizes in the West. Prices are as follows: Byproduct, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

LAKE MARKETS

PITTSBURGH

Lake shipments slightly increased, but still small and market otherwise unimproved. Mines operating at 50 to 60% of capacity. Possibilities of car shortage.

Pittsburgh district coal shipments in the Lake trade are increasing steadily, but the total is still relatively small for the second half of May. The shipments going forward are chiefly to steady consumers, like the railroads, the ordinary buyers being still out of the market except in rare instances. Very little coal has been moved except by the regular shippers, purchases for shipment being very light. The usual asking price on Lake coal, ¾-in., is $1.15 but it is understood that on lots of any size this price would be shaded a few cents.

Occasional export shipments are being made from the Pittsburgh district, but only in cases where a particularly high-grade coal is required, as other districts can name much lower prices at Tidewater.

An interesting point in the situation is the fact that although coal shipments are far from heavy, mine operations being at only 50 to 60% of capacity, hopper cars are relatively scarce on the Baltimore & Ohio and one or two other lines. There is no actual shortage, but it is thought that with a slight further increase in demand some actual car shortages would develop.

Prices are about the same as formerly quoted. On contracts to Apr. 1, $1.15 would probably be shaded on mine-run. For free coal it is only occasionally that $1 is shaded for mine-run, the large mines adhering to this as minimum. Slack naturally softens as Lake shipments increase, producing more slack, otherwise prices for free coal are the same as last reported: Slack, 60@70c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous market fails to show any improvement. Operations heavily curtailed. Anthracite also under heavy pressure. Coal started moving from Upper Lake docks.

There are conflicting reports on the Canadian trade. Buffalo salesmen agree that the demand there is much lighter than at home, but Canadians contend that the factories there are running at a good rate. It is going to take a decided increase in tonnage before it is much felt in the trade generally. Most mines are now working only two to three days a week.

Quotations remain on the basis of $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack. Allegheny Valley coal is usually 25c. lower than Pittsburgh for sizes, all slack selling about on a par.

There has been an unusually large number of Pittsburgh coal men in the city during the past week.

Anthracite—It is seldom that the trade has been so dull. Some shippers report that there is some sign of improvement, but from what the others say the chances are that any small change for the better looks large. Dullness is to be expected at this time of the year and nobody is alarmed, but the movement is too small for real comfort. It is not likely to improve right away.

Both the local and the rail-line trade is dull and the independent agent or jobber is about as slack as the regular companies. Cutting the price does not sell coal in any amount, either anthracite or bituminous. The amount of Lake coal loaded for the week foots up 156,000 tons, nearly all of it going to shippers' docks at the large ports.

COLUMBUS

Trade quiet and prices maintained with difficulty. Lake business still slow. Production shows a slight increase.

Trade is light in most departments and efforts are being made to maintain quotations. On the whole the price list is fairly well maintained despite cutting on the part of smaller operators and jobbers. The tone of the market is fairly good and many of the producers as well as wholesalers believe that conditions will improve materially when the stocking season arrives.

Domestic trade is quiet, which is to be expected at this season of the year. Some little buying of the fancy grades is reported although this is not large. Preference is being shown for Pocahontas and West Virginia varieties. Little demand is noted for Hocking at this time. Dealers' stocks are apparently sufficient for the present.

Lake Trade is increasing in volume but not fast. There is still considerable coal on the docks of the Upper Lake ports and consequently some shippers are slow in chartering bottoms. The interior movement from the docks is not rapid. With the opening of the eastern Ohio district a larger Lake trade is anticipated. Chartering of boats is more active since the scale has been signed.

Production in Ohio fields has not increased materially during the past week. In fact some of the districts do not show quite as large output. In the Hocking Valley the production is estimated at about 25% of normal and the same figures are good for Crooksville and Jackson. In the Cambridge field the output has been about 35%, Masillon has produced about 40%, while Pomeroy Bend reported 50%.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	.60	.60	.55
Coarse slack	.50	.50	.45

CLEVELAND

Eastern Ohio mines are resuming operations and sales agents are working the Lake trade. The local market remains unchanged except for Youghiogheny slack, which is slightly stronger.

Current receipts of coal have been slightly under a week ago with only 200 cars coming in over Sunday. This is 100 cars short of the average over a period of several weeks. Some high-grade West Virginia mine-run steam coal was sold here at $1.65 Monday and was the bargain of the day. Every day last week there was an offering of some particular coal below the normal market price. Pan Handle slack figured in this business one day.

The sales of Youghiogheny slack Monday at $1.65 to $1.75 were easier than usual. The price was not particularly higher than other fine coals, but the demand seemed to be greater and the average price was better. Coarse coals are unchanged.

No. 8 operators put about 2000 men at work Monday and it is understood the entire field will have close to 10,000 men employed next week. This coal is being sold to Lake shippers mostly. No floating arrangements for the coal have been reported, but the supply of tonnage far exceeds the available coal.

Lake shippers report they are able to buy coal cheaper than in the last two years. Prices are from 5 to 15c. below quotations of last year, which in turn were lower than two years ago. So far Lake shipping has been very light. Full shipping is not expected before Aug. 1. Some shippers are only beginning to route coal to the Lakes and others are just beginning to increase bituminous shipments. Hard coal shipping has been normal so far this season.

Quotations for shipment to jobbers are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	......	......	......	......
Lump, ¾ in.	......	$2.20@2.25	$2.00	$1.80@1.85	$1.75@1.85
Egg	3.10	......	......	......	......
Mine run	2.65@2.70	2.10	1.85	1.85@1.90	1.75@1.85
Slack	......	1.65	1.60	1.65@1.70	......

CINCINNATI

Gains in the Lake movement have not affected the local market. Buyers still confining their purchases to the open market.

The domestic demand is virtually negligible and the same is true of the steam market. The tendency has naturally been toward lower prices, and in many instances spot coal of all grades has sold at almost unheard-of figures. One of the worst effects of this has been to encourage consumers and retailers to hold off on their contracts, in the hope of getting their requirements at bargain prices. At present there is no relief in sight, save in the long-deferred hope of a general and emphatic improvement in the industrial situation, calling for better consumption.

LOUISVILLE

Unsettlement in industrial conditions has caused a slowing down. Some tendency to cut prices.

With industrial conditions so unsettled, the Kentucky coal trade is at a low ebb, purchases are on the hand-to-mouth order and for the time being the retailers are slowing up on their stocking operations. Prices are unchanged, on the basis of $1.30 for 4-in. block, though there is some tendency to cut prices. Salesmen are not having much success on the road and mine operations are heavily curtailed.

MIDDLE WESTERN

GENERAL REVIEW

Profound quiet prevails in all directions. Screenings still strong with no demand for other Illinois and Indiana sizes. Plans maturing for coöperation among Indiana companies.

There is no appreciable gain noted in sales and prices, with the exception of screenings, are inclined to be weak. Some shippers are of the opinion that the market is worse than last week, and that the immediate prospects are anything but encouraging. All agree that the demand is nil, yet there is a feeling that the present stagnation presages a brisk business once mid-summer is passed. Contracting continues slow and a large amount of tonnage is still unplaced. Retailers are taking no coal; the absorption of steam sizes, other than screenings, is backward considering the small output, and weather conditions are such as to cause even less than a minimum movement.

The industrial situation is showing some signs of improvement, which augurs well for the future, and the absence of stocks in the hands of retailers and consumers sustains the opinion that sooner or later a pronounced change will occur. In Chicago the strike of the building trades has reduced shipments to that point. Operations of brick, cement, concrete and crushed stone plants are practically at a standstill, and since the producers of building material are considerable users of Indiana and Illinois coal, the depressed state of the industry has had a detrimental effect.

The over-stocking of Lake coal last summer and fall is now bearing fruit, and these must be reduced before that situation will right itself. It is quite evident that the Lake business will not be active until the middle of July.

CHICAGO

Strong demand for screenings in all districts. Domestic grades generally flat except West Virginia grades. Anthracite slow.

The situation in Franklin and Williamson Counties has been enlivened by the increasing demand for screenings at higher prices. A goodly number of shipments have recently gone forward at $1 per ton. The demand for other sizes is below normal but prices are held steady.

Increasing quietness is observable in Indiana except on screenings, the supply of which hardly equals the demand. Prices of domestic sizes are not being well maintained, and concessions are being made to move what little domestic coal is screened.

The mines of the Springfield district have always shipped large quantities of coal on contracts each season, but so far this year few contracts have been closed, and only a little railroad tonnage is moving. Screenings are steadily absorbed at higher prices than last week.

The range of prices on eastern Kentucky coals is very wide, and there is little stability to the market.

The Pocahontas and smokeless situation has improved, and prices for Third Vein Pocahontas lump are strong at $1.60. Contracting progresses freely in these coals. It is now difficult to obtain shipments to this territory unless a previous allotment has been arranged. The stronger tone is probably influenced by the export situation. Splint coals have also sympathetically advanced, and are averaging perhaps 5c. to 10c. per ton better than last week.

Anthracite orders are not as plentiful as could be wished, but if the dealers fail to order this month they will be compelled to do so in the following month, or later, so that the average amount of business during the season is bound to be maintained whatever the current situation may be.

The Chicago market is now quotable as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump......	$1.25@1.35	$1.25@1.35	....	$1.25@1.40	$1.35@1.50
4-in. lump..	....	....	$1.40	....	....
Steam lump	1.10	1.10@1.25	1.25@1.35	1.15@1.25	....
2½-in. lump.	....	....	1.20@1.35	....	....
1¼-in. lump.	....	....	1.05@1.25	1.05@1.20	....
Mine-run...	1.10@1.25	1.00@1.10	1.00@1.10	1.00@1.10	....
Egg........	1.20@1.35	1.25@1.35	1.15@1.25	1.10@1.25	....
No.1washed	1.20@1.35	....	1.65	....	1.40@1.50
No.2washed	1.25@1.35	....	1.75	....	1.40@1.50
6x3-in. egg.	1.20@1.35	....	....	....	1.50@1.60
Nut.......	1.10@1.30	1.10@1.25	.95@1.05	.90@1.10	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.20@1.35	....	....	....	....
Screenings..	.90@1.00	.85@ .95	.80@ 95	.85@ .95	1.00

	Harrisburg Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.35	$1.15@1.35	$1.60	$1.60	1.25@1.50
1¼-in. lump.	1.15@1.25	1.10@1.25	....	....	1.15@1.35
Mine-run...	1.00@1.10	....	1.15@1.25	1.25	....
Egg........	....	.95@1.10	1.60	1.60	1.25
No. 1 nut..	1.20@1.35	....	....	....	1.15@1.25
No. 2 nut..	1.15@1.25	....	....	....	....
Screenings..	.80@1.00	....	....	....	....

Greene County, 5-in. lump, $1.15@1.25; 3-in. lump, $1.10@1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.05@1.15; mine-run, $1@1.05; screenings, 90c.@$1.

ST. LOUIS

Screenings continue the market leader. Pool of the Standard operators not maintained.

Continued quietness prevails with the exception of the screenings market, which is unusually strong. Carterville screenings sell at from 95c. to $1, and in the Standard field they are worth from 90 to 92½c. Such little washed coal as is being produced is bringing its own figures. Carterville lump has sold down as low as $1, while the general circular is from $1.10 to $1.30. The other screened sizes are holding to the same figures.

The effort on the part of the Standard operators to maintain reasonable prices is not coming up to expectations, due to the fact that some of the operators are employing questionable methods of marketing their coal. Some of those in the arrangement to sell their coal through a general selling agency, have sold lump as low as 90c., when their circular calls for $1.10, and 6-in. lump which has been quoted at $1.20 was sold as low as $1.05.

PRODUCTION AND TRANSPORTATION STATISTICS

Exports of domestic coal and coke, from the United States, and bunker coal laden on vessels engaged in the foreign trade at the specified districts, during the month of March, were as follows:

EXPORTS BY DISTRICTS

Districts	Anthracite Tons	Bituminous Tons	Coke Tons
Maine and New Hampshire.....	83	....	....
Maryland..................	....	76,888	....
New York.....	4,603	554	31
Philadelphia..............	2,371	43,290	330
Porto Rico	....	290	....
Virginia..................	....	262,687	452
Florida...................	329	....	....
Mobile....................	24	799	....
New Orleans...............	....	154	7
Arizona...................	....	1,837	7
El Paso..	....	32,050	13,177
Laredo....................	....	891	....
San Francisco.............	....	50	10
Southern California...........	40	29	....
Washington................	....	840	1,372
Buffalo...................	83,696	172,359	36,881
Dakota....................	251	2,541	133
Duluth and Superior..........	30	3,242	40
Michigan..................	....	40,643	5,725
Ohio......................	....	16,817	26
Rochester.................	797	19,100	302
St. Lawrence..............	34,583	17,685	1,148
Vermont...................	388	108	60
Total....................	127,195	692,854	59,701

Bunker Coal

Customs Districts	Gross Tons
New York..................................	267,104
Philadelphia..............................	32,948
Maryland (Baltimore)......................	35,265
Virginia..................................	120,357

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for January and the preceding three months:

	December		January		February	
State	1913	1914	1914	1915	1914	1915
Missouri...	266,335	285,547	277,609	276,641	259,270	225,996
Kansas.....	540,872	643,213	526,300	637,708	492,304	492,320
Arkansas...	138,678	123,737	162,056	125,275	113,354	102,451
Oklahoma..	324,728	352,267	333,125	371,309	257,162	302,026
Totals...	1,270,613	1,404,764	1,299,090	1,410,933	1,122,090	1,122,793

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during April and the past four months in short tons:

	January	February	March	April
Pocahontas Field........	912,682	835,826	1,003,437	1,163,948
Tug River District.....	298,766	243,910	282,886	285,243
Thacker District........	257,580	195,557	227,817	245,887
Kenova District.........	98,422	67,667	66,605	112,076
Clinch Valley District....	169,581	129,193	144,031	138,970
Other N. & W. Territory	3,769	1,785	2,478	3,271
Total N. & W. Fields..	1,740,800	1,473,938	1,727,254	1,949,395
Williamson & Pond Creek R.R..................	58,296	58,101	48,052	55,311
All other railroads......	87,842	88,982	129,446	195,845
Grand total...........	1,886,938	1,621,021	1,904,752	2,200,551

Distribution of shipments for March and April were:

	March			April		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas.	879,237	13,433	892,670	1,057,142	12,542	1,069,684
Tug River..	281,162	1,261	282,423	282,815	2,428	285,243
Thacker....	182,943	7,986	190,929	210,144	6,811	216,955
Kenova....	58,867	7,738	66,605	103,941	8,135	112,076
Total....	1,402,209	30,418	1,432,627	1,654,042	29,916	1,683,958

Shipments of coke entirely from the Pocahontas field, amounted to 61,075 tons.

FOREIGN MARKETS

GREAT BRITAIN

Prohibition of exports the feature of the market. Situation uncertain. Labor troubles also serious.

May 7—The coal trade of the country is somewhat unsettled and rather quiet. The decision of the Premier that the question of the miners' bonus must be considered by the District Conciliation Boards has given a little more confidence in the trade, and the results are awaited with more than the usual interest which is associated with wage questions. Another matter of grave importance is the announcement of the Government Order prohibiting coal exports except under license. This has caused considerable stir. It is understood that all ships sailing from our ports, except liners, will have to obtain from the Committee licenses specifying the quantity of coal to be exported. Restricted exports would also seriously affect shipping by depleting the outward business and throwing greater freight cost on the imported food stuffs and other commodities which form the return cargoes of coal boats.—"The Iron and Coal Trades Review."

May 4—The export of coal and coke, except under license is prohibited to all destinations other than British possessions and protectorates and allied countries, also Portugal. The uncertainty which prevails in connection with this prohibition is holding up business at present. Quotations are more or less normal as follows:

Best Welsh steam.......	Nominal	Best Monmouthshires. ..	$8.04@8.16
Best seconds...........	Nominal	Seconds................	7.92@8.04
Seconds................	$8.52@8.76	Best Cardiff smalls.....	5.16@5.28
Best dry coals.........	8.40@8.88	Cargo smalls..........	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is also greatly affected by the prohibition of exports and rates are approximately as follows:

Gibraltar.........	$4.80	Naples	$6.24	Las Palmas......	$5.04
Marseilles........	5.79	Venice..........	9.60	St. Vincent.......	5.16
Algiers...........	5.79	Alexandria.......	6.60	Rio de Janeiro....	6.60
Genoa............	6.24	Port Said........	6.60	Monte Video.....	6.00
				River Plate......	6.24

Note—These quotations are based on an exchange rate of 24c. to one shilling.

SPAIN

The Spanish imports of coal for January of the current year amounted to 118,749 tons as compared with 231,661 tons for the same month last year. Coke imports for the same periods were 9464 tons in 1915 and 29,146 tons in 1914.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
454	Mun. Elec. Light Dept.	Cleveland,	Ohio		875
535	Whiteside Baking Co.	Louisville	Ky.		708
649	Lighthouse Inspector	New Orleans	La.		835
677	Board of Education	Everett	Mass.	2000a	876
677	Board of Education	Everett	Mass	2500b	876
690	Board of Education	Port Huron	Mich.	1200	877

a Indicates anthracite coal b Indicates bituminous.

Supplemental Notes

✚No. 312—Chicago, Ill.—Bids on this contract (pp. 488, 666, 748), which provides for furnishing the city with about 2000 tons of coal per month, were as follows:

Bidder	Name of Fuel	Moisture	Ash	B.t.u. per Lb. of Dry Coal	Price Delivered	*Net B.t.u. for One Cent
Martin Howe Coal Co.	Lincoln—Lincoln Co., Ill.	10	12	12,500	$1.58	137,195
Ender Coal & Coke Co.	Centralia—Marion Co., Ill.	8	15	12,300	1.62	133,522
Northern Coal Co.	Sunshine—Perry Co., Ill.	9	13	12,500	1.687	129,851
Northern Coal Co.	Springfield—Sangamon Co., Ill.	11	15	12,000	1.57	129,848
Northern Coal Co.	Centralia—Marion Co., Ill.	10	14	12,400	1.649	129,843[1]
Golsen Doan Coal Co.	Centralia—Marion Co., Ill. Warrick—Warrick Co., Ind	9	15	12,300	1.67	128,286
Edwin F. Daniels & Co.	Glenridge—Marion Co., Ill.	10	13	12,300	1.67	127,608
Peabody Coal Co.	"Shellback"—Williamson Co., Ill.	8.5	14	12,400	1.80	121,348
Consumer's Co.	2″ Screenings—Perry Co., Ill.	12	13.77	12,323	1.72	121,242

*The lowest bid is the one furnishing the greatest number of net B.t.u. for one cent. This is computed from figures furnished by bidders, as per rule in specifications.

$$\text{Net B.t.u. for one cent} = \frac{2000 \times \text{B.t.u. per lb. dry coal} \times (100\% \text{ less } \% \text{ of moisture as delivered}).}{\text{Price per ton delivered} + (\tfrac{1}{2}\text{c.} \times \text{number of } \% \text{ of ash in dry coal}).}$$

[1] Bid informal—B.t.u. as guaranteed below minimum allowed in specifications.

✚No. 486—Boston, Mass.—Bids on this contract (p. 665) will be received until 10 a.m., May 25. The contract involves 47,000 tons of semibituminous steaming coal and 6800 tons of birdseye for use at the 15 institutions of the State Board of Insanity. Specifications and proposal forms may be obtained on application. Address E. R. Libby, Room 6, State House, Boston, Mass.

✚No. 588—Everett, Mass.—The approximate requirements on this contract (p. 749), which provides for furnishing the local schools with coal during the ensuing year, are 2000 tons of anthracite, 1500 tons of bituminous mine-run and 1000 tons of screenings. All the coal is to be delivered in the bins at the various schools, as the committee may designate. Bids will be received until 8 p.m., May 28, and must be on the printed forms, which may be obtained on application. Address Chn. of Com. on Fuel Charles Manser, High School Bldg., Everett, Mass.

✚No. 592—Nashville, Tenn.—Bids on this contract (p. 750) will be received until noon, May 31. The contract will cover the fiscal year beginning June 1, 1915. Address Business Mgr. H. S. Van Doren, Bd. of Edu., Hume-Fogg High School Bldg., Nashville, Tenn.

✚No. 504—Dover, N. J.—Bidders on this contract (p. 665) were as follows, arranged in order of their excellence, according to the Government's interpretation of the analysis submitted:

	Bidder	Coal	B.t.u. per Lb.	Price Tons	Price Cents*
	Mine-run				
2	Moreland Coke Co.	Columbia	14,000	$3.30	10.61
4	C. P. Burtner C. Co	Hamilton	14,764	3.60	10.66
5	Birch & Bassett	Cardiff	14,400	3.51	10.70
6	Greensburg C. & C. Co.	Clearfield	14,400	3.49	10.72
7	Penna. C. & C. Corp.	Gallitzen	14,500	3.50	10.73
8	D. W. Hughes & Co.	Woodland	14,190	3.45	10.77
9	Wharton C. & C. Co.	Wharton	14,000	3.35	10.78
10	Keystone C. & C. Co.	Cardiff	14,300	3.50	10.78
11	C. P. Burtner C. Co.	Burtner	14,065	3.35	10.79
12	Empire C. Mining Co	Empire	14,400	3.48	10.83
13	Glen Brook Coal Co.	Conemaugh	14,600	3.60	10.86
14	Glen Brook Coal Co.	Carnwath	14,600	3.60	10.86
15	Vinton Colliery Co.	Vinton	14,650	3.55	10.87
18	Blaine Mining Co.	Quemahoning	14,400	3.55	10.92
19	Geo. D. Harris Co.	Ligonier	14,050	3.42	10.93
20	John Wills	Wills 2 and 3	14,360	3.46	10.94
21	D. W. Hughes & Co.	Hamilton	14,300	3.60	10.99
22	Willard H. Bradford	Victoria	14,500	3.585	11.01
23	Hartwell, L. & C.	Brush Creek	14,300	3.47	11.04
24	Weston, Dodson & Co.	Navajo	14,200	3.53	11.07
25	Pattison & Bowns	Vivian	14,500	3.65	11.11
26	Geo. D. Harris Co.	Margaret	14,500	3.60	11.11
27	D. E. Williams Co.	Glenwood	14,500	3.60	11.19
28	Punxsutawney C. M. Co.	Frances	14,000	3.54	11.20
29	Peale, Pea. & Kerr	Victor	14,200	3.498	11.20
30	Hite & Rafetto	Bird	14,040	3.50	11.25
31	Willard Bros.	Valona	14,250	3.55	11.27
32	Maryland C. & C. Co.	Imperial	14,500	3.69	11.28
33	Maryland C. & C. Co.	Bernice	14,000	3.54	11.32
34	Marshall, Mat. & Co.	Curnard	14,400	3.70	11.34
36	D. W. Hughes & Co.	South Fork	14,200	3.65	11.39
37	Chas. Dunlop	Richhill	14,300	3.60	11.39
38	National Coal Co.	Georges Creek	14,500	3.80	11.69
39	Thorne, Neal & Co.	South Fork	14,800	3.95	11.83
	Slack				
1	B. Nicoll & Co.	Thomas Slack	13,800	$3.20	10.37
3	Hartwell L. & C.	R. & P. C. I. Co.	14,000	3.32	10.65
16	Peale, Pea. & Kerr	Victor	14,000	3.398	10.91
17	Greensburg C. & C. Co.	Slack	13,500	3.39	10.92
35	National Coal Co.	Georges Creek	13,300	3.30	11.36

*Cents per 1,000,000 B.t.u.

Address Lt. Col. Ord. Dept. Adus C. Norney, Picatinny Arsenal, Dover, N. J.

✚No. 615—Seattle, Wash.—Bids on this contract (p. 795) were received until 11 a.m., May 19. The tonnage involved amounts to about 400 tons of Australian steam coal to be delivered in bulk for the U. S. Coast and Geodetic Survey Steamer "Patterson." Delivery is to be made at ship's side on pier at Unalaska, Alaska, in lots of 100 tons per month, beginning in July. Address H. C. Denson, U. S. Coast and Geodetic Survey, 204 Burke Bldg., Seattle, Wash.

✚No. 620—Webster, S. D.—Both the Berwind Fuel Co. and the Northern Coal & Dock Co. bid on this contract (p. 795) $2.75 for Pocahontas screenings and $3.25 for run of pile coal. Address City Auditor J. P. Egeland, Webster, S. D.

✚No. 647—Worcester, Mass.—The bids received on this contract (p. 835) were as follows:

	Court House	House of Correction	Training School Anthracite	Training School Bituminous
Claflin, Sumner Co.	$7.19	$4.50†	6.73	$4.65**
F. E. Pavers	6.92½	3.95		4.95
Peoples Coal Co.	6.97	3.94	6.75	4.60
Carlson-Hammond Co.	7.30	....	....	....
Seiler-Blanchard Co.	6.25*	....	6.65*	....

*F.o.b. †Also $4.25 and $3.90. ** Also $4.55 and $4.40.

Address County Commissioners' Court House, Worcester, Mass.

✚No. 650—Pittsburgh, Penn.—The bids on this contract (p. 835), which provides for furnishing the local Board of Education with about 14,000 tons of coal, will be closed on May 27, but awards will not be made until June 22. Address Supt. of Supplies C. M. McKee, Fulton Bldg., Pittsburgh, Penn.

✚No. 656—Murphysboro, Ill.—We are advised that there has been no inquiry about coal on this contract (p. 836) up to May 11. Address Supt. W. O. Settle, Murphysboro Water Works, Electric & Gas Light Co., Murphysboro, Ill.

No. 706—New York—Bids on this contract (p. 877), which calls for furnishing and delivery of 178,533 tons of anthracite coal, 63,060 tons of mine-run and 600 tons of gas coal for fourteen city departments, were divided into twenty zones as follows: No. 1, Manhattan, south of 23d St.; No. 2, 23d St. to 59th St.; No. 3, 59th St. to 110th St.; No. 4, north of 110th St.; No. 5, Brooklyn, Northwest Section; No. 6, Brooklyn, Southwest Section; No. 7, Brooklyn, Greenpoint and Williamsburg Section; No. 8, Brooklyn, Canarsie, Brownsville, East New York and Eastern Parkway Sections; No. 9, Brooklyn, Bensonhurst, Coney Island, Gravesend and Sheepshead Bay Sections; No. 10, Queens, Long Island City Section; No. 11, Rockaway, Rockaway Park, Far Rockaway and Arverne, Queens; No. 12, Woodhaven, Richmond Hill and Jamaica, Queens; No. 13, College Point, Whitestone and Flushing, Queens; No. 14, Maspeth, Winfield, Elmhurst, Newtown and Corona, Queens; No. 15, The Bronx, south of Tremont Ave. and 177th St.; No. 16 The Bronx, north of Tremont Ave. and 177th St.; No. 17 Richmond; No. 18, water-front deliveries in barge loads; No. 19, Croton Water Shed Region and Otisville, N. Y.; No. 20, Long Island Water Shed Region outside city limits. Tonnages required in the different zones are as follows:

						—Buckwheat—		
Zones	Egg	Stove	Nut	Broken	Pea	No. 1	No. 3	Bitu.
1	3,038	354	144	324	2,800	200	1,300	265
2	1,228	402	59	190	1,300	475		
3	1,191	249	193	500		1,150	3,100	1,550
4	951	434	50	150		4,150		
5	2,064	1,606	84	100	650	4,250	8,215	180
6	696	222	30			3,275		
7	588	398	50		1,000	220		
8	1,310	390	94		20	31,475		19,000
9	284	159	22		1,000	800		
10	319	18	18					
11	246		10					
12	396	15	2			800		500
13	140	15	9			1,300		
14	720	96	31					
15	1,019	162	55			275		
16	1,319	154	19	102	2,045	2,300	5,000	2,500
17	225	165	45			17,800		
18	4,200	2,915			2,535	33,800	14,260	20,415
19	143	1,605	241		30			
20						400		18,650
	20,077	9,359	1,156	1,366	11,380	102,870	31,875	63,060

Zone No. 3 also requires 450 tons of buckwheat No. 3 and zone 18, 600 tons of gas coal. Totals in gross tons: anthracite, 178,533; mine-run, 63,060; gas, 600; grand total, 242,193. Address Contract Clerk, Room 1226, Municipal Building, New York.

New Business

No. 713—Cincinnati, Ohio—Sealed proposals will be received up to noon, May 25, by the Board of County Commissioners of Hamilton County, Ohio, for the purchase and delivery of smokeless coal at the Court House, Armory, Morgue and the Memorial Building. The contract is to run for a period of one year from June 15. All coal must be the best smokeless for steam and heating purposes and is to be delivered in such quantities and at such times as may be necessary. All bids must be accompanied by a bond in the sum of $300 or a certified check for $100. The County Commissioners reserve the right to reject any or all bids. Address Clk. Al Reinhardt, Board of County Commissioners, Cincinnati, Ohio.

No. 714—Toronto, Can.—The Queen's Hotel is now taking bids for a year's supply of heating coal and the contract will be closed within a week or two. Approximately 1700 tons will be required, and the average price paid is $4. Address Manager, Queen's Hotel, Toronto, Can.

+No. 715—New York, N. Y.—The Immigration Commissioners at Ellis Island will receive bids until 10:20 a.m., May 24, for anthracite coal to cover their requirement during the ensuing year. Address Commissioners of Immigration, Ellis Island, New York Harbor, N. Y.

+No. 716—Puget Sound, Washington, D. C.—Sealed bids will be received until 10 a.m., June 1, for furnishing 100 tons of foundry coke (Stock No. 5) to be delivered in covered lighters alongside wharves at the navy yard, as may be directed. The deliveries are to be made during the fiscal year ending June 30, 1916, and within 30 days after receipt of order. (Government Schedule No. 8261). Address Paymaster Gen. of the Navy Samuel McGowan, Bureau of Supplies and Accounts, Washington, D. C.

+No. 717—Burlington, Iowa—The Board of Education at this place will contract about June 1 for 800 tons of mine-run coal and 1400 tons of lump. The call for bids is advertised and the purchase usually made through local dealers. The current contract is being filled with Fulton County, Ill., mine-run at $2.35 per ton, and Franklin County, Ill., 6-in. lump at $3.20 per ton. Address Fuel Committee, Board of Education, Burlington, Iowa.

No. 718—Toronto, Can.—The King Edward Hotel of this city is now in the market for 9000 tons of coal, the great bulk of which is bituminous. Tenders are not advertised for but the exact needs can be obtained by application. The usual figure obtained is considerably less than $4. Address Manager, King Edward Hotel, Toronto, Ont.

+No. 719—Revere, Mass.—Sealed proposals were received until noon, May 21, for furnishing coal required at the city buildings during the ensuing year. Specifications are on file at the office of the City Engineer. Address Mayor Arthur B. Curtis, Revere, Mass.

+No. 720—Baltimore, Md.—Sealed proposals will be received at the office of the Lighthouse Inspector for furnishing anthracite and bituminous coal during the fiscal year ending June 30, 1916. Blank proposals, etc., may be had on application. Address Lighthouse Inspector, Baltimore, Md.

No. 721—Limoges, France—An inquiry was made at this office by a correspondent for a French concern who is desirous of getting in touch with American exporters of anthracite coal with a view to obtaining a supply during the continuance of the European war. Address Leonard Rouguart, 37 Murray St., New York.

+No. 722—Toronto, Canada—Sealed proposals will be received by the Toronto General Hospital until May 25 for about 8500 tons of bituminous screenings, 40 tons of anthracite stove, 25 tons of egg and 5 tons of nut. All coal to be of the best quality. Address Secy. and Treas. A. F. Miller, Toronto General Hospital, Toronto, Can.

No. 723—Boston, Mass.—Sealed proposals will be received at the office of the Lighthouse Inspector, Boston, Mass., until May 25, 1915, for furnishing anthracite and bituminous coal for use in the second lighthouse district for the fiscal year ending June 30, 1916. Blank proposals and particulars may be obtained on application. Address the Lighthouse Inspector, 19 Congress St., Boston, Mass.

No. 724—Toronto, Can.—Bids will be received by the Lumsden Bldg. for a supply of coal from Aug. 30 until May 15. It is likely that all tenders will close before the end of May. Address, Building Superintendent, Lumsden Bldg., Toronto, Can.

+No. 725—Northampton, Mass.—Bids will be received by the county authorities until noon, June 1, for furnishing the coal required at the Court House, Jail and Hampshire County Sanatorium until Apr. 1, 1916. Philadelphia & Reading Coal & Iron Co.'s hard white ash coal is required, and deliveries are to be made in such quantities and at such times as required. Address County Commissioners, Court House, Northampton, Mass.

+No. 726—New York—Sealed bids will be received by Fire Commissioner Robert Adamson until 10:30 a.m., June 1, for furnishing and delivering anthracite coal for use on the Fire Boats of the Department, for the period ending Apr. 1, 1916. Blank forms and further information may be obtained on application. Address Robert Adamson, Fire Com., Municipal Bldg., New York City.

+No. 727—Muncie, Ind.—The Board of Education at this place will be in the market some time during next month for approximately 1200 tons of West Virginia splint coal. The call for bids is advertised, and the business done on a competitive basis. Address Board of Education, 445 The Johnson, Muncie, Ind.

+No. 728—Bryan, Ohio—Bids will be received by the Board of County Commissioners of this place until 1 p.m., June 8, for furnishing 125 tons of anthracite furnace coal. Address County Auditor C. R. Lowe, Bryan, Ohio.

+No. 729—Vicksburg, Miss.—Sealed proposals will be received until noon, June 1, for furnishing about 10,000 tons of bituminous coal to contractor's barges engaged in the Third Mississippi River District. Complete details and specifications may be had an application. Address Maj. Engrs. J. R. Slattery, U. S. Engr. Office, Third Mississippi River District, Vicksburg, Miss.

+No. 730—Louisville, Ky.—The Board of Education at this place will receive bids until 3 p.m., May 26, for furnishing the annual supply of coal for the fiscal year beginning July 1. All bids must be accompanied by a certified check for varying amounts, dependent upon the amount of the bid. The requirements are as follows: Western District, 1923 tons of nut and slack, 195 tons of lump, 115 tons of mine-run. Central District, 3267 tons of nut and slack, 64 tons of lump, 837 tons of mine-run. Eastern District, 1087 tons of nut and slack, 127 tons of lump, 383 tons of mine-run. Bids must include all expenses incident to the delivery and storage of the coal. Full details and proposal forms may be obtained on application. Address Business Dir. Samuel D. Jones, Administration Bldg., Eighth and Chestnut St., Louisville, Ky.

No. 731—Toronto, Can.—The Prince George Hotel is said to be in the market for a year's supply of bituminous coal. The average yearly consumption is 2000 tons. Address, Manager, Prince George Hotel, Toronto, Can.

No. 732—Marshall, Minn.—The Electric Light & Water Works Plant at this place will be in the market some time during June for about 20,000 tons of Elkhorn (Kentucky) screenings. The business is usually done at about $4.55 per ton, and the call for bids is always advertised. Address Supt., A. L. Fields, City Electric Light & Water Works Plant, Marshall, Minn.

No. 733—Providence, R. I.—Sealed proposals will be received by the Board of Control and Supply until 10 a.m., June 10, for furnishing the coal supply. Specifications and information may be obtained on application. Address Secy. Gilbert R. Parker, Bd. of Control and Supply, Room 18, State House, Providence, R. I.

+No. 734—Brookings, S. D.—The Light, Heat & Water Department at this place will be in the market some time during June for approximately 2000 tons of Wilmington (Illinois) coal. The contract is made on a competitive basis and is usually closed at about $4.20 per ton delivered. Address Supt. A. W. Morton, Light, Heat & Water Dept., Brookings, S. D.

+No. 735—Davenport, Iowa—The Board of Education here usually contracts the second Monday in June for its annual requirements of coal involving about 2200 tons of lump and 700 tons of slack coal. The call for bids is advertised in the local papers and the business done on a competitive basis. Address Secy. J. D. McCollister, Bd. of Edu., 1144 Main St., Davenport, Iowa.

+No. 736—Covington, Ky.—The Board of Education at this place will be in the market some time during June or July for about 500 tons of 2-in. lump coal. The call for bids is advertised, and the coal bought in carload lots. The usual price is about $1.30 per ton at the mine. Address Business Dir. W. A. Shore, Bd. of Edu., Covington, Ky.

+No. 737—Charleroi, Penn.—The Board of Education here received bids till 7 p.m., May 18, for furnishing approximately 18,000 bu. of mine-run coal to be delivered to the various school buildings. Address Secy. T. M. Faddis, Bd. of School Directors, Charleroi, Penn.

+No. 738—Flint, Mich.—Bids were received until 10 a.m., May 18, for furnishing the Michigan School for the Deaf at Flint, Mich., with approximately 2500 tons of bituminous coal during the year, beginning July 1. Specifications may be had on application. Address Steward H. R. Niles, Michigan School for the Deaf, Flint, Mich.

+No. 739—Joliet, Ill.—The Board of School Inspectors at this place will contract some time during June or July for approximately 2500 tons of coal. Pana lump is being used at present which costs about $2.50 per ton delivered at the school buildings as required. The call for bids is advertised. Address Board of School Inspectors, Library Bldg., Joliet, Ill.

+No. 740—San Antonio, Tex.—The Board of Education of this place will be in the market some time during June or July for their annual requirements of coal involving about 750 tons. The best commercial McAlester lump coal is used, the current contract being closed on the basis of $6.85 per ton. About 600 tons is delivered in the summer, and the balance as required. The call for bids is advertised. Address Business Agent of the Board, Prudential Bldg., San Antonio, Tex.

+No. 741—Catasauqua, Penn.—Sealed proposals will be received by the local Board of Education until 7:30 p.m., May 28, for furnishing 300 long tons of stove coal to the local schools. Address Secy. C. H. Riegel, Borough of Catasauqua, Catasauqua, Penn.

+No. 742—Saginaw, Mich.—The Board of Education at this place will be in the market during the latter part of next month for their annual requirements of coal involving about 1300 tons of steam lump and 2000 tons of slack. The lump coal is used at the Ward Schools and the Slack at the Training School, the cost of the former being about $2.90 and the latter $2.30. The present contract on the lump coal is being supplied from the Caledonia Mines in Saginaw County, Michigan, and the slack is being furnished from the Bliss Mine in Swan Creek County. The call for bids is advertised and the business let on a competitive basis. Address Business Agt. W. E. Klumpp, Bd. of Edu., Saginaw, East Side, Mich.

+No. 743—Demopolis, Ala.—The Electric Light & Power Co. at this place will be in the market some time during next month, or in July, for their annual requirements of coal involving about 1500 tons of mine-run. The business is usually let at about $2.40, and the call for bids is advertised. Address Purchasing Agent, Demopolis Electric Light & Power Co., Demopolis, Ala.

+No. 744—Moultrie, Ga.—The Electric Light Department at this place will be in the market some time during the summer for their annual requirements of coal involving about 200 tons of screened mine-run. It is understood that the business is not let to competitive bids and the current contract is being filled at $3.20 per ton. Address J. M. George, City Light Dept., Moultrie, Ga.

+No. 745—Houston, Texas—The Board of Education here will be in the market about June 20 for their annual requirements of coal involving about 900 tons of Alabama 6-in. lump. The current contract is being filled at $4.65 per ton delivered at the buildings. The call for bids is advertised. Address Public School Board, Houston, Tex.

+No. 746—Seattle, Wash.—The School Board at this place will be in the market some time during June or July for their annual requirements of coal involving about 8000 tons of mine-run. The present contract is being filled on Black Diamond coal at about $4.15 per ton delivered at the schools. The call for bids is advertised. Address the School Board, 347 Central Bldg., Seattle, Wash.

+No. 747—Pittsburgh, Penn.—Sealed proposals will be received until 10 a.m., May 25, for furnishing the coal requirements at nine different pumping stations and the Pittsburgn City Home and Hospital and the North Side City Home during the fiscal year beginning June 1. Specifications and blank forms may be had on application. All bids must be accompanied by a suitable bond as provided by the city ordinances. Address Dir. F. P. Booth, Dept. of Supplies, 314 Oliver Bldg., Pittsburgh, Penn.

+No. 748—Detroit, Mich.—Sealed proposals will be received by the Dept., of Parks and Boulevards until May 24 for furnishing coal as follows: 1000 tons of bituminous nut, pea and slack for delivery at the Power Plant on Belle Isle Park; 300 tons of bituminous lump or smokeless lump, anthracite, for delivery at the same place; 300 tons of smokeless lump for delivery to road rollers; 200 tons of anthracite stove or egg or smokeless lump for delivery at Palmer Park, Clark Park and City Barns. Address Secy. H. W. Bush, Dept. of Parks and Boulevards, 201 City Hall, Detroit, Mich.

+No. 749—Perrysburg, N. Y.—Bids will be received until May 29, for supplying the J. N. Adam Hospital at this place with 2500 tons of three-quarter bituminous coal and 500 tons of anthracite. Delivery to be made during the fiscal year beginning with July. Address Supt. Clarence L. Hyde, J. N. Adam Hospital, Perrysburg, N. Y.

No. 750—Hartford City, Ind.—The contract of the City Government for their fuel supply expires about the first of next month, and the City Council proposes testing out various grades of coal before closing a new contract. The present contract is with the Norfolk & Chesapeake Coal Co. on the basis of $1.10 per ton, f.o.b. mines. Several coal companies are investigating the possibilities of obtaining the business, which involves about two car loads a month. Address City Council, Hartford City, Ind.

+No. 751—Washington, D. C.—Sealed bids will be received until 10 a.m., June 1, by the United States Navy (Schedule 8288, Steam Engineering) for furnishing anthracite and bituminous coal during the fiscal year beginning June 30, as follows: Portsmouth Navy Yard 75 tons of pea; 150 tons of egg; 120 tons of stove. Boston Navy Yard 100 tons of anthracite stove; 325 tons of egg coal, 5 tons pea coal. West Hingham (Mass.) Naval Magazine, 150 tons anthracite. Iona Island, N. Y., 2000 tons pea; 60 tons egg; 75 tons nut. Fort La Fayette, N. Y., 50 tons egg coal. Naval Hospital, N. Y., 2000 tons of broken, best quality of white ash and 50 tons of stove same grade. Brooklyn, N. Y. 200 tons Cumberland coking coal. Philadelphia Navy Yard, 25 tons of anthracite nut; 150 tons anthracite broken; 100 tons anthracite stove. Philadelphia Naval Home. Quotations are requested on approximately 2000 tons of anthracite, pea, buckwheat, rice and barley, deliveries to be made in 100 ton lots. Washington Navy Yard, 3000 tons egg coal; 150 tons of red ash stove; 300 tons of white ash egg; 500 tons pea coal. Norfolk Navy Yard 300 tons of anthracite broken; 85 tons of anthracite; 85 tons of white ash furnace. Norfolk Naval Hospital 150 tons of anthracite, 150 tons of white ash stove. Address Paymaster Gen. U. S. Navy Samuel McGowan, Washington, D. C.

+No. 752—Washington, D. C.—Sealed proposals will be received by the U. S. Navy (Schedule 8287, Ordnance, Construction and Repair, and Steam Engineering) until 10 a.m., June 1, for furnishing coke as follows: Portsmouth Navy Yard (Kittery, Me.) 100 tons, 72-hr. foundry, and 250 tons egg coke. Boston Navy Yard, 250 tons hard coke. Brooklyn Navy Yard, 4000 bu. gas coke. Philadelphia Navy Yard, 120 tons nut coke; 500 tons Connellsville 72-hr. foundry. Washington Navy Yard, 1000 tons coke. Norfolk Navy Yard, 800 tons 72-hr. foundry coke. South Carolina Navy Yard, 450 tons cupola coke. Deliveries are to be made during the fiscal year beginning June 30. Address Paymaster Gen. of the Navy Samuel McGowan, Washington, D. C.

+No. 753—Irvington, N. J.—The Board of Education at this place received bids up to May 20 for supplying coal to the local schools. As a result of a protest regarding the phraseology of the first call for bids, all proposals received were returned unopened, and new bids will be asked for. Address Chn. of the Supply Com. Bd. of Edu., George H. Smalley, Irvington, N. J.

+No. 754—Edgewater, N. J.—The Board of Education at this place will receive bids until 8 p.m., May 28, for furnishing 175 tons of anthracite egg coal for immediate delivery to the four schools in the borough. Address District Clk. Thomas F. Rigney, Municipal Bldg., River Rd., Edgewater, N. J.

+No. 755—Lakewood, Ohio—The Board of Education at this place will receive bids until noon, June 8, for furnishing 2000 tons of semibituminous coal to the local schools during the season 1915-16. Bids are requested on either lump or mine-run and are to include the cost of delivery to the various public schools and trimmed as directed. Specifications may be had on application, and bids must be submitted on blanks furnished for that purpose, accompanied by a certified check for $100. The successful bidder will be required to furnish a security bond for $1000. Address Clk. P. T. Harrold, Bd. of Edu., High School Bldg., Warren Rd., Lakewood, Ohio.

Contracts Awarded

+No. 367—Dunkirk, N. Y.—This contract (p. 566), which provides for furnishing the City Water Works with 8000 tons of nut and slack coal, has been awarded to the **Valley Camp Coal Co.** at $1.99 per ton. Address Secy. Baumgartner, Bd. of Water Comrs., Dunkirk, N. Y.

+No. 448—Springfield, Mass.—This contract (pp. 627, 834, 875), which provides for furnishing the Ordnance Department of the Springfield Armory with coal during the fiscal year beginning July 1, has been awarded to the **Maynard Coal Co.,** Springfield, Mass., at $7.25 for anthracite nut and $7 for egg coal. The prices are per short ton. Address Major Ordnance Dept. Samuel Hof, Springfield Armory, Springfield, Mass.

+No. 465—St. Louis, Mo.—This contract (pp. 627, 707, 794, 875), which provides for furnishing the Board of Education with 75,000 tons of bituminous coal, has been awarded to the **Polar Wave Ice & Fuel Co.** at $1.91¾ per ton. The bid of the Bald Eagle Mining Co. was the same as the Polar Wave Co., but the latter's superior facilities won it the contract. Address Supply Commissioner, 3431 School St., St. Louis, Mo.

+No. 520—Jeffersonville, Ind.—This contract (pp. 666, 707), which provides for furnishing the Depot Quartermaster's Corps with fuel requirements during the year commencing July 1, has been awarded to the **Taylor Coal Co.,** of Louisville, Ky., at 85c. per short ton, f.o.b. mines for straight mine-run coal. Address Depot Quartermaster Maj. Joseph T. Davidson, Jeffersonville, Ind.

+No. 602—Beverly, Mass.—This contract (p. 795), which provides for furnishing the local City Government with anthracite and bituminous coal, has been awarded as follows: J. J. Harrigan, 750 tons of Lackawanna stove at $7.25 and nut at $7.50 (deliveries on this latter business are to be made in quarter-ton lots as directed). **John Girdler,** 900 tons of egg at $7.15 and broken at $6.90 **Sprague Breed & Brown Co.,** 2500 tons of New River coal at $4.61. Address Clk. of Coms. Frederick B. Browning, Beverly, Mass.

+No. 604—Newton, Iowa—This contract (p. 795), which provides for furnishing the City Electric Light Plant and Water Works with coal during the fiscal year beginning June 1, has been awarded as follows: **The Newton Coal Co.,** $2.48 per ton for mine-run coal delivered in bins at the Electric Plant; **T. J. Kating,** $3.29 per ton for mine-run coal delivered in bins at the Water Works Plant. Address City Clk. C. G. Finch, Newton, Iowa.

+No. 605—New York, N. Y.—This contract (p. 795), which provides for furnishing 650,000 lb. of egg coal for delivery at the city Asphalt Plant, has been awarded to the **Meyer, Denker Sinram Co.,** at $1755. The William Farrell & Sons bid $2.90 per ton or gross of $1885. Burns Bros. bid was $2.97 per ton or $1930.50. Address Pres. of the Borough Marcus Marks, Room 2034, Municipal Bldg., New York.

+No. 611—Ada, Minn.—This contract (p. 795), which provides for furnishing the Local Water & Light Plant with coal during the fiscal year terminating Apr. 1, 1916, has been awarded to a local dealer. The price was $3.30 f.o.b. Duluth, or Superior, for Youghiogheny, screened lump coal. We are advised that the purchasers were unable to obtain any competitive bids on this contract, the five proposals submitted, all quoting the same price. Address Clk. Peter Sharpe, Water & Light Com., Ada, Minn.

+No. 631—Milwaukee, Wis.—This contract (p. 795), which provides for furnishing coal to the Department of Public Works, has been awarded to **Frank Gross, Jr.,** at $2.97½ per ton. Address Deputy Com. of Pub. Wks. Percy Braman, Dept. of Pub. Wks., Milwaukee, Wis.

+No. 632—Phillipsburg, N. J.—This contract (p. 796), which provides for furnishing the local Board of Education with its fuel requirements for the ensuing year, has been awarded on the following basis: Stove, $6.05; chestnut, $6.20; pea, $7.45, all per gross ton. Address Secy. Geo. W. Smith, Board of Education, Phillipsburg, N. J.

+No. 633—Hot Springs, S. D.—This contract (p. 796), which provides for furnishing the National Home for Disabled Volunteer Soldiers with 9000 tons of lignite coal, has been awarded to **Peter Kooi,** Kooi, Wyo., at $3.40 for mine-run coal. This was the only bid received on this contract. Address Treas. and Quartermaster William H. Stanley, N. H. D. V. S., Hot Springs, S. D.

+No. 639—Boston, Mass.—This contract (p. 796), which provides for furnishing the Franklin Union Building with approximately 200 tons of coal has been awarded to **F. C. Warren & Bradford Co.,** at $4.17 per ton, with a guarantee of 14,300 B.t.u. The City Fuel Co. bid $4.24 on a guarantee of 14,400 B.t.u., and the Staples Coal Co. $4.23 on a guarantee of 14,500 B.t.u. Address, Pres. Richard Olney, Franklin Foundation, Berkeley St., Boston, Mass.

Contract Notes

Argentina—Beginning Apr. 1, 1915, the Central Cordoba Ry. will burn wood instead of coal in its locomotives. The road has been importing 80,000 to 100,000 tons of Welsh coal a year at Rosario. The Santa Fé and Government lines already consume considerable quantities of wood fuel and, according to newspaper reports, other companies are considering its use.

Spain—An American consular officer in Spain transmits the names and addresses of a number of leading coal importers and merchants in his district. Correspondence should be conducted in Spanish.

Germany—Germany has notified Sweden that coal will hereafter be regarded as unconditional contraband. Six neutral colliers, it is stated, are now held by the Germans, whose aim is supposedly to stop the exportation of coal to Scandinavia.

New York—The recent announcement that B. Nicoll & Co., of this city, has been appointed exclusive sales agent of the Clinchfield Coal Corporation for the territory in the United States and Canada north of the Ohio River and Hampton Roads, Va., was of much interest to the trade. L. G. Bruder, the Chicago manager of Nicoll & Co. will look after the sales, which will be vigorously pushed.

Buffalo, N. Y.—The bids for supplying 1000 gross tons of mine-run bituminous coal for the Buffalo Post Office were: Marine Coal Corporation, $2.85; Buffalo Fuel Co., $2.88; Spaulding & Spaulding, $2.88; Fairmont Coal Co., $2.90.

Lyon, France—Direct shiploads of anthracite come from time to time from England. Both English and Belgian anthracite are used here in large quantities, and they sell at an average price of from 7 to 8 francs ($1.35 to $1.55) per 100 kilograms (220.46 lb.) in normal times, although the price at present has increased about 25.%

Railroad Coal Cars—On June 30, of last year, there were 899,314 coal cars in the United States having an aggregate capacity of 40,583,490 tons. The average number of freight cars per 1000 mi. of line was 10,121,

Leominster, Mass.—The Hadley Coal Co., at this place, has been awarded the contract to furnish the local public schools with coal during the ensuing year at $7.25 per ton for egg and $7.35 per ton for stove.

Albany, N. Y.—According to press reports, the contract for furnishing the filtration plant and Quackenbush pumping station at this place has been awarded to the **C. M. Stuart Coal Co.,** at $28,780.

Great Britain—The committee of the British Board of Trade which has been investigating the state of the coal trade has recommended as follows: (1) That exports to neutral countries should be restricted. (2) That steps be taken at once to consult with local public bodies regarding the question of accumulating large storage reserves of coal in or near London for use of the small consumers next winter. (3) That freight rates on interned steamers be reduced. (4) That enemy ships condemned by the prize court be taken over by the Government and used for coal transport. (5) That the Government assume control of the output of collieries during the balance of the war, should prices not soon return to a more reasonable level.

COAL AGE

Volume 7, No. 22
Issued Every Saturday
Hill Publishing Company

NEW YORK, MAY 29, 1915

Price, Ten Cents
Contents, First Page
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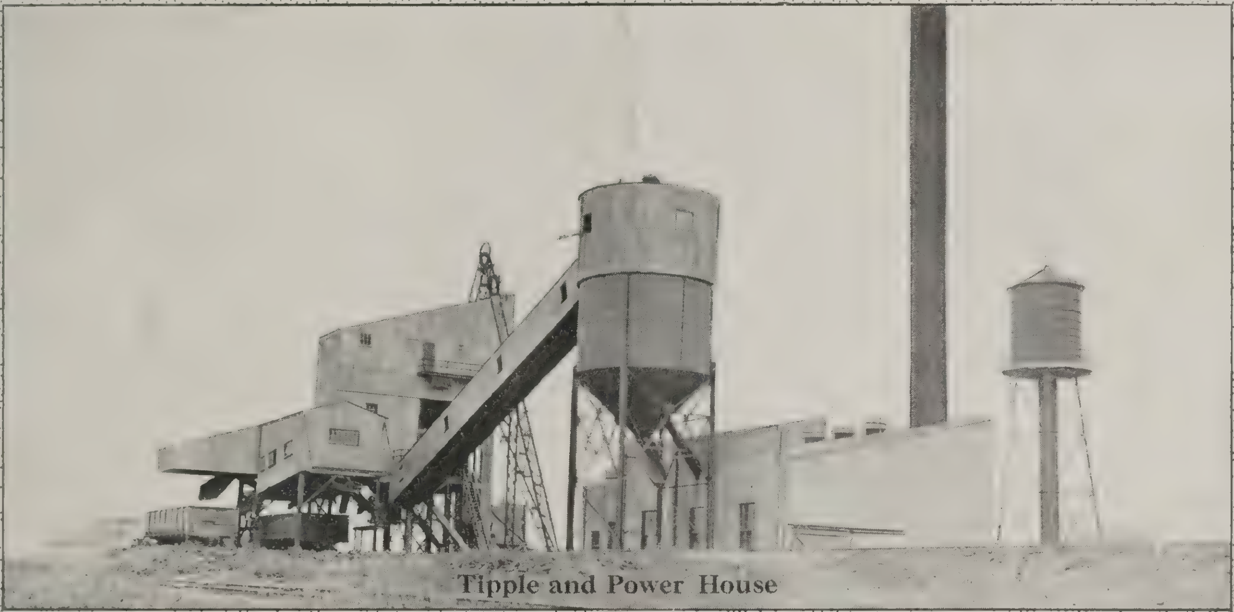
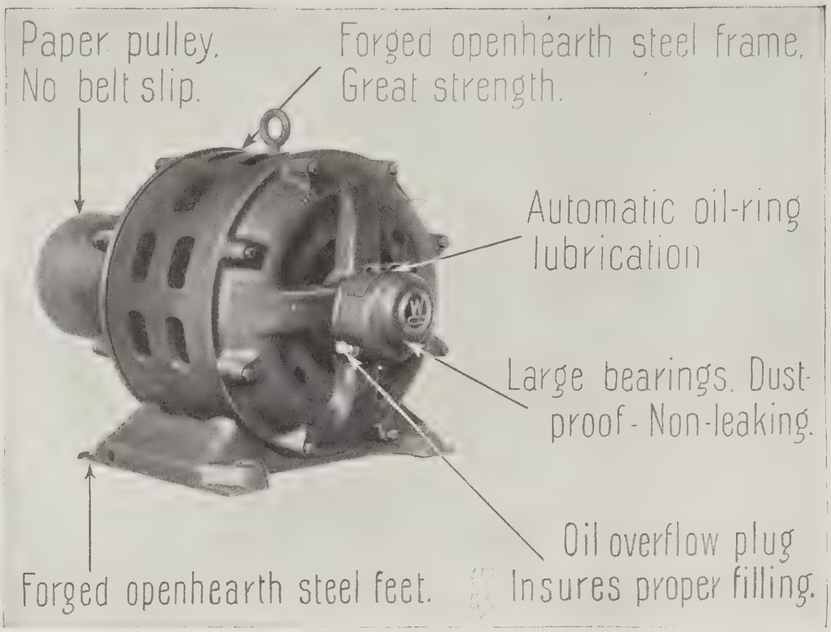


Tipple and Power House

Top of Shaft Showing Concrete and Steel Headframe

Interior of Power House



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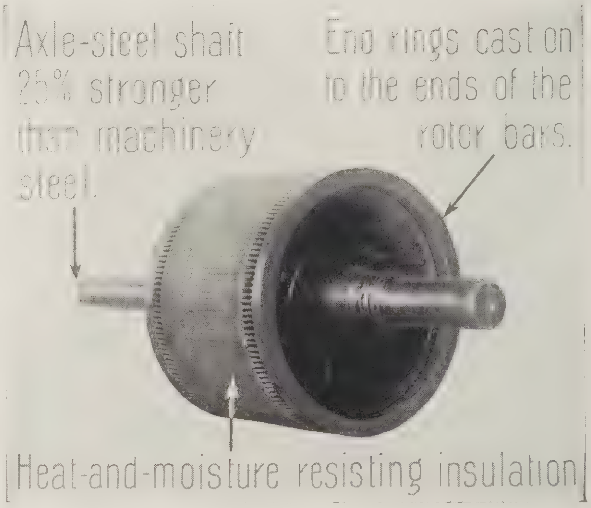

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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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NUMBER OF COPIES PRINTED THIS ISSUE, 10,000
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

"THE OUTSIDE POINT OF VIEW" is a healthy one for each and all of us to get once in a while.

Just because we are in the coal business is no reason why we shouldn't be interested in a whole lot outside of it.

In "*Advertising and Selling*" for May, Herbert N. Casson, writes, along this line:

"It is physically impossible for a man to see more than two sides of a square house at one time. It is necessary to project oneself mentally to imagine the other sides. But to have it under really close observation, you must have someone else help you, from a different vantage point than your own.

The same thing is true of business. No organization can hope to see all its sides unaided. It must have outside point of view, or work on a distorted basis.

This is the rock on which thousands of stubborn business men split. And this is the magnificent opportunity which scores of brainy men have seized to wrest leadership from those too dull to see their own benefit.

It is a matter of history that general improvements come from outside and that detail improvements come from inside.

For instance—

Field was a merchant, yet he laid the first ocean cable.

Bell was a professor of elocution, yet he invented the telephone.

Carnegie was a railroad official, yet he became the richest steel maker in the world.

Judge Gary is a lawyer, yet he is at the head of the American Steel Trust.

Allis was an auditor, yet he created the Allis-Chalmers Works at Milwaukee.

Ingersoll, who gave the world good cheap watches, was not a watchmaker.

Selden, who secured the first automobile patent, was a lawyer.

Eastman, creator of the Kodak, was a bank clerk.

Harriman, the greatest of American railway organizers, was a stock broker.

Even in the larger affairs of national history we find this extraordinary law. Cromwell, for instance, was an outsider; he was not born of royal blood; and Napoleon, who put kings up and pulled kings down until they sent him to St. Helena, was an outsider.

The most desirable thing in the world is *balance*. Balance means sanity, it also means success. It is the balanced man and the balanced business that win—aided by the outside point of view to achieve such balance."

COAL AGE

Vol. 7 NEW YORK, MAY 29, 1915 No. 22

Unintentional Distortion

WE have recalled many times the accompanying observation of Pascal's in following the testimony developed by the Federal Industrial Relations Commission and we have wondered what might be the effect of placing that remark on a wall conspicuously before all of the witnesses as they give testimony.

Any one can talk interestingly if questioned as to his opinion about someone else, but such testimony as a rule has little value beyond its power to entertain; and yet more than half of the commission's questions, at least so far as the mining industry is concerned, could be answered by pure gossip.

If we substitute thought for "said" in Pascal's remark, it would no longer hold water; who believes that the majority of Union men in Colorado or elsewhere look upon the operators of coal mines as being one-half as black as they are so willing to picture them?

It does not necessarily follow that such testimony is rehearsed beforehand "with malice aforethought" any more than it follows that ordinary gossip originates from evil intent. It just happens that the normal human mind has a way of being led far afield by the imagination if the imagination is given half a chance.

> I hold it to be a fact that if all persons knew what each said of the other there would not be four friends in the world.

This quotation is a bit of wisdom left by Pascal, who devoted several years of his life to the collecting of proverbs.

The truth of this has been brought out time and again in public hearings held by boards of arbitration, and it is even used as an argument by most, if not all, the opponents of arbitration.

An employee that has been contented with his surroundings and conditions of employment is more than liable to give the most startling testimony, providing the audience seems to demand it and the questions suggest it. After the hearing is concluded, the man himself will probably not be able to give any satisfactory explanation for his action if questioned.

And yet of hearings and investigations there is apparently to be no end. We are all too apt to see only the abuse of a thing. The abuse is nothing against the proper use.

Out of the present world-wide turmoil let us hope there will come an era of moral fellowship for employer and employee, as well as an age of good-will on the part of great nations. Then benefactors will forget what they have given, and beneficiaries will remember what they have received. Laws will be created to reform the individual rather than to punish him.

Crime will be treated preventively rather than retributively.

A Modern Coal Mine in Iowa

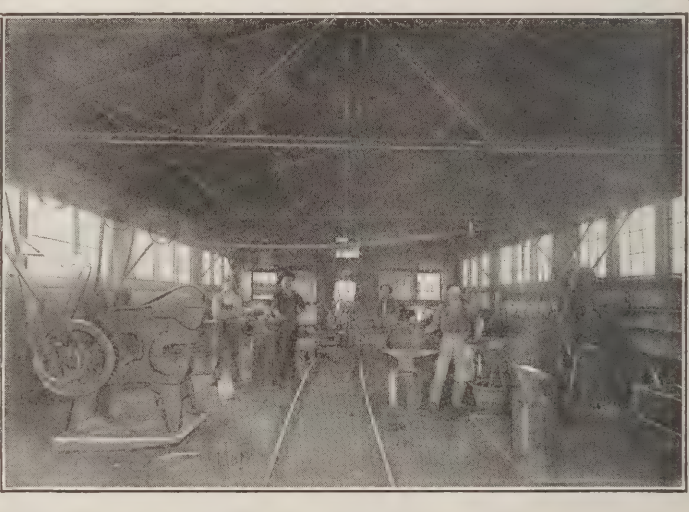
By Willis P. Thomas*

SYNOPSIS—Description of a comparatively new operation where advanced ideas in the matter of concrete and steel construction have been carried out. Electric hoisting and electric haulage are employed. The system of screening and picking the coal is quite efficient.

Situated 40 miles south of Des Moines, Iowa, on the Rock Island "Short Line" is the Electra mine of the Consolidated Indiana Coal Co. This company, which is owned by the Rock Island R.R. through stock ownership, has approximately 4500 acres of Iowa coal, the bulk of which lies in Marion County. Electra mine, which is one of the most modern plants in the Middle West, was located in the center of the company's holdings to serve as the central power plant for all future developments in the field. Power is also sold to nearby towns for lighting purposes and commercial use.

As the country is quite rough considerable heavy grading was required to construct the gravity yards, which have a capacity of 75 empty cars and 75 loads. Track scales were installed for the weighing of empty and loaded cars, accurate weights thus being secured.

Tipple and Storage Bin



Interior of Shop

The Mine Tipple

The tipple which spans three tracks is constructed of steel throughout, the headframe having a concrete covering to prevent corrosion from moisture and gases rising out of the shaft. In order to better control the dumping of the coal, the hoisting engineer is located in the tipple, standing directly in front of the dump. He is thus enabled to use a speed in dumping which will secure proper screening over the bars with a minimum breakage of the coal. After being dumped the coal passes over a 6x12-ft. bar screen. The bars in this screen have a 1⅜-in. spacing, the lump going into the weigh-pan.

This weigh-pan is provided with a two-way gate. Dumping one way, the coal passes to the shaker screen; dumping the other way, the coal passes over a chute suspended over the shaker to the lump-track direct. Mine-run coal can also be loaded over this chute by covering the bars with flat sheets. The shaker screen, which is connected by toggles with an electric motor, makes slack, egg and lump coal. The egg coal, which carries practically all of the dirt and impurities, is run over a picking table to insure a thoroughly clean preparation.

The tipple is so arranged that if necessary the egg coal can be loaded in box cars as well as the lump. If there should be a temporary shortage of cars the slack coal can be run into a 200-ton capacity storage bin which is located directly in front of the boiler plant. This bin is also used as storage for boiler coal, the slack being spouted direct to the stoker hopper. This location of the storage bin is economical as it serves a double purpose.

Boiler and Engine Rooms

The boiler and engine rooms are located a short distance from the tipple and adjacent to the mine tracks. The buildings are of brick-and-steel construction. The ends of the buildings are of corrugated iron so that they can be readily taken down whenever it is necessary to install additional equipment. The boiler room at present contains two Geary 300-hp. water-tube boilers equipped with Illinois chain-grate stokers, feed-water heater and feed pumps in duplicate. Draft is furnished by a steel stack 5 ft. in diameter and 135 ft. in height. The ashes from the stokers drop off at the rear end of the boilers into a small hopper and are blown out through an 8-in. pipe by steam into a ravine back of the boiler plant.

The engine-room equipment consists of a 660-kw. General Electric generator driven by a Curtis condensing steam turbine, a 100-kw. motor-generator set for haulage and mining machines and the hoisting engine, which is driven by a 350-hp. induction motor using 2300 volts. In the basement of this building are located the vacuum pump and condenser. One interesting feature of this boiler and engine-room installation is that one man operates it all, even to the disposal of the boiler-plant ashes. Hoisting is done through a concrete shaft, the concrete being cast around a steel framework. The design of this

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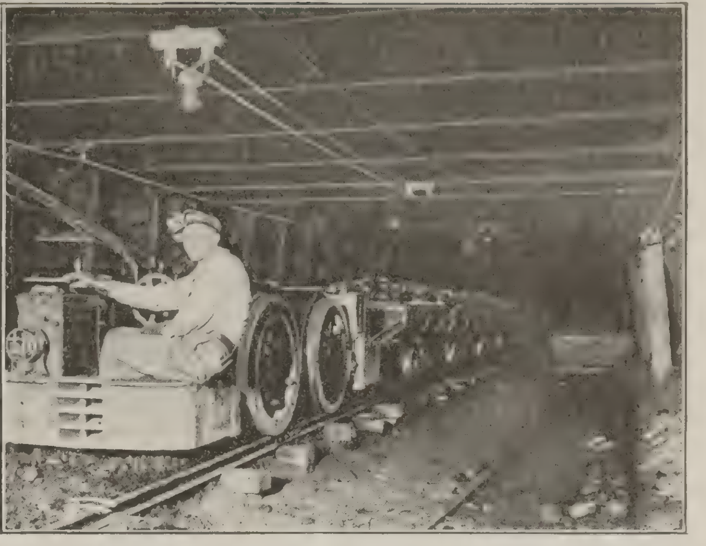
*Mining engineer, Des Moines, Iowa.

View at Shaft Bottom Showing Steel Timbering



Motor and Trip Entering Shaft Bottom

shaft was made by Carl Scholz, general manager of the company, and is something entirely new in concrete construction. The design gives great strength and large clearances for the passage of air while hoisting is taking place. The coal seam is reached in the shaft at a depth of 185 ft. The second opening to the underground workings is through a slope driven at an angle of 17 deg. Here steel timbering is used, and a concrete partition divides the slope into two compartments, one of which is used for an airway and the other as a manway. The second compartment is also used to handle supplies into the mine. With this arrangement it is possible to handle coal through the shaft the full 8 hours without interruption.

The Shaft Bottom

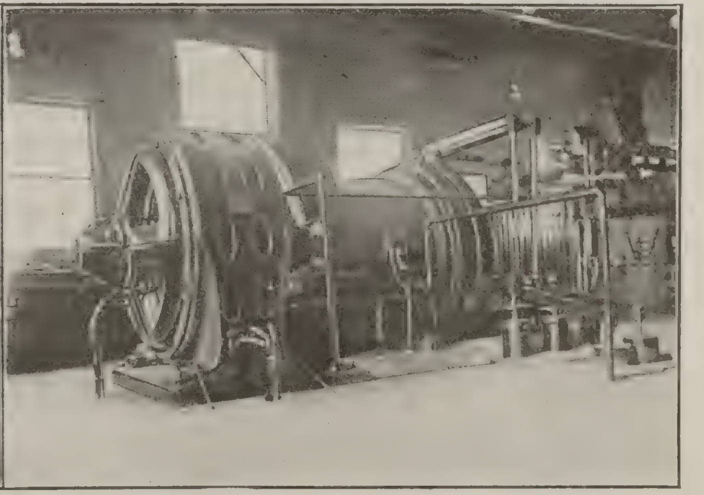
The shaft bottom is 16 ft. wide, double tracked and timbered with steel, the caging being done from one side on gravity tracks. The empties are elevated by two-car hauls to such a height that they run by gravity back to the main east and west haulage roads, where they are picked up by the motors. All of the main haulage as well as most of the gathering is done with electric motors. The seam is quite rolling, resulting in grades as high as 12 per cent. against the loads in some rooms. Where this is the case gathering motors with independent-driven crabs are used to bring the cars to the entries.

Quite a little steel timbering has been done, especially on permanent air-courses. Main haulage roads which have a 36-in. gage are laid with 25-lb. steel on 4x5-in. wooden ties. Room tracks are laid with 16-lb. steel placed on steel ties. These ties are found to be of great advantage in the low coal as they take up very little in height and are more economical than wooden ties because they may be used over and over. A telephone system connects the underground workings with the mine office, power house and shop as well as the tipple.

Pick and machine mining are both in use. Machine mining is done with shortwall machines which cut rooms with a double track and a 60-ft. face. It has been found that the roof stands as well under these conditions, if the timbering is done properly, as it formerly did in a 25-ft. room.

Miners' dwellings have been built about a half a mile from the plant, each house being of different design and painted a color different from the house adjoining. The effect is pleasing to the eye and gives each place an individuality of its own. Each house has a large lot with ample space for a garden in the rear. Water is supplied from a large reservoir to the whole townsite. The management's idea in building a superior class of houses is to attract a better class of men and to promote better living conditions. The plan seems to have been successful.

Hoisting Engineer and Car Just Finished Dumping



Electric Hoist Operated from the Mine Tipple

The Air Factor in Dust Explosions

By John Verner*

SYNOPSIS—Objection to use of facts of limited application to establish a general rule. A brief outline of facts essential to explosive combustion. The Eskmeals tests taken for illustration. Effect of draft to produce and maintain explosive combustion. The counter-current theory defended. The condition of the air factor important. The Illinois investigations. Explosion in a drift mine. The Royalton explosion. Influence of temperature and barometer on explosive conditions in mines. The position of the cannon in a testing gallery important. The results and hasty conclusions in the Bruceton tests.

In the introductory remarks of *Bulletin* 83, issued by the Bureau of Mines and entitled "The Humidity of Mine Air," having special reference to coal mines in Illinois, the following statement appears:

> Experiments in the gas-and-dust gallery at the Pittsburgh testing station of the Bureau of Mines verified the fact that certain dusts that explode violently when dry are rendered inert by proper humidification of the atmosphere within the gallery, and the importance of humidity as a factor in limiting the inflammability of coal dust in a mine is demonstrated by the fact that there has never been in Illinois a dust explosion during the summer months, whereas the records show a number of dust explosions during cold weather. It is easy to see that the warm moisture-laden air that enters a mine in the summer must deposit moisture on cooling, whereas the cold and relatively dry air that enters in winter must take up moisture as it becomes heated in traveling through the mine.

The *ex parte* presentation of a case should not be depended on to ascertain the full truth, as in many instances such presentation may be positively misleading. Some of the facts given in the above statement apply only to conditions peculiar to coal mines in Illinois and do not apply to conditions in mills in the same state where dust explosions have occurred and their occurrence was also confined to the cold season of the year.

The use of these facts of limited application, with the obvious intention of creating the impression that the principal cause of all dust explosions in Illinois was the increased dryness of the dust in winter, is objectionable; because, although the facts may seem to furnish a plausible and easy reason for the persistent occurrence of explosions in the mines during the colder months, they fail utterly to explain the likewise persistent occurrence of explosions in the mills in winter, and therefore the truth of the inference suggested in the bulletin becomes a matter of doubt even if it is applied to mines only.

Initiation and Propagation of an Explosion

There can be but one process of starting and propagating explosive combustion, and it must be essentially the same under all conditions. It must be fundamentally the same whether such combustion takes place in a mill or a mine or whether the primary igniting agent is a spark, a gas flame, a mine fire, a blownout shot or an explosion of firedamp.

In order to discover this process there must first be a thorough understanding of the fundamental facts. Explosive-dust combustion is possible only when the following essential factors are present to participate in its production: 1. Flame. 2. Combustible dust. 3. An air current or draft toward the source of heat, to bring the dust and air in contact with the flame.

It is true that the fineness and dryness of the combustible dust determine in a measure its inflammability and ease of ignition. But although this is a favorable factor, it is not sufficient of itself to cause explosion, which is determined by the rate and completeness of the combustion; and these invariably depend on (1) the temperature of the flame producing ignition and (2) the character of the air supply or draft that brings the dust in contact with the flame.

Illustration Furnished in the Eskmeals Tests

The following case will serve as a fair illustration to show the process by which combustion is brought to the explosive point. In some of the tests in the Eskmeals gallery resulting in explosion a gas flame was about 10 ft. in length and a foot in diameter. The dust was placed on shelves and was put in suspension by the shelves being upset after the gas was lighted. There was no mechanically produced draft, but it is clear that as soon as the gas was lighted the air commenced to move toward the flame. It is obvious also that this movement of air or draft carried with it some of the dust in suspension, which was thus brought in contact with the flame. The ignition of the dust enlarged he flame and increased the heat, and this condition in turn caused a stronger draft, which furnished a greater air and dust supply to further increase the rapidity, range and temperature of the combustion. This progressive process continued until the temperature reached the required point and the air and dust supply provided by the draft was large enough to cause the first manifestation of explosive combustion.

It has been suggested that the presence of draft to bring dust in contact with the flame is not necessary under the assumption that explosive combustion is produced by conductivity or radiation; or, in other words, that the continued explosive ignition of the dust particles occurs in about the same manner as the ignition of a train of gunpowder, strung along the ground and fired at one end. However, the results of numerous experiments have shown the fallacy of this view.

Conclusions Drawn from the Eskmeals Tests

Evidence that the propagation of explosive combustion is produced essentially by the same process that produced the first manifestation of explosive combustion in the gas-flame test may be found in Dr. Wheeler's letter, Coal Age, Vol. 6, p. 761, regarding the effects observed during the progress of certain experiments made at Eskmeals. Following is a brief quotation from the letter:

> The first air movement is the concussion wave from the cannon (which travels with the speed of sound in air at the temperature of the gallery). There is then a pause of maybe a second or two before a rushing noise is heard, and flame can be seen (through small holes in the side of the gallery). When the flame reaches within 150 or 200 ft. of the open end of the gallery these "spurts" and "halts" are manifested by corresponding outbursts of smoke and inrushes of air at the open end. There is an interval sometimes of several seconds between successive spurts of the flame.

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*Former state mine inspector, Chariton, Iowa.

It will be noted that in the tests referred to in Dr. Wheeler's letter the primary means of ignition was a blownout shot and, in the other test mentioned above, it was a gas flame. Essentially the same ultimate effects were produced in each case, the only difference being that in the former a shorter method was used of getting the explosion under way, because the blownout shot practically took the place of the first manifestation of explosive combustion in the gas-flame test, thus cutting out the preliminary stages leading up to the production of the first explosive effects in the latter case. Then, as surrounding conditions were the same, the action and effects of the blownout shot in one test and of the first manifestation of explosive combustion in the other were also substantially alike, in kind if not in degree, and therefore the process of flame propagation must have been the same in both. That the propagation of flame was not effected by conductivity or radiation is clearly shown in Dr. Wheeler's letter, for had this been the case, there would have been no "interval, sometimes of several seconds, between successive spurts of the flame."

Dr. Wheeler's observations show that there was no difference, except perhaps in the magnitude of the immediate effects produced by the explosion either from the cannon or any subsequent explosive combustion of the dust. Hence, the immediate effects of the shot from the cannon can be considered as typical of all. The first of these effects was the concussion wave from the cannon, which drove the air and dust away from and beyond the reach of the flame. The latter, being thus more or less cut off from the necessary air and fuel supply, was halted in its progress and began to shrink. As a result its temperature and the temperature of the immediate surroundings decreased. This condition caused the formation of a partial vacuum around the dwindling flame that not only arrested the further progress of the concussion wave, but caused a reflex air movement or counter-current to set in toward the flame. This counter-current again brought sufficient air and dust into contact with the flame to cause a renewal of explosive combustion.

Effect of Draft to Produce Explosive Combustion and Propagation

It will be seen, therefore, that there was no essential difference between the process of propagation and the process by which the first manifestation of explosive combustion was effected in the gas-flame test. In the latter case the draft that brought the air and dust into contact with the flame—a draft caused by the effects of heat only—was comparatively sluggish and weak, while in the other case the draft or counter-current due to both the combined effects of heat and the partial vacuum formed about the flame moved more quickly and was of greater force.

As the explosion progressed, in addition to the partial vacuum about the flame due to the contraction following each subsequent explosive combustion, another partial vacuum developed in the area behind the flame. These two vacuums are separate phenomena, although they may act in conjunction to a greater or less extent. However, their combined action is not essential in the process of propagation, for it was shown above that the effects of the partial vacuum immediately in front and about the flame were alone sufficient to cause a counter-current strong enough to provide an adequate air and fuel supply for the further enlargement of the flame and the renewal of explosive combustion.

It should be understood that in all the tests at Eskmeals, in which the alternate spurts and halts of the flame were observed and where the alternate outrushes of dust and smoke and inrushes of air were both visible and audible, the gallery was open at one end and closed at the other, the cannon being located near the closed end. Every one of these tests furnished unmistakable and conclusive proof of the presence of the counter-current. But there were other tests at Eskmeals with both ends of the gallery open, and regarding their results Dr. Wheeler states in his letter to which I have referred: "No such phenomena (alternate spurts and halts of flame, etc.) occur when the gallery is so arranged that air can enter freely behind the flame."

Influence of the Counter-Current

This closing statement in Dr. Wheeler's letter has been offered as conclusive proof of the faultiness of the counter-current theory, Coal Age, Jan. 9, p. 94, one writer even claiming that there could be no counter-current in a mine having two openings. In answer to that claim I will only mention the fact that in the second Lick Branch explosion the presence of the counter-current was convincingly proved, and that mine had at least three openings to the surface. The fact that a thing is not readily distinguished is not sufficient proof that it does not exist. Under certain conditions, for instance, the exhalations and inhalations of a man may be plainly visible and audible, while under other conditions "no such phenomena occur." Now it would be absurd to suggest that, because the inhalations and exhalations could not easily be distinguished, the man had ceased to breathe.

When the retarding and reflexive influence of the partial vacuum formed in the wake of the flame is materially reduced or perhaps entirely removed, by the access of air from the rear, the following changes in effects may be reasonably expected: 1. A longer forward reach of the flame at each manifestation of explosive combustion. 2. A concussion wave of greater force preceding the flame. These changes in effects, however, do not change the process of propagation. At each manifestation of explosive combustion the concussion wave again forces the air and dust beyond the reach of the flame and the latter halts and recedes because its air and fuel supply is momentarily cut off. The partial vacuum formed in front and about the flame is still of sufficient force to cause a counter-current to set in, which brings again into contact with the flame the air and fuel required for its propagation. The range of this counter-current is probably shorter and its action quicker and more powerful. The intervals between successive "halts" and "spurts" of the flame, instead of lasting sometimes several seconds, according to Dr. Wheeler's observations, are now of such short duration that neither these nor the action of the counter-current can be distinguished by the human eye.

Influence of the Condition of the Air Factor

In view of the above it appears that the condition of the air factor, considered both in a physical and chemical sense, is of much greater importance and influence in starting and propagating explosive combustion than the condition of the suspended dust. Much stress has been laid on the necessity of dust suspension in order to produce explosive effects, yet in many tests where the dust was in suspension above the flame explosive combustion failed to develop, while in other tests made under the same surroundings, and employing the same kind of dust and the same means of ignition, explosive combustion was produced in every test without fail when the air and dust were forced into close contact with the flame by draft. The former tests furnish additional proof that explosive combustion is not effected by conductivity or radiation, while the latter tests give further evidence that draft action determines explosive combustion and controls its magnitude.

The Illinois Coal-Mine Investigations

If the investigations made by the Bureau of Mines in Illinois had been of broader scope and due consideration had been given not only to the effects of seasonal changes on the state of the dust in mines, but also to the effects of these changes on air and draft conditions affecting the initiation, propagation and intensity of dust combustion, perhaps a different conclusion would have been reached regarding the cause of the persistent occurrence of explosions in that state during cold weather than the conclusion presented in *Bulletin* 83. Ample proof could have been found in Illinois to show that the state of the dust is not the all-important thing.

At the Waukegan starch works three very violent and disastrous dust explosions have occurred during a period of ten years. Like mine explosions, all have occurred during cold weather—two in February and one in the latter part of November. The fact is shown that the state of the dust in the starch works was not appreciably affected by seasonal influences and remained substantially in the same state of dryness the year round. Under the circumstances the explanation given in *Bulletin* 83 that the difference in dust conditions accounts for the persistent occurrence of explosions in Illinois in winter and for their equally persistent absence in summer can have no application in the Waukegan case.

If the fact is accepted that draft-action determines the magnitude of explosive combustion, then we have an explanation that will account satisfactorily for the marked prevalence of dust explosions in winter, irrespective of the fact whether they occurred in a mill, a mine or any other place; because it is a matter of common knowledge that air conditions and draft-action are much more favorable and effective for inciting and hastening combustion in winter than in summer. Many years ago Peckham and Peck, after investigating the Minneapolis mills explosion, called attention to the danger of a draft carrying dust and proved that draft was essential in producing explosive combustion.

Explosion in a Newly Opened Drift Mine

Richard Newsam told of an explosion that occurred in Illinois, Jan. 31, 1907, in a newly opened mine drift. The distance from the drift mouth to the face where the shot was fired was 103 yd., and the drift was wet the entire distance, the water dripping from the roof. There was no gas and no dry dust. The flame extended through the entire length of the entry and 20 ft. beyond the opening. What proof can be found in the conditions surrounding this explosion to support the claim that the dryness of the dust was the principal cause of all dust explosions in Illinois? The explosion occurred in midwinter, air conditions and draft-action were especially favorable and effective in supporting explosive combustion and the Eskmeals tests proved the presence in that drift of strong inrushes of air or counter-currents that stirred up the wet dust and brought it in contact with the flame.

The Royalton Mine Explosion

The explosion in the Royalton mine occurred on Oct. 27, 1914, about 7:25 a.m. It is supposed that the explosion was primarily caused by the ignition of a body of gas, but there appears to be no definite proof to that effect. Regarding dust conditions it is stated that there was but little dust and that the requirements of the Illinois mining law with regard to dampening the dust had been carried out. Regarding weather conditions Oscar Cartlidge, manager of the Springfield mine-rescue station, makes the following statement, Coal Age, Jan. 16, p. 116:

> The barometer at Royalton, at 7:30 a.m., registered as follows, the readings being corrected to a sea-level basis: Oct. 26, 29.98 in.: Oct. 27, 30.42 in.; Oct. 28, 30.15 in. This indicates a rise of 0.44 in. in the 24 hr. preceding the explosion.

Another report stated, "The morning was particularly cold and windy."

Considering briefly the effect of weather conditions in the Royalton mine we find that, as the weight of the oxygen content of a cubic foot of air increases proportionately to the decrease in the absolute temperature of the air, a given space in the mine could contain a greater number of pounds of oxygen for the support of combustion in winter than in summer, and with the same number of revolutions of the fan per minute a materially larger quantity of air would be passing through the mine on a cold than on a hot day.

Influence of Outside Temperature to Facilitate Explosion

The effects of temperature on the manner of the flow of air in a mine are very marked. If the men in charge of the Royalton mine will select a place on the intake, say ¼ mile inby from the downcast shaft, and measure at convenient intervals the velocities of the air current at points near the roof and near the floor, they will find that with the outside temperature higher than that in the mine the velocity of the air will be greater at the roof than at the floor. Again, with the outside temperature below that of the mine it will be found that the reverse of this is true and that the greater the difference of temperature the greater will be the difference in these velocities.

This fact is important, because explosive combustion is determined in a large degree by the manner of the draft-action that brings the air and dust into contact with the flame. A noticeable difference is observed in the flame of a safety lamp when the air supply enters the lamp above instead of below the flame. In the mine the stronger dust-carrying draft near the floor, in winter, is most effective in producing explosive combustion as it impinges on the flame. The truth of this has been proved in a number of tests.

Effect of Barometric Changes

The fact that the barometer indicated a rise of nearly ½ in. in the 24 hr. preceding the Royalton explosion is rather important. An increase in atmospheric pressure is generally considered a protection against the occurrence of a gas explosion to the extent that it tends to diminish the outflow of gas from the strata, but considered in respect to the occurrence of a dust explosion a rising barometer should be looked upon as a sign of danger. The rise of the barometer at Royalton of nearly ½ in.

indicated that the weight of the oxygen content of that mine was increased about 1½ per cent.

At my place of residence in Iowa a sudden drop in temperature was noted during the night of Oct. 26, and a similar sharp change in temperature probably occurred at Royalton, for it was stated that the morning of Oct. 27 was "particularly cold and windy." Supposing this sudden change in weather conditions had the effect of lowering the mine temperature, say 5 deg., the weight of the oxygen content of the mine would then have been increased another 1 per cent. Now, if the presence of less than 1 per cent. of methane tends to increase the magnitude of dust ignition, surely an increase of more than 2 per cent. in the weight of oxygen per cubic foot of air cannot be without effect in the same respect. The French advice regarding the unraveling of mysterious social happenings is, "Look for the woman." The advice regarding the explanation of mystifying phenomena in connection with dust explosions might well be, Look to the air factor.

Position of Cannon in Testing Gallery

The British Explosions in Mines Committee stated that by placing the cannon 50 ft. *from* the closed end of the gallery better effects could be obtained than by placing the cannon right *at* the closed end; but the committee offered no explanation regarding the cause of the difference in these effects. Following this suggested advice we find that in the former case the air supply furnished by the counter-current could reach the flame from one direction and through one channel only. The supply of air being somewhat limited on that account, the initiation of explosive combustion was comparatively slow and uncertain. When the cannon was 50 ft. away from the face explosive combustion was more readily effected and of larger scope, because in addition to the air supply by the counter-current there was another air supply from the rear caused by the rebound of the momentarily compressed air between the cannon and the closed end of the gallery.

The Bruceton Mine-Explosion Tests

A number of so-called "preliminary tests" made in the Bruceton experimental mine failed to produce explosive combustion, although the kind, amount and disposition of the dust charge and the powder charge were the same as in other experiments in that mine that resulted in explosions. Apparently no attempt was made to locate the cause of the failures, and the matter was disposed of with the assumption that the range of dust suspension had probably not been extensive enough. Why should the investigators at Bruceton be satisfied with assumptions when they have the best facilities in the world to obtain conclusive proof? They could have controlled the extent of dust suspension as readily as they did control the firing of the shot. Had they done so, they would probably have found that the cause of the failures was not the insufficiency of dust suspension, but, as further investigation might have shown, the cause was probably insufficient draft and a counter-current that was too weak to propagate explosive combustion.

It has been said that the fact of the existence of a counter-current during the progress of explosion is of no practical value in supplying means for its prevention. Possibly this is true; but, nevertheless, the success of patented devices, as the Rice barrier for instance, depends on the action of the counter-current to drive the solid or liquid extinguishing material against and into the flame. The proof of the existence of the counter-current permits us to develop definitely and accurately the process of propagation of explosive combustion, and in that fact lies its greatest value, for it has been admitted that accurate knowledge of that process is essential in devising the right means of prevention.

More than three years ago the chief mining engineer of the Bureau of Mines made the following statement: "The principal object at the present time is to determine how and why coal dust explodes, in order that means of prevention and limitation may be suggested from the experiments, and be tried out subsequently." Surely, in the time that has elapsed some progress must have been made in this direction. If the process of explosive combustion has been discovered at Bruceton it should be made public without delay; if it has not been discovered it would be interesting to know what obstacles are in the way.

The general recognition of the fact that air and draft conditions largely control the initiation and propagation of explosive combustion will prove to be of greater value in preventing dust explosions than the application of any artificial remedy so far proposed, because the knowledge of the preponderating influence of the air factor will permit the men in charge of mills and mines to note the danger signs which, before having that knowledge, they were unable to see, and they will thus be better prepared to avert a threatening disaster.

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Kentucky Mining Institute

Several hundred of the leading coal operators of Kentucky were present in Pineville, Ky., on Friday and Saturday, May 14 and 15, at the first-aid field day and annual meeting of the Kentucky Mining Institute.

Much of the first day was devoted to field demonstrations, and about 250 of the early arrivals took an all-day jaunt through the fields of Bell and Harlan Counties. They inspected the plants and workings, stopping at Coxton, Ky., for lunch, where Kenneth U. Meguire, of Louisville, president of the Harlan Coal Mining Co., and John W. Williams, of Harlan, representing the Lick Branch Coal Co., were hosts.

Among the principal speakers were Frank H. Cassell, sales director of the Belknap Hardware & Manufacturing Co., of Louisville, who spoke on "The Growth of the Coal Industry in Eastern Kentucky and What This Means to Louisville Commercial and Manufacturing Interests," and William J. von Borries, who spoke on "The Coal Fields of Perry County." Other papers were: "Good Roads Legislation and Its Effects on Southeastern Kentucky," by Jos. F. Bosworth, Middlesboro, Ky.; "The Coals of Eastern Kentucky," by Frank Haas, Fairmont, W. Va.; "The Goodman Straight-Face Mining Machine," by H. H. Small, Chicago, Ill.; "The Coal Fields of Harlan County," by Walter R. Peck, Big Stone Gap, Va.

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A great deal of unnecessary wear in working parts of machinery could be avoided if the nature and application of lubricants were properly studied. Too much oil should never be used, and it should be the special care of the workman to see that it is uniformly distributed and regularly applied. One dry spot on a bearing causes heat, and cutting is bound to follow.

Driving Gangways in Anthracite Mines by Improved Method

By Charles C. Phelps*

SYNOPSIS—The substitution of electrically driven mine-car compressors and Jackhamer drills for drilling both coal and rock in place of hand augers and rock drills resulted in greater speed of driving as well as the saving of considerable time.

This article refers to the results obtained in mining anthracite coal by the use of Jackhamers and electrically driven mine-car compressors by one of the large coal-mining companies operating in the Scranton district of Pennsylvania. One of the collieries of this company was recently visited by the writer after the above-named equipment had been in service about seven months.

The mine-car compressors here employed are of the Ingersoll-Rand type, as described in the Dec. 12, 1914, issue of Coal Age, and the Jackhamers are of the Ingersoll-Rand "BCR-430" type, as described in the Apr. 3 and other issues. It will not be necessary, therefore, to go into a detailed description of either machine. A large number of these equipments are in use in the various mines of this company for drilling both coal and rock, also for cutting hitches for timbers.

Formerly hand coal augers were used for boring the coal, while Temple-Ingersoll electric-air drills as well as hammer and "jumper" steel were employed for the rock. Whereas two men were required for either machine or hand drilling, as formerly practiced at this mine, it now requires but one man to run a Jackhamer drill, as this machine is easy to operate and, owing to its lightness, may be moved from place to place almost as easily as a shovel or pick.

One feature of the Jackhamer that is particularly appreciated by the drill runner is the improvement in the ventilation at the face due to the air exhausting from the drill.

Although some of the holes are drilled downward, most of them are projected horizontally for blasting from the solid. Probably three out of every four holes are horizontal. The blast holes are drilled to a depth of 6 ft. with changes of steel varying by a foot. A set comprises lengths of 2½, 3½, 4½, 5½ and 6½ ft. of hollow hexagon steel with cross-bits of such size that the bottoming diameter permits of charging with ⅞-in. 50-per cent. gelatin powder. Holes were formerly put in to the same depth and the same strength powder was used, but the holes were of 1½ in. diameter.

With conditions as mentioned above, the rate of progress during one month was 225 ft. of gangway driven, working with one Jackhamer during two 8-hr. shifts per day and driving a section 14 ft. wide comprising 3 ft. of anthracite coal and 4 ft. of bottom sand-rock. The rate of drilling of the Jackhamer in hard coal was observed to be 3 min. for a 6-ft. hole, including changes of steel. It required 10 min. to drill a 6-ft. hole in the sand rock, also including the changing of steel.

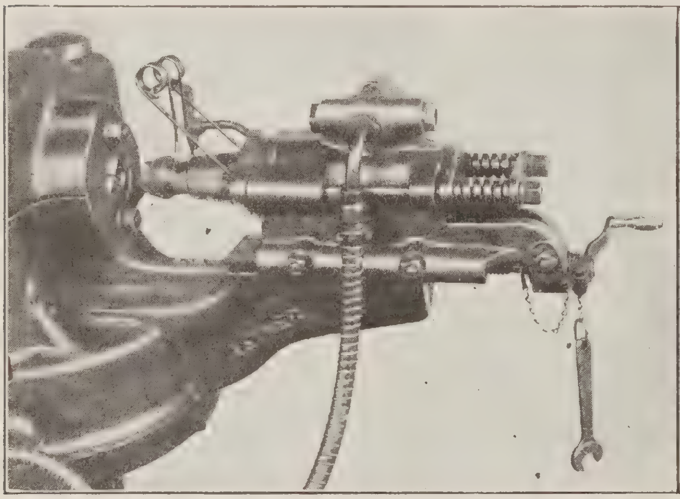

Fig. 1. The Dolly Sharpening a Drill Point

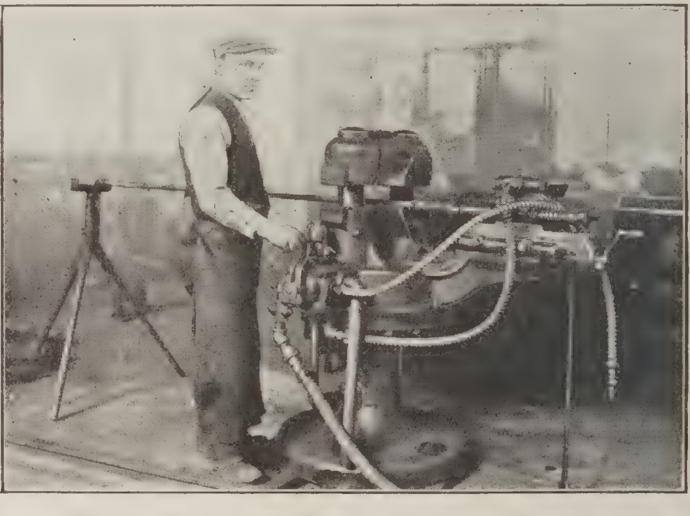

Fig. 2. General View of Leyner Sharpener

The mine-car compressor is transported over the regular mine tracks to a point near the face. It is then derailed and placed to one side and connected with the electric line supplying the trolley system. The drill-runner also cares for the mine-car compressor, no other attendant being required. In fact, about the only attention required by the compressor is an occasional filling of the water jacket, which is of the hopper reservoir type, and replenishment of lubricating oil. In other respects the compressor is entirely automatic in action, an automatic unloader keeping the pressure in the receiver at approximately 100 lb.

The 25-hp. motor which drives this compressor is started and stopped with an automatic motor starter, which is a new development, as hand-operated starters have been employed previously for starting machines in this service. The hand starter has the shortcoming that it depends for successful operation upon a certain amount

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*Ingersoll-Rand Co., 11 Broadway, New York City.

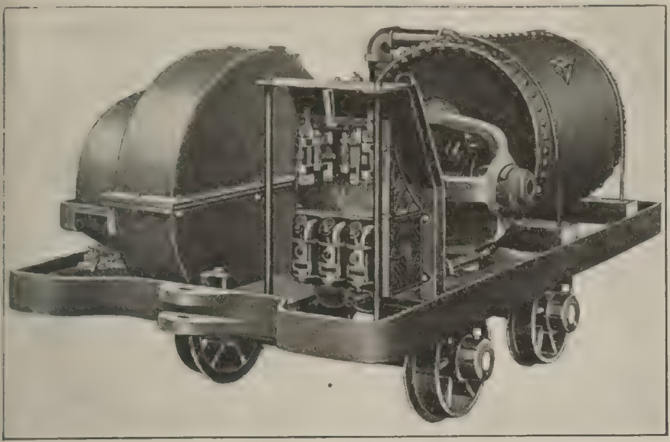

FIG. 3. THE MINE-CAR COMPRESSOR, SHOWING THE AUTOMATIC STARTER

of skill on the part of the operator, and as these equipments are often handled by inexperienced men, it is difficult to prevent abusing the motor when the hand type of starter is employed. With the automatic starter, the knife switch is closed in order to start up, whereupon the motor is smoothly but quickly accelerated to maximum speed. The knife switch is opened when the compressor is to be shut down.

The automatic motor starter may be seen in Fig. 3 showing the compressor car. It is known as a form AK made by the Electric Controller & Manufacturing Co. The copper contacts are protected by dirt-proof covers, which also help to exclude the corrosive gases that are present in coal mines. On account of the extremely wide range of voltage found in the average mine these starters are specially designed to keep the motor across the line, even when the voltage drops to a very low figure. An added advantage of using automatic starters lies in the fact that if power is interrupted the motor will be gradually restarted without further attention when current is again restored.

The steels used while making the observations referred to were sharpened by hand. Since that time several Leyner drill sharpeners have been purchased for the company's various mines. One of these is shown in Fig. 2. Three coal forges located near the sharpener are used for heating the steels. The bit is first inserted between the forming blocks, and the heavy cross-head forges the bit to approximate cross-section. It is then inserted in the dies in the center of the machine and the cross-head is lowered to grip the steel tightly. The dolly then reciprocates rapidly, striking the end of the bit a succession of light blows, compacting the metal and sharpening the bit.

FIG. 4. STARTING A HOLE

The sharpener is operated by compressed air, and its action is controlled entirely by the single lever shown in the illustration. After sharpening, the steel is reheated to a cherry red and hardened by dipping in a pail of water upon the surface of which floats about ½ in. of crude oil. The shanks are formed in the same machine and are hardened for a distance of about ¼ in. from the end.

By means of the Leyner sharpener the time required for sharpening steel is greatly decreased, giving the blacksmith more time for other duties. At the same time a much better and more uniform quality of work is obtained. The method of hardening described has proven satisfactory, resulting in very little broken steel.

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Decrease in Coal Production

Production of coal in the 24th bituminous district of Pennsylvania in 1914, as compared with production in the same district for 1913, is given by Nicholas Evans, inspector, as follows:

Names of Operators	Tons, 1913	Tons, 1914
Berwind-White Coal Mining Co.	3,841,715	3,351,406
Valley Smokeless Coal Co.	416,261	286,835
Scalp Level Coal Mining Co.	140,000	208,798
Lackawanna Coal & Coke Co.	341,222	189,989
Smokeless Coal Co.	113,581	125,054
Maple Ridge Coal Co.	75,418	122,311
Kiskiminetas Coal Mining Co.	96,320	117,601
Victor Coal Mining Co.	67,824	111,600
Lochrie Coal Co.	60,000	106,828
Loyalhanna Coal & Coke Co.	10,803	102,585
Ninevah Coal & Coke Co.	63,985	82,835
Morrellville Coal Mining Co.	.....	82,807
Bird Coal Co.	.....	81,524
Sunnyside Coal Mining Co.	137,194	69,743
Lacolle Coal Mining Co.	129,761	64,903
Shade Coal Mining Co.	143,512	59,584
Grazier Coal Mining Co.	.....	56,173
James Turnbull & Son	.....	49,131
Armerford Coal Mining Co.	21,019	40,533
Rummel Coal Co.	60,025	38,740
Arrow Coal Mining Co.	.....	37,250
A. J. Haws & Sons, Ltd.	17,888	35,388
Carmer Coal, Coke & Stone Co.	.....	29,889
Bolival Coal & Coke Co.	22,247	27,838
Shade Creek Coal Co.	.....	27,198
Climax Coal Co.	31,034	20,612
Fairfield Coal & Coke Co.	.....	19,227
Joas. Soisson Fire Brick Co.	14,704	16,732
Highland Coal Co.	13,706	14,901
W. G. S. Robertson	10,450	13,340
Cupp & Weller	.....	10,128
Conemaugh Valley Coal Mining Co.	78,902	.....
S. & C. Coal Co.	35,493	.....
C. O. Wilson	7,000	.....
Other operators	.....	3,700
	6,062,961	5,605,981

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C. E. Lesher Succeeds Mr. Parker

C. E. Lesher, associate geologist of the land-classification board of the United States Geological Survey, has been assigned by the director of the Survey to take charge of the work of compiling the statistics of coal production published in the annual volume, "Mineral Resources." This work has heretofore been directly under Edward W. Parker, whose resignation from the Geological Survey is effective July 1.

Mr. Lesher is a graduate of the Colorado School of Mines, and after his graduation was engaged in mining in British Columbia until 1910, when he went to the United States Geological Survey. Since then as a field geologist he has had experience in the coal fields of Montana, Colorado, Wyoming, North Dakota, Washington and Oregon. As a member of the land-classification board, his largest contribution has been in perfecting the scheme for the valuation of the public coal lands, in which it has been necessary to utilize a large amount of statistical data of various types.

Small Steam Turbines at Coal-Mine Power Plants

By R. M. Rush*

SYNOPSIS—Cost of power production at coal mines is seldom known accurately, with the result that machinery has often been installed which was highly extravagant in steam consumption. The steam turbine possesses many advantages over reciprocating engines where condensing water can be secured. In many instances mine water may be used for this purpose with excellent results.

The cost of producing power for the operation of coal mines has long been an unknown quantity with the average coal operator. He has felt that inasmuch as coal is cheap to him, a producer, the matter of power cost made little difference, and hence the class of apparatus used for power production was in many cases of the poorest type as regards economy.

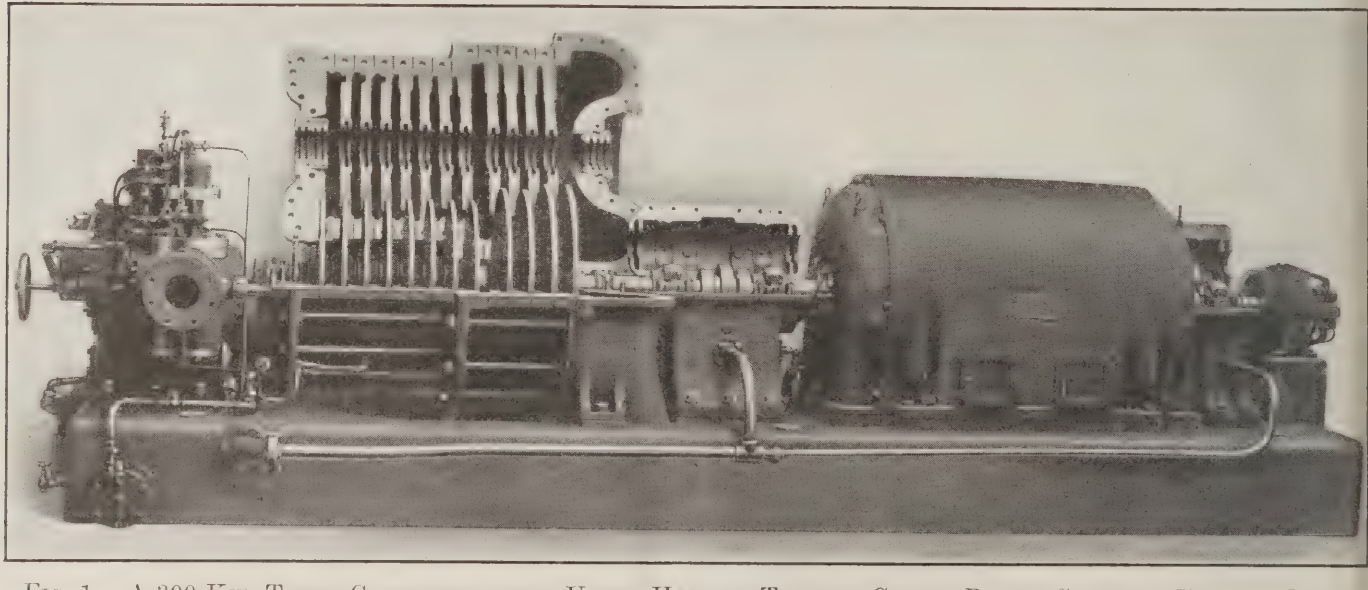

Fig. 1. A 300-Kw. Turbo-Generator with Upper Half of Turbine Casing Raised Showing Turbine Disks

Fire-tube boilers hand-fired and carrying low steam pressure and driving simple noncondensing engines were employed in nearly every instance. Often feed-water heaters were not employed. The question of reliability alone concerned the operator. With this state of affairs central-station power, generated by efficient condensing steam turbines with high-pressure boilers and automatic stokers, was usually able to show a saving over the inefficient noncondensing engine, and many coal operators adopted central-station power regardless of their own cheap fuel.

Owing to local conditions such as exceedingly bad boiler feed and a lack of condensing water, central-station power is often better for the producer than operating his own plant, but to compare this source of energy with inefficient apparatus is manifestly unfair.

With the advent of the small steam turbine the situation has been largely changed. A comparison of a modern, uptodate condensing turbine plant for operatio of a mine with the purchase of central-station power i nearly every instance is found to favor the local plant provided condensing water is available. It is the purpos of this article to tell of some interesting installations i coal mines where small steam turbines have bee employed; that is, turbines below 500 kw. that have bee installed for the economic generation of electric current

Fig. 1 is a photograph of one of two 300-kw. high-pressure condensing turbo-generators installed at th plant of W. J. Rainey, at Allison, Penn. These machine are designed for a steam pressure of 125 lb. and for 27 in. of vacuum, under which conditions the guarantee steam consumption per kilowatt-hour is about 22 lb Condensers of the barometric type are installed. These were guaranteed to produce 27 in. of vacuum, but were of such ample size that the vacuum actually obtained was approximately 29 in. all the time. This reduced the steam consumption of the turbine to about 20½ lb. per kw.-hr., or approximately 15 lb. per brake hp. per hr.

This compares favorably with the average noncondensing engine, the consumption of which is from 26 to 35 lb. per i.hp. per hr. The load curve of a steam turbine, furthermore, is practically flat, since the entire rotor revolves in a vacuum during periods of light load. A noncondensing engine, however, nearly doubles its steam consumption per brake horsepower-hour at light load. A coal-mine load is always fluctuating, and this fact alone places the steam turbine far ahead of the reciprocating engine for coal-mine service.

A Turbine Has Many Advantages

There are numerous other advantages possessed by uptodate steam turbines over the old-fashioned steam engines. A turbine requires no cylinder oil. This in itself is a considerable saving, but it also means that the

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*Kerr Turbine Co., Pittsburgh, Penn.

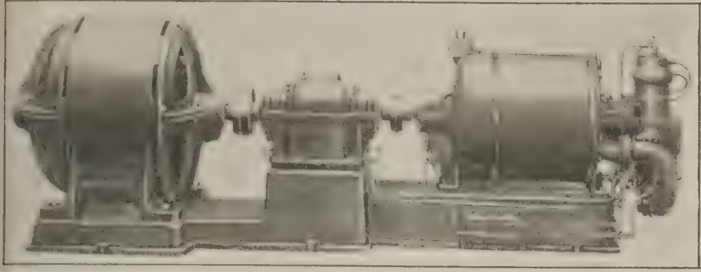

Fig. 2. A 200-Kw. 550-Volt D. C. Turbo-Generator for 2-Lb. Inlet Pressure and 27 In. of Vacuum

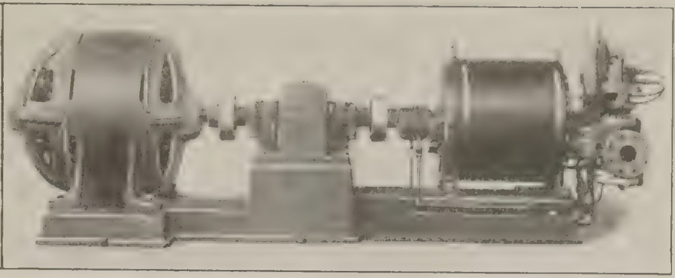

Fig. 3. A 75-Kw., Geared Generating Unit Installed near Brownsville, Penn.

condensate can be returned to the boilers free from oil and that oil is eliminated in the feed-water heater. The repairs on a steam turbine are considerably less than on a steam engine for the reason that there are no rubbing parts in the turbine. Oil under pressure is circulated to the bearings, cooled and recirculated, so that often a barrel of lubricant will last for a year. Leakage loss alone renders oil renewal necessary.

The question of a condenser for the production of vacuum has been a bugaboo to the average coal operator. At the plant of W. J. Rainey, referred to, the water for condensing purposes is typical of the average coal mine. It is highly impregnated with sulphuric acid and utterly unfit for boiler feeding, yet with the type of condenser employed there has been no trouble whatever with this part of the equipment. The barometric condensers here installed are constructed with the distributing cones made of monel metal, which is highly acid-resisting. Water flows through the condenser at a low velocity, so that erosion is practically negligible.

The pumps which supply the water to the condensers are made of acid-resisting bronze. They are of the double-suction centrifugal type. The head is comparatively low, so that wear on the pumps is slight. The water discharges from the condenser by gravity, so that there is no withdrawal pump to deteriorate as is the case with the low-head jet condenser.

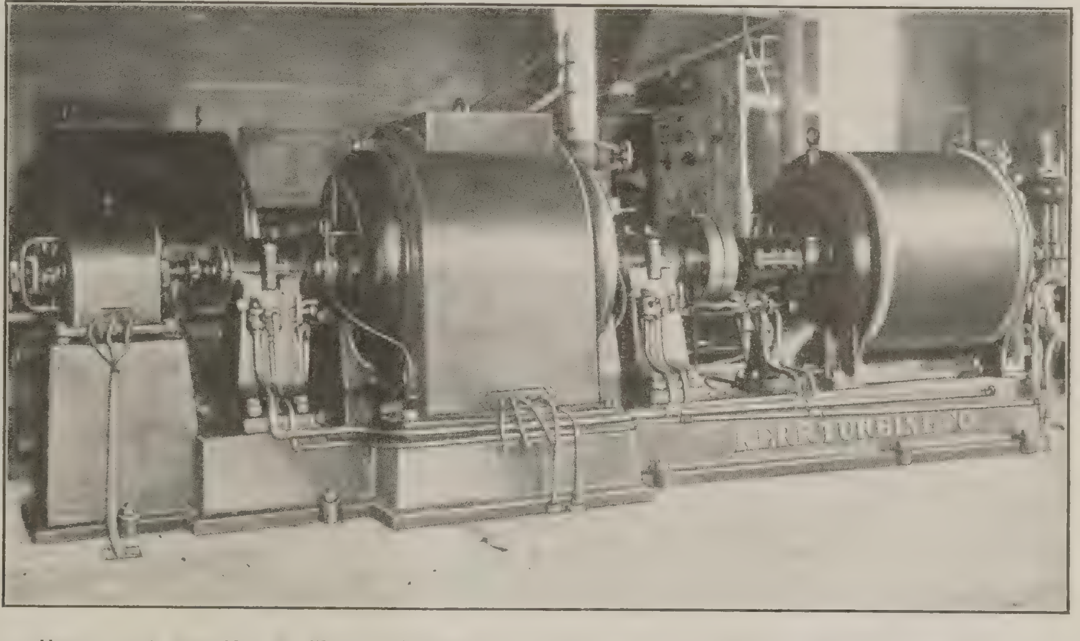

Fig. 4. A 625-Kv.-A. Turbo-Alternator Installed at North Kemmerer, Wyo.

In this plant, as stated, the water conditions are about as bad as exist at any mine, yet the vacuum obtained is from 28 to 29 in., and everything points to freedom from trouble owing to acid. At this plant water for the boiler feed is obtained from a reservoir in the hills, so that there is no need of returning the condensate to the boilers, and hence a surface condenser was not considered in this installation.

A Low-Pressure Turbine and Condensing Plant

At another plant in the same vicinity, water for boiler feed is not readily available. At this plant, there are a number of noncondensing engines in operation, and an extension is planned which requires doubling the electrical equipment. This could be obtained by the installation of noncondensing engines and more boilers, but it is proposed to gather the exhaust steam from the existing noncondensing generator engines, from the fan engine, the hoist engine and the pumps into a main header and use this in a low-pressure steam turbine. There is sufficient exhaust steam to double the present electrical output without additional boiler equipment.

As has been stated, considerable trouble has been caused in the boilers owing to bad feed water, and hence it is proposed to install a condenser of the surface type large enough to condense all the steam at this plant and return it as pure distilled water to the boilers. This means that a condenser with copper tubes properly tinned to resist corrosion must be installed. All the steam that is needed will be utilized through the exhaust turbines, the remainder flowing through a special valve around the machine into the condenser. This installation, therefore, will double the present power output with the same coal consumption and eliminate boiler trouble.

At the plant of the Westmoreland Coal Co. a somewhat similar installation has been made except that a condenser of the jet type was used. Water from the mine pumps highly impregnated with acid is discharged to a cast-iron standpipe made up of old pump cylinders, overflowing this to a jet condenser. In this plant 200 kw. of power was produced from exhaust steam, and it was possible to shut down two high-pressure boilers with a resultant large saving in coal. This condenser worked out satisfactorily, except for the fact that the high water velocity through the nozzles caused considerable erosion and corrosion.

Additional installations are now being made in which the barometric type of condenser will be employed. The lower water velocities of these condensers will probably eliminate corrosive troubles. The condensers will be wood lined so that the acid water cannot come in contact with the metal of which the condenser is made.

The fact that power can be produced from exhaust steam is one which is often overlooked by coal operators. The only thing necessary is a sufficient supply of condensing water, and when this can be obtained from the mine water (which has to be pumped away anyway), it is a decided mistake to continue installing high-pressure boilers and noncondensing engines for increased power requirements.

The reliability of present-day steam turbines is evidenced by their continued purchase after initial installation. For instance, the Kemmerer Coal Co., North Kemmerer, Wyo., installed in 1910 a 150-kw. turbo-alternator, built by the Kerr Turbine Co., Wellsville, N. Y. In 1911 a 250-kw. unit was purchased, while in 1913 a 625-kv.-a. machine was also purchased.

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Extracts from a Superintendent's Diary

The curse of gold—it shows its color even in a mining town. To-day the county sheriff came into our camp with a warrant calling for the arrest of John Stewart, and as he left with John Stewart in his custody probably not a man, woman or child in the camp resented his mission. And yet not more than three years ago John Stewart was one of the most popular young men of our community and his popularity was merited.

John came into our camp about five years ago. He had been employed in our company's general office as an accountant and was sent out to take a check clerk's place temporarily. The temporary position developed into a permanent one because the check clerk finally died and John accepted the vacancy.

Being city bred he was surprised at the way our citizens allowed their earnings to slip through their fingers and how then in a few days they would agree to any kind of terms in order to obtain small loans necessary to tide them over until the next payday.

In time the novelty of seeing men pour their earnings into a sieve, as it were, wore away, and one day John awoke to the fact that here were wonderful possibilities. He got his cue from a young fellow who came up to the check window to draw a check, but had to be refused because his earnings had been overdrawn. The man begged John to make him a small loan and volunteered to repay at the rate of two for one on the following payday. John hesitated but recalling that this was done every day, finally consented. After that he hesitated less and less, and in a few months his slight capital suggested astonishing possibilities.

Soon he got to a point where he not only took all loans offered, but even suggested them, and then in a short time he began to invent ways and means of encouraging his associates' extravagances, having in mind the inevitable personal profit that would result. And during all this time he was well within the law, was popular with most of his associates and was considered a valuable employee by his superiors.

One must question if he could tell when he began to have fear for the law or found it necessary to doubt the sincerity of his associates, but once fully convinced that such was the case he became a changed man and his easy temper and suavity gave way to austerity and moroseness.

Then it was that the lust for gold became a matter of life and death with him, and one by one all of the ties that bound him to friends and to ideals were loosed by the vision that had intoxicated his brain. When the inevitable crash did come, he was left dazed and friendless like a lone survivor from a wrecked ship.

The men who induced him to try his luck on the stock exchange were indirectly responsible for his downfall, since he tried to cover his losses there by a forgery, but they never saw him and are entirely ignorant of his fate. Often, no doubt, he will curse them mightily, and he in turn will be denounced just as often by the victims he left behind in our camp. But it is doubtful if he or a single one of his victims will associate his undoing with the chance opportunity that overcame his prejudice against usury and seemed to offer the way to riches.

If I keep on moralizing, I'll have to take up preaching.

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Decreased Receipts of Coal in Brazil

From a steadily increasing importation of coal through a period of years prior to 1914 there was a marked decline during last year, or a total importation to the value of $12,209,561 as compared with $19,505,066 in 1913, says Consul General A. L. M. Gottschalk in a supplement to *Commerce Reports*. The coal trade of Brazil is shared between Great Britain and the United States, and although Great Britain still furnishes by far the bulk of the local supply ($16,670,780, or 85 per cent. of the total in 1913), the receipts of Cardiff and Newcastle coal declined in 1914 to $9,950,795, while the imports from the United States (chiefly Pocahontas) increased to $2,242,651 in 1914 as compared with $2,162,098 the preceding year.

The gradual introduction of oil (and in some cases wood) fuel in some of the Brazilian railroads met the scarcity of coal here brought about by embargoes, scarcity of bottoms and the high freight and insurance rates of the war. But there is here an important market in which American exporters should have a greater share during the present stringency.

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Record Haul with One Mule

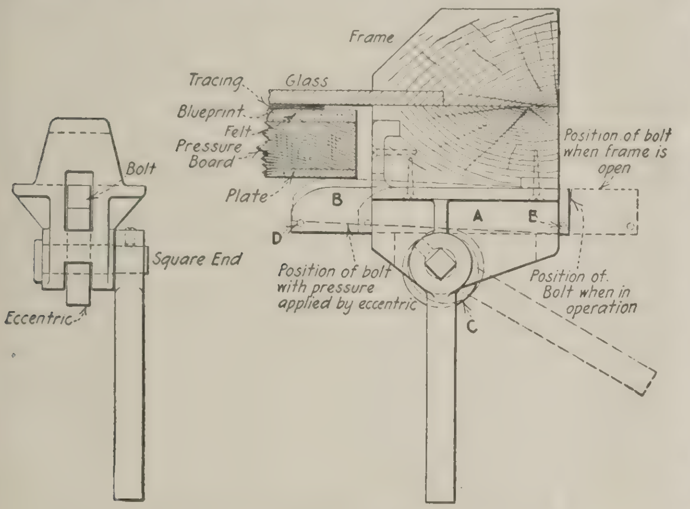
On May 18, 1915, Lindsey Shorts, a mule driver in No. 4 mine of the West Virginia-Pittsburgh Coal Co., Wellsburgh, W. Va., gathered 152 cars of coal and rock with a single mule from the rooms and entries and delivered them to a parting.

The minimum distance on this haul was 1200 ft. and the maximum distance 2500 ft. The cars were of 2-ton capacity and were hauled in an 8-hr. day. In this district about 40 to 50 cars are considered a day's work for a single mule; the haulage of 152 cars is the best I have ever seen during this time.

Clamp for Blueprint Frame

F. J. Hibberd in the *American Machinist* describes a clamp for blueprint frames for use in those drafting-rooms where the electric blueprinting machine has not been introduced, but where the old-style sun frame still exists. There are many devices used for clamping the pressure board down on the back of the frame so as to give the necessary close contact between the tracing and the glass. The common door-bolt, which is the device generally used, is a most unsatisfactory means of securing this contact.

The illustration shows an improved method. It is composed of a brass bracket *A,* which is fastened by screws to the side of the frame. It has a sliding piece *B,* which can be moved in and out by hand like a "bolt" and is so designated in the illustration.


Frame
Tracing
Glass
Blueprint
Felt
Pressure Board
Bolt
Plate
B
A
E
D
Position of bolt when frame is open
Square End
Position of bolt with pressure applied by eccentric
Position of Bolt when in operation
C
Eccentric

DETAILS OF BLUEPRINT CLAMP

Underneath this bolt is an eccentric disk *C,* which is fastened to a pin and has a hand lever fitted in its square end. When the bolt is shot into place, the lever is pulled over to the right, as shown by the dotted lines, and the eccentric disk forces the bolt up in the direction of the pressure board, thereby pressing the tracing against the glass of the frame. There are pegs, *D* and *E,* to limit the movement of the bolt. Of course in actual use the whole appliance is reversed and so remains till the clamping is complete.

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A Practical and Convenient Mine Stopping

By Ralph W. Mayer*

A mine in which the pillars are taking weight from the overburden is likely to have its concrete stoppings crushed or cracked, rendering them worthless.

Squared timbers cut about 2 ft. long and of any convenient dimensions, usually about 4 in. square, stacked up like brick lengthwise with the crosscut and with a little sand or cement laid between the blocks, make a stopping that becomes more compact the tighter it is crushed together by the weight of the overburden. Burlap or calking and wedges should be tightly driven between the blocks and the ribs and roof.

Props which have been pulled out of the gob and which are too short to be used a second time in the rooms can be utilized instead of the squared timbers, piling them like cordwood in the crosscut, with sand or cement between them, and tightly wedging them in place. A coating of cement or mortar over the end of the stopping will prevent air from leaking through any small cracks which may exist before the timbers and sand get crushed together.

Forty-penny spikes driven into the ends of the props or squared timbers before the cement is applied will help to hold the coating of cement from falling off.

A stopping which may possibly be exposed to the heat of a mine fire and the crushing weight of the overburden and is to be built in a wide opening such as an entry can be built double. The inside stopping is made of 1x12-in. boards nailed to props wedged between the floor and roof.

The outside stopping is set back in the entry 6 to 10 ft. from the inside stopping, the distance depending upon the height of the coal seam. It is built of 12x12-in. squared timbers laid across the entry and walled up one on top of the other. Hitches or channels are cut in the floor, roof and ribs to receive the timbers. A thin layer of cement or mortar is put between the timbers and at all the joints.

The space between the two stoppings is packed tight with fine dirt as the outside stopping is built up, extra care being taken to pack the dirt tight up against the roof before the outside stopping is sealed. A coating of cement or mortar is spread over the surface of the outside stopping to close any leaks of air that might possibly exist.

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*Roslyn, Wash.

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Summer Meeting of the Rocky Mountain Coal Mining Institute

The summer meeting of the Rocky Mountain Coal Mining Institute will be held June 8-10 at Trinidad, Colo. E. H. Weitzel is president and F. W. Whiteside is secretary-treasurer. The committee on arrangements, consisting of W. F. Murray, J. P. Thomas and M. O. Danford, has prepared the following program:

June 8, Tuesday—10 a.m., opening at West Opera House; music; address of welcome by Mayor D. L. Taylor; addresses by leading citizens; music; regular order of business; obituary of deceased members. 2 p.m., paper on "Geology of Trinidad Coal Field," by R. C. Hills; discussion of paper. 8 p.m., moving-picture show at West Opera House, consisting of five reels of pictures from the Bureau of Mines.

June 9, Wednesday—7:30 a.m., special train leaving Santa Fé depot on the Colorado & Wyoming R.R. for Cokedale, Segundo, Primero and other points of interest; box picnic at Tercio. Prize contest in the evening, under the auspices of the Eagles.

June 10, Thursday—9:30 a.m., opening meeting at West Opera House; music; paper on "Use of Electric Safety Lamps," by A. L. Thompson; discussion of paper; paper on "Social Welfare Work," by David Griffiths; discussion of paper. 1:30 p.m., special train over Colorado & Southeastern R.R. to Ludlow, Hastings and Delagua. 9 p.m., banquet at Cardenas Hotel.

Special entertainment for the visiting ladies has been provided as follows:

June 8, Tuesday—2 p.m., reception and cards at the Country Club. 9:30 p.m., after the picture show there will be an open-house reception and dance in the ballroom under the West Opera House; refreshments will be served.

June 9, Wednesday—Special trip to Tercio; interesting contest at night.

June 10, Thursday—9 a.m., automobile trip to top of Raton Pass, where lunch will be served. 1:30 p.m., special trip to Ludlow, Hastings and Delagua. 9 p.m., banquet, cards and dancing at the Masonic Temple reception rooms.

The Labor Situation

SYNOPSIS—The examinations of John D. Rockefeller, Jr., L. M. Bowers, E. S. Gaddis and D. S. McCorkle before the Industrial Relations Commission continue the interest in the Colorado situation.

Mother Jones appeared before the Industrial Relations Commission at Washington, D. C., on May 13 and told her story in her own way without any questions. It would be wrong to heckle anyone with so benign a past. Chairman Walsh found nothing to question. The difference between his attitude toward Mother Jones and J. D. Rockefeller, Jr., was clear evidence of his purpose to make political capital out of the investigation.

Her characteristic reply to the inquiry as to her place of residence is worth repeating: "I live wherever there is a good fight against wrong. I live wherever the workers are fighting the robbers." She was allowed to reveal a selected part of her past, and even went back to 1877, when she aided in the Pennsylvania R.R. strike.

Two Employees, on Dismissal, Condemn the Fuel Company

Eugene S. Gaddis, a Methodist minister, testified on May 19 that he had been in the employ of the Colorado Fuel & Iron Co as sociological superintendent. He said he was dismissed last February because he and a superior official of the company were not in accord, and he had called to the attention of John D. Rockefeller, Jr., and the officials of the company many abuses and conditions of hardship of which the miners complained.

He said he had not informed the public of the injustices because he believed that only by silence could he do good in his work. He declared that the state authorities did not enforce the laws and that the company dominated politics, the justices of the peace being usually company employees. The company controlled the schools and churches, and by systematic oppression drove the men to strike in self-defense.

R. S. McCorkle, a Presbyterian officiating at the Sunrise, Wyo., church, of which we illustrated the interior and exterior in our issue of May 15, stated that he was instructed not to inform the employees that the company maintained the church. He stated that he urged that this be made public. It must have been a profound secret known to 99 per cent. and surmised by the other 1 per cent. His sympathies were with the strikers. When asked why the miners bought guns 10 days before the strike, he declared that the company at that time had supplied itself with machine guns.

Chairman Walsh Is Subjected to Censure

When on the following day John D. Rockefeller, Jr., was examined, the inquiries of Frank P. Walsh were so vindictive that it is alleged his fellow-commissioners privately took him to task. Mr. Rockefeller's remarks mostly declared his lack of knowledge of the facts relating to the Colorado trouble. He stated that he had been intending to visit the mines, but unforeseen business duties prevented.

The chairman strenuously endeavored to have Mr. Rockefeller promise to do certain things, some of which were unlawful, if he thought, on investigation, that injustice had been done to J. R. Lawson. Mr. Rockefeller declared that the company had taken no part in securing Lawson's conviction for murder and that he did not propose to try to overawe the courts.

L. N. Bowers, the treasurer of the company, declared that the strikers had been given an opportunity to meet the representatives of the operators; that the courts were not controlled by the coal companies; that the first violence occurred when the strikers killed a camp marshal; that Sheriff Jefferson Farr, "the king of Huerfano County," was at one time connected with the Colorado Fuel & Iron Co.—in fact, he was a part of it.

He admitted that in the early days an officer of the concern, now dead, organized a partnership between the company and Farr for the conduct of saloons in the mining camps, which were used as employment bureaus. Bowers declared he fought the system of which Farr was the head and that he favored state prohibition as a means of eliminating the control of politicians.

On May 24 the jury before which Robert Uhlich, a union leader, was tried for the murder of Mack Powell, a cowboy, returned a verdict of not guilty on the first ballot. The cowboy was killed during a fight between mine guards and striking coal miners near Ludlow Colo., on Oct. 9, 1913, during the Colorado coal strike. The evidence presented by the state endeavored to show that the Ludlow colonists were armed and led by Uhlich when Powell was killed by the striking coal miners, but seven witnesses swore that Uhlich was in Trinidad on the day of the battle.

Eastern Ohio Goes Back to Work

The representatives of the operators and miners in the eastern Ohio district met on May 22 and formally signed the wage agreement. The right of the pit committee to leave its work and investigate grievances at its pleasure gave trouble up to the last.

A number of plants in the eastern Ohio district have already resumed operations. They are mines Nos. 1 and 3 of the Rail & River Coal Co., the Crescent mine of the Lorain Coal & Dock Co., the mines of the Glenns Run Coal Co., the Morris-Poston Coal Co., the Hutchinson Coal Co. and the Youghiogheny & Ohio Coal Co.

The work of preparing the other mines for operation is progressing satisfactorily. According to J. M. Roan, the Ohio "mine inspector," most of the mines in the eastern Ohio district are in much better shape than might be expected after an idleness of 13 months.

The Gallagher Amendment Still Unsigned

It is announced that Governor Willis will have until May 27 either to approve or veto the Gallagher amendment to the Ohio anti-screen law which was passed by both houses of the Ohio Legislature. Labor leaders are urging the Governor to veto the amendment, while eastern Ohio operators are advocating its approval. The long time provided for the consideration of the bill is due to a technical error in clerical work, which required the amendment to be returned to the Senate for correction.

Announcement was made last week that 200 miners at the West Wheeling mine of the Lorain Coal & Dock Co. struck because of the employment of nonunion miners. The truth of the matter is that 17 men employed at the West Wheeling mine of the West Wheeling Coal Co., a coöperative concern, refused to work until certain men were discharged. The Lorain Coal & Dock Co. was not involved except as owner of the mine, which is operated by the West Wheeling Coal Co. under lease. The miners resent working with men who worked at nonunion mines during the strike.

Anthracite Button and Grievance Strikes

The anthracite region is troubled with small strikes. On May 19 at the Luke Fidler colliery of the Susquehanna Coal Co. 800 employees went on strike because some of the other men were not members of the union. On the same day strikes of the mine workers at Maxwell No. 20 colliery to secure the settlement of alleged grievances of two driver boys and at No. 4 slope of the Stanton colliery for the abolition of the new checking system were settled, but button strikes occurred at the Lance No. 11, Parrish and Hollenback collieries on that day. These mines all belong to the Lehigh & Wilkes-Barre Coal Co. The union is trying to hold the men to the terms of their agreement, which forbids strikes.

The Anthracite Conciliation Board on May 17 heard the grievances of the employees of the Lehigh Valley Coal Co. and of the workmen at the Shenandoah City colliery of the Philadelphia & Reading Coal & Iron Co. The men complained that those corporations had increased the size of the cars at the mines. The engineers of the Susquehanna Coal Co. also submitted their wage grievances.

COMING MEETINGS

M. O. I. Coal Association annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland.

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N Zern, Morgantown, W. Va.

Mine Inspectors' Institute of the U. S. A. will hold its annual meeting June 8, 9, 10 and 11, 1915, at St. Louis, Mo. Secretary, J. W. Paul, Pittsburgh, Penn.

American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Mine Safety Association will hold the following meets: June 1, Moberly, Mo.; June 5, Des Moines, Iowa; July 2-3, Big Stone Gap, Va.; July 23-24, Billings, Mont. Secretary, H. M. Wilson, 40th and Butler St., Pittsburgh, Penn.

New Apparatus and Equipment

Believing that one of the greatest services that a journal such as Coal Age *can render its readers is to acquaint them with new and improved equipment which may be employed directly or indirectly to the benefit of the coal-producing industry, this department is inaugurated. For the present it will appear in the second and fourth issues of each month. We shall therefore be glad to receive from builders, manufacturers or dealers brief descriptions of new or improved pieces of apparatus in which they are interested, the use of which will tend toward better results in or the economic development of the fuel industry or any of its numerous ramifications.*

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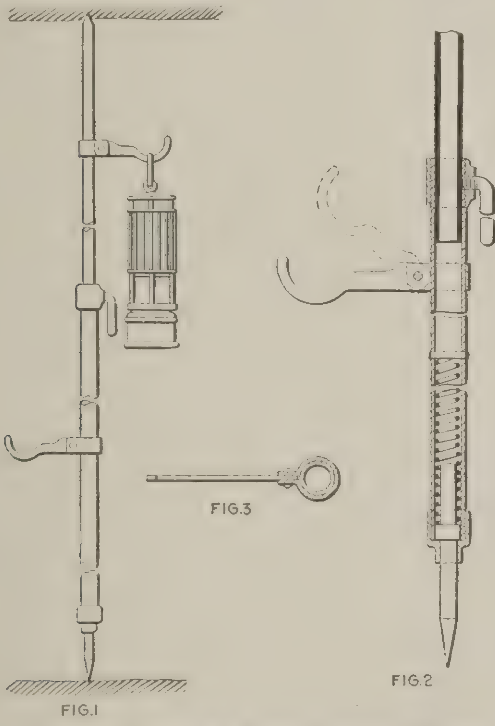
New Support for Safety Lamps

In the mining of coal where safety lamps must be used the miner is often compelled to work in a position where light is needed near the roof of the mine. Heretofore he has either placed the lamp on the floor, where it was liable to be knocked over and broken, or has driven a nail in one of the posts, or even into the coal of the rib, from which he suspended the lamp. Even under these conditions, he often failed to get the lamp in a position where its light would be most effective.



Details of the New Safety-Lamp Support

To obviate these difficulties, Charles J. Maher, of Manor, Penn., has invented a safety lamp support. As may be seen in the accompanying drawing, this consists of two pipes, one telescoping within the other and each provided with a sharp point. The lower point or foot of the support is so arranged as to be under the tension of a spring when forced against the mine floor. The upper section may then be pushed against the roof and clamped in position, when the spring-actuated foot will hold the support firmly in place.

Two lamp hooks are provided, one upon the lower section of the support, which is the larger in diameter, and the other upon the upper, or smaller, section. These are so arranged that by folding up the hook proper the yoke which attaches it to the support may be slipped up or down throughout the vertical length of the section upon which it is mounted. Lowering the hook and attaching the lamp holds this hook securely in position.

This support is light and easily portable and will hold a safety lamp in almost any position between the floor and roof of the mine. The support may therefore be so placed and the height of the lamp so adjusted as to give light at the point most needed in the miner's work.

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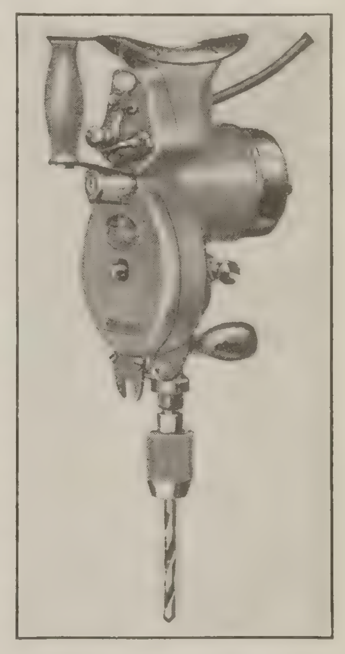
A New Line of Portable Electric Drills

The "Temco" line of portable electric drills recently placed on the market by the Western Electric Co. are especially designed to give long and efficient service under severe conditions and hard usage and are essentially all-around tools.

These electric drills have the general shape of an ordinary breast drill, are compact in design and light in weight. The weight is well balanced, making handling easy, while the electric switch is conveniently placed near the handle.

A special feature is the ease with which the motor may be reversed when the drill sticks. Whether working at high or low speed, a touch of the switch reverses the motor, loosening the drill or sending it ahead as required. These drills will also tap holes, the reversing feature being here of great advantage.



One of the New Portable Drills

Temco drills are particularly advantageous when holes are to be drilled or tapped where the material cannot be carried to a drill press. The tool is then carried to the job. They are also handy for working inside objects, or upside down and in other inconvenient places.

The motors are built to operate on either direct or alternating current at standard voltages. The two principal sizes are model B and model C, the former having one and the latter two motors, making it especially adapted to the hardest kind of work.

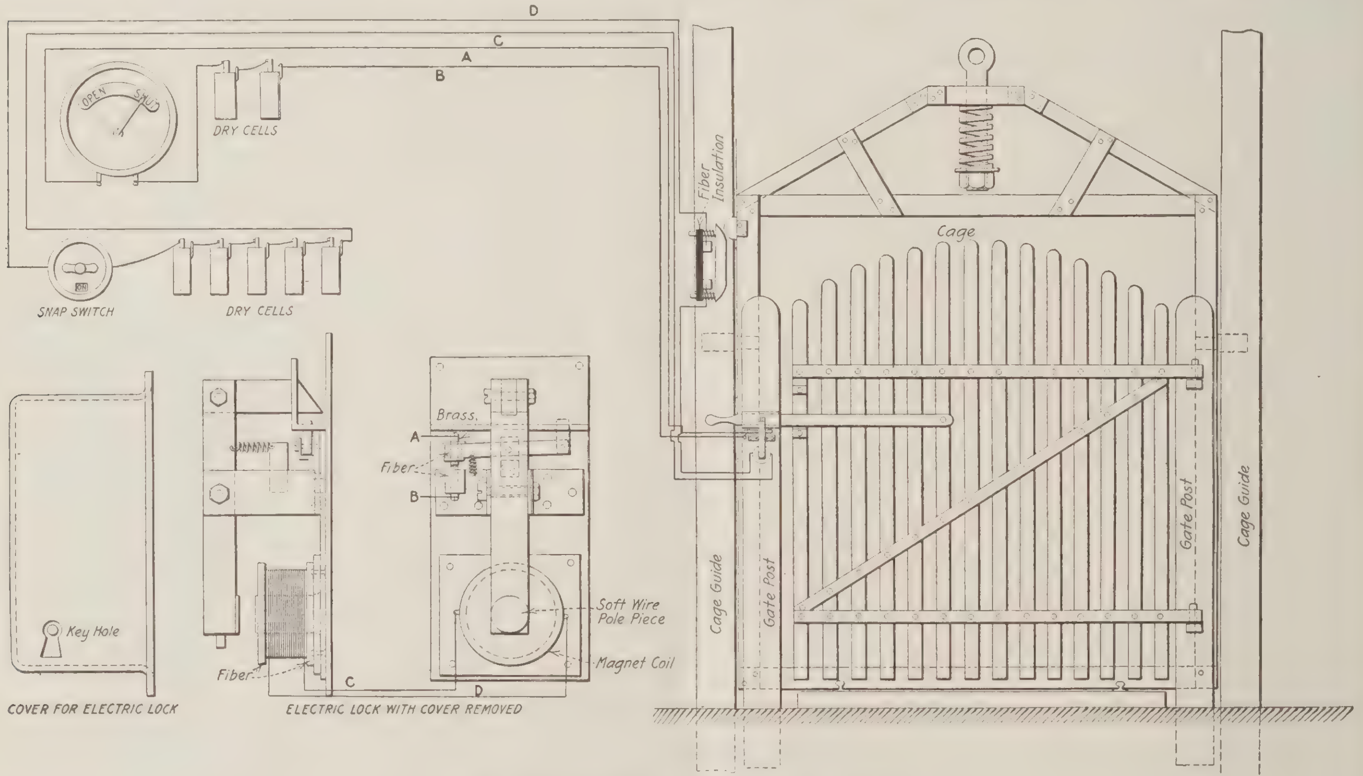
The motors are of the high-speed commutator type, having forged nickel-steel shafts and built-up cores of magnetic steel. The commutator consists of hard-drawn copper bars of ample carrying capacity forced together under high pressure and insulated by selected mica.

Model B drill has a capacity up to and including 3/8 in. in steel, cast iron or similar substance and weighs 12 lb. complete. Model C has a capacity of 1/2 in. in steel, has two speeds and weighs without the chuck about 19 lb.

The Western Electric Temco line of tools also includes a tool-post grinder, a valve grinder for automobile engines and a buffer and polisher.

Automatic Safety Lock and Dial Indicator

An automatic safety lock for shaft gates, together with a dial indicator showing whether the gate is open or closed, has been invented by W. A. Williams, of Barton, Ohio. The object of this device is to automatically lock and unlock the gates of elevator shafts, particularly those on the hoisting shafts of coal mines, during the time that men are being hoisted or lowered.



THE AUTOMATIC LOCK AND INDICATOR

The accompanying drawing shows a cage at the shaft landing, and a gate hinged to a post. On the gate a bar is pivoted which extends through a keeper and is movable vertically at one end. On the face of the adjacent gatepost is a plate with a suitable catch for holding the locking bar.

An electromagnet is introduced into the locking mechanism in such a way that when it is energized a bolt is withdrawn from the lock, allowing the locking bar to be swung out of contact with its catch, thus permitting the gate to be opened.

The coils of this electromagnet are included in and form a part of an open electric circuit, one side of which leads from a source of electric energy while in the other is a bridge-piece or switch. When the cage is approaching the position at the landing, a contact mounted upon it closes the circuit, thus energizing the magnet, withdrawing the bolt in the lock and allowing the locking bar to be elevated. If the cage is but slightly moved, however, the contact is broken and the locking bar cannot be moved.

A snap switch is also introduced into the circuit whereby the latter may be broken, rendering the latch bolt inoperative so that the gate is held in a closed and locked position. This snap switch may be located at any convenient point, usually in the engine room.

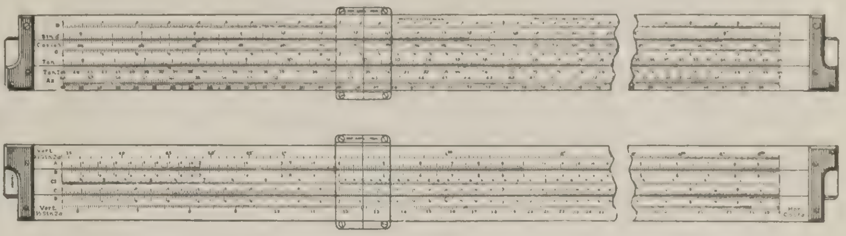
The electric lock is provided with a cover and so arranged that the introduction of a suitable key will open the lock independently of the electric circuit. This key of course permits of the gate being opened when the cage is not at the landing. It should be carried by some person in authority so that the gate may not be opened and left open by some irresponsible individual.

In the engine room a dial indicator is placed which shows at all times the movement of the latch bar through suitable electrical connections. When the latch bar is disengaged from the locking mechanism, the dial stands at the open position, while when the gate is closed and the latch bar dropped into its place, the dial stands at shut position. Thus whenever the engineer receives a signal to either hoist or lower the cage, he may know at all times whether the gate is open or closed and locked.

A New Surveyors' Slide-Rule

The fact that all astronomic data essential to surveying, such as azimuth, time, latitude, etc., can be ascertained by means of an ordinary transit with vertical circle, but without solar attachment, is seldom utilized in this country. The chief reason for this is the difficulty of computing in the field by spherical trigonometry the result of the observation.

The Keuffel & Esser Co., of New York, has recently placed on the market a surveyor's slide-rule which entirely eliminates this difficulty by reducing the hitherto complicated calculation to mechanical operation, thereby rendering the method of field astronomy with the engineers' transit extremely simple and practical.



FRONT AND BACK OF THE SURVEYORS' SLIDE-RULE

The new rule, which is 20 in. long, of the duplex type, having a double face, has been evolved to meet the requirements of the modern surveyor that demand that it shall be fully commensurate in accuracy with the standard transit, reading to one minute of arc. The scales are conveniently arranged for handling all problems arising in the field, while the length of the rule permits of fine subdivisions on the trigonometric scales, and consequently the necessary accuracy is easily attainable.

One face of the rule is arranged for the determination of the meridian by direct solar observation and solves the formula

$$Cos\ A_z = \frac{\cos h \cos l}{\sin d} - \tan h \tan l$$

with only three settings of the slide and the use of the runner or indicator. This face also has the sine and cosine scale used in computing the latitudes and departures of courses.

This side of the scale has been provided with these features: The regular D-scale; the sine D-scale from 2° 22′ to 24° for declination; the cosine L- and H-scale from 0° to 84° 15′ for latitude and altitude respectively; the regular C-scale; the tangent scale from 5° 43′ to 45°; and the tangent scale inverted from 20° 50′ to 75°; the azimuth scale (which is one of natural cosines) for reading azimuth or cosine bearings for angles from 0° to 60° referred to an adjacent scale of equal parts.

The other face of the rule has the usual scales A, B, C1, C and D for all general numerical calculating, as well as two stadia scales for computing horizontal distances and vertical heights.

This rule, 20 in. long, with "frameless" glass indicator, in case with directions is catalogued at $18.

Legal Department

Validity of Mining Laws

By A. L. H. Street*

The chapter of the Kansas Coal Mine Law which requires operators to maintain bathing facilities for use of their miners on leaving work is sustained as being a valid regulation in a decision recently handed down by the state supreme court (State vs. Reaser, 145 Pacific Reporter 838).

The constitutionality of the law was questioned on the ground that the regulation involves a discrimination against the coal-mining industry, in that operators of lead, zinc, gypsum and salt mines are not subject to the requirement. But the supreme court holds that coal mines constitute a sufficiently broad class to warrant the regulation. Part of the opinion reads:

"The determination of the necessity and wisdom of a police regulation rests, in the first instance, upon the Legislature and if there be reasonable grounds for exercising such power, the court should not interfere, although its judgment might not fully concur with that of the Legislature."

The court assigns as justification for the law the facts that the temperature in mines, the dampness of the atmosphere, and other conditions of mine work render it a great protection to the health of miners that the requirements of the act be observed. "The health of the employee is a matter of concern not only to himself but to the employer and the public as well."

As sustaining the decision, the supreme court refers to cases wherein similar laws have been upheld in other states, and to the following statement made by the United States Supreme Court:

"The regulation of mines and miners, their hours of labor, and the precautions that shall be taken to insure their safety, health and comfort, are so obviously within the police power of the several states that no citation of authority is necessary to vindicate the general principle."

* * *

Rupture as Subject of Compensation Award—The West Virginia Workmen's Compensation Act authorizes allowance of compensation for injury or death of an employee, resulting from a rupture sustained in lifting a heavy object in the course of his employment. (West Virginia Supreme Court of Appeals, Poccardi vs. Public Service Commission, 84 Southeastern Reporter 242.)

* * *

Right of Miner to Rely on Pit Boss' Promise—Where an operator's pit boss assured a miner that a dangerous defect in a mine track would be remedied by a certain day, the miner was under no legal duty to inspect the place after that time to determine whether the danger had been removed, as affecting his right to recover damages for consequential personal injury. (Colorado Supreme Court, El Paso County Land & Fuel Co. vs. Perdaris, 147 Pacific Reporter, 675.)

* * *

Liability of Stockholders of Dissolved Corporations—Under the statutes of Kansas, when a coal-mining company dissolves, leaving unpaid a claim against it for wrongfully mining coal on the lands of another, the stockholders may be held liable on such claim. (Kansas Supreme Court, Abernathy vs. Loftus, 147 Pacific Reporter, 818.)

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*Attorney-at-law, St. Paul, Minn.

Editorials

Eastern Ohio Wage Agreement

We are told that the settlement in Ohio should be a source of great gratification. It does not, however, add anything to the national prosperity as the return to work of the eastern Ohio mines will only render idle or less active many operations in other fields. It does, however, spread the evils of inactivity more evenly over the country, and that in itself is a gain.

We congratulate the people of eastern Ohio, especially the operators, because the new contract will make possible a better system of working whereby coal will be conserved and will be prepared in better shape for the market. The rooms have been in the past far too wide, and the coal in the ribs has consequently been lost.

The miners have obtained the letter of their demands—47c. per ton for machine-mined run-of-mine coal—but to get it they have had to make substantial concessions. These may yet make trouble when the schedule comes into operation. When the operators and miners were in session the miners loudly proclaimed that there were to be no concessions on fundamentals, but the letter which Charles J. Albasin, president of the subdistrict, addresses to the miners shows that he has doubts as to the satisfaction of the men with the scale as now signed. In this he says:

> We have done our full duty without any apologies. Now we have reached a settlement with the eastern Ohio coal operators that in our opinion spells victory and vindication of our long struggle. We are fully confident that we did not receive everything for which we were contending, but taking into consideration the tremendous opposition that was continually massed against us and the deplorable industrial conditions surrounding us, we believe that we have done the best possible under the circumstances. We desire to have your full coöperation. Be prudent and self-possessed; don't permit any prejudice to carry away your best judgment.

All this does not spell "sweeping victory" as stated by the official organ of the union. Men do not need to be coaxed into the rôle of victors. And indeed a sweeping victory would have been a sweeping defeat, for the eastern Ohio miners would have been swept into pauperism by such a triumph. While the rate per ton would have been somewhat more than fair, the amount of work the mines would have secured from the market would have been so greatly restricted that the yearly wage of the miner would not have sufficed for his sustenance. It is to be hoped that the concessions have saved the miners from this possibility.

There were formerly about 18,000 miners in the subdistrict. Of these about 6700 have moved away during the 13½ months of idleness, and the operators have agreed to give those who stayed the advantage when selecting workmen. This they should do, seeing that many owe rent for all the time during which they were idle.

The actual figuring of the division of increased pay for cutting and loading would have awarded 7.95c. per ton to the machinemen and 39.05c. to the loaders. The operators insisted on giving the cutters 8c. and the loaders 39c., thus increasing the rate of the cutters 0.629 per cent. and decreasing that of the loaders 0.128 per cent. from the rates which would otherwise have been obtained, but as both were receiving an increase in scale rates of measurable importance these imponderable variations were unworthy of consideration.

The change in distribution between machinemen and loaders was negligible, but it aroused bitter antagonism between them and nearly prevented ratification. It normally should travel in the opposite direction, for as machines increase in their effectiveness the scale rate for cutting should lag in percentage behind that for loading.

Until mechanical loaders or conveyors are introduced, a cheaper explosive is invented or a method of cutting making less powder necessary is put into operation, the work of the loader will hardly become any easier. On the other hand, the work of cutting progressively grows less time-consuming and no revolutionary changes are necessary to make it more rapid.

The idea of the operators doubtless was that the narrow work to be introduced would press more severely on the machinemen than on the loaders and that the percentage between them should be revised accordingly. But there was much bad feeling between these classes of labor and the decision of the operators has increased the tension.

Three of the smaller operators have declared that they cannot make ends meet under the new scale, and George S. Jones, of the George M. Jones Coal Co., of Cleveland, states that the Webb and Pultney No. 2 mines at Bellaire will not be opened owing to lack of business. The new scale is apparently a draw with both sides thoroughly exhausted. Neither side can be regarded as having won a real victory. In fact, like all industrial strife, the end is unsatisfactory to both.

Italian Demand for Coal

The demand from Italy for American coal, which developed almost immediately upon the breaking out of the European war last August, is now certain to be greatly augmented, as Italy's entrance into the war shuts off the supply from Germany. For years Italy has imported annually about 10,000,000 tons of coal and coke, her own production being only about one-fourth as much.

In 1913 Italy imported 9,647,000 tons of coal from the United Kingdom, and in the first half of 1914 the imports were at a slightly greater rate, but the war caused such a reduction that the total for 1914 was only 8,625,000 tons, showing a decrease of 1,022,000 tons for the year.

Italy imported in 1913 from Germany 1,073,000 tons of coal, of which 441,210 tons, or 41 per cent., was shipped via the St. Gothard railway, the remainder being by routes since closed by the war. Statistics are available only through last December, showing shipments of coal from Germany to Italy by the St. Gothard to have been 150 tons in August, 12,000 tons in September, 27,000 tons in October, 35,000 tons in November and 48,000 tons in

December. It is probably safe to infer from these figures that the shipments have increased this year and may lately have been in the neighborhood of 75,000 tons per month. Italy's entrance into the war necessarily shuts off those supplies, and a correspondingly greater demand for American coal is reasonably to be expected.

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Journalistic Ethics and Psychology

The ethics of no business is above criticism. It is not therefore surprising that journalistic ethics has its shortcomings. News is perpetually coming to every newspaper and finds its way into the columns. Credit is generally given to the source of the news, except perhaps in cases where credit is not desired and where the facts are not doubted.

In the Colorado trouble for many months the public saw nothing and heard nothing but the ex-parte statements of the agitators. The more distorted these utterances were the more valuable as news items they appeared. What did it matter that they were attributed to Mother Jones or John R. Lawson or other labor leaders? The reliability of these persons as witnesses was a matter of which the public was not competent to judge, and as journalistic ethics requires in the best daily papers that statements shall be made without comment, the accusations of these irresponsible persons received wide publicity without a vestige of contradiction.

After awhile the operators started to circulate their side of the case, and while the story doubtless modified editorials and in some cases inspired them, yet the statements failed to get a place in the news. This is a severe arraignment of the press. It had conscientiously republished all the stories of outrage while it did not publish the refutation.

It was not necessary that these corrections should be published by way of retraction, but they should have been given place as supplementary statements from other authorities. The public never received the views of the operators till the Rockefeller memorandum was inadvertently published, and thus the publicity campaign was largely thrown away.

And this complaint is made not against the yellow press only. There are some papers which stand consistently for right and others which sometimes seem to lean toward capital, but these like the anti-capitalistic papers failed to avail themselves of the news despite the fact that as furnished it was in excellent shape to attract attention and to be prepared for publication.

As a result the papers published much that they knew to be untrue without a hint that they knew it was unreliable. They did not of course in any way guarantee the news, but as they did not contradict or explain it they left it to be inferred that it was true and could not be controverted. Having forbidden editorial criticism in the news columns, having omitted references to the news editorially and finally having failed to print some of the material supplied them, they appeared to take the side of the agitators as if the stand of the calumniators of capital was without possible answer.

The West Virginia strike was handled similarly, with this difference—that at first there was no publicity of any kind and later Senator Martine became the protagonist for the forces of disorder. That legislator fortunately did not make a favorable impression on the public. He is distinctly less interesting in appearance than Mother Jones, while more is naturally expected of him.

It is largely by its judgment of persons that the public is swayed, and the people only began to get their bearings in the Colorado trouble when they compared the character of John D. Rockefeller, Jr., with that of his inquisitor, Walsh.

The public is not disposed to listen to arguments. It lights instinctively on men, and the restful humanitarianism of Rockefeller contrasted favorably with the disturbing vindictiveness of Walsh. The impersonal work of Ivy L. Lee, excellent as it was, failed to effect its purpose because it had a man relatively unknown behind it and could not even be quoted as his.

In the last analysis it is doubtful whether the newspapers' ethics or the operators' psychology of attention was most to blame. If at the first the coal companies had put out a man—the right man—and centered their defense around him, perhaps the papers would have been responsive and the public more friendly. Let us hope that the anthracite operators in the coming strike will be able to center their arguments on a striking, outstanding figure who will be the visible embodiment of their position and whose contentions will be published freely in the public press.

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No Fear for the Future

The British are spending $150 a second on the war in which they are engaged and the press is urging on the public the stupendous significance of such prodigality. But we are expending about an equal amount for the running of federal, state, county, city and village governments and improvements. So after all probably Europe is not nearly bankrupt as we think, and a few years of economy—abstinence from liquors, increased devotion to business and reduction in the amount of domestic help—will erase the recollection of the war from the world's markets. Marvelous indeed would be the resources of the world if only everyone will save a little. Ten dollars saved by every citizen of the United States would give us a billion dollars. Little wonder is it that after every business depression trade leaps forward more energetically than ever before.

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Explosives in Coal Mines

A letter from one of our readers suggests that mining men generally would be greatly interested in a series of articles covering the use, storage and transportation of explosives in coal mines. Since we agree fully with the idea, we wish to take this occasion to invite any and all of our readers who have had experience with explosives to to tell us (a) what methods they employ in shooting the coal—we would like to describe the system used in each field; (b) where permissible explosives have proved more economical and efficient than ordinary black powder; (c) what depth of borehole and what amount of tamping are employed; (d) remedies for blownout shots; (e) where electric shotfiring systems are successfully used; and (f) how explosives are transported and handled in the mines.

All articles dealing with any of the subjects suggested above will be most acceptable for publication in COAL AGE. Let us hear from all our readers who are qualified by experience to write on the topics outlined.

Discussion By Readers

The Trouble Maker

I am led to make the following comments after reading the interesting account in "Extracts from a Superintendent's Diary," Coal Age, Apr. 24, p. 716, in which is described very vividly the visit of a delegation of women to the office of the mine superintendent of a large coal corporation. The women were campaigning the state in the interest of a proposed child-labor law.

The account given shows quite clearly that, while these women were no doubt sincere in their purpose and self-sacrificing in their efforts in behalf of good legislation, they had permitted their minds to become prejudiced to the true facts as they existed in and about the mines. They were ready to believe what they had been told—that the operator is a grafting, grabbing baron; they had come to regard the average miner as an inveterate kicker who constantly carries a club. Indeed, in their talk with the superintendent, they acknowledged that they had listened for two hours to the address of a labor leader, who they assumed correctly represented the views of the company and the men. They did not realize that they had been listening to an agitator—a trouble maker.

To the suggestion of the superintendent, after he had patiently listened to what the ladies had to say and had asked them to interview some of the men for themselves, they replied that they were already familiar with the views and the conditions of the miners. They said that the man who had addressed them had requested that they should withhold his name, fearing that he would lose his job if his interest in the matter were to become known.

The speaker had so prejudiced the minds of these women that they could not realize that the representative body of operators and miners alike compose as high a type of capital and labor as can be found in any industry. The fact that the superintendent was willing for these visitors to interview his men should have made clear to their minds that he had a contented lot of workmen whose ideas when expressed would not be at variance with his own and would not be in opposition to the well-known policy of the company.

The incident shows clearly that the agitator is a real trouble maker—a busybody and a menace to the peace and harmony of any mining camp. His purpose is to create a false impression and to bring about a feeling of dissatisfaction among the workmen. He is thus responsible for the larger part of the friction that exists, from time to time, between the miners and their employers. The agitator starts discord by influencing the small and noisy element among the miners to believe that they have a fancied grievance that should be adjusted. It is a comparatively easy task to convince this class of miners that they are being robbed or to make some operators believe that their miners are taking an unfair advantage of them. The submission of these unjust complaints, through a committee or a local union, has the effect to prejudice another *just* complaint in the eyes of the operator who gives the matter slight attention.

In closing, permit me to say that with a contract system in force between the operators and miners, determining the wage scale and the duties of both parties and providing for the settlement of disputes that may arise, there is no logical place for the irresponsible agitator. The way is thus provided by which a real grievance presented by either the miners or the operators acting as a whole can be readily adjusted in a fair and amicable manner. In my remarks I have referred only to the local agitator who goes about looking for points of contact that can be made to develop friction. The elimination and downfall of this class of agitator would go a long way toward establishing industrial peace.

SUPERINTENDENT OF MINES.

New Straitsville, Ohio.

Preventing Mine Explosions

Having read with great interest the letters in regard to rescue work following explosions in mines and the discussion of the question, "What recognition should be made for acts of bravery performed by miners at such times?" the thought occurred to me that it would be well for both miners and operators to give more attention and make greater efforts to prevent the occurrence of these explosions as far as it may lie in their power. By so doing, it will be possible to reduce the number of mine explosions to a minimum.

Many of the causes of mine explosions are so simple and plain as to be recognized at once by all practical coal miners and operators. The question is, What can be done to remove these causes and prevent their natural results? For example, many explosions are caused by the too rapid firing of shots, as well as the firing of shots that the practical judgment of competent men would condemn as being dangerous. The best means of preventing accidents from this cause is by means of strict regulations in regard to blasting.

Particularly in gaseous mines the following rules and regulations should be enforced: 1. No shots should be fired while men are in the mines. 2. All holes should be examined by competent men before they are charged. 3. The charging and firing of all shots should be performed by competent shotfirers after the men have left the mine. 4. The shotfirers should be compelled to proceed with their work slowly. 5. There should be a sufficient number of these men to divide the mine into separate districts, so that one man will not be required to fire from 300 to 400 shots in one or two hours, as is often the case. 6. The shotfirers should be authorized to condemn and refuse to fire any shots that in their judgment would be unsafe.

The object of proceeding slowly with this work is to give the air current time to sufficiently clear away the gases produced in firing and which always to some extent are forced back against the air into adjoining places where shots are yet to be fired. The firing of shots should always begin on the last of the air and progress in a direction against the air current so that subsequent shots will be fired in comparatively pure air. The velocity of the air current should not be too great; neither should the circulation of air be cut off while firing is in progress in the mine workings.

Another danger inviting mine explosion is the accumulation of gas in old and abandoned workings and void places in the mines. Any heavy fall of roof in these places will force the gas out into the live workings, and its ignition may result in an explosion of gas and dust that may be extended throughout the mine. To reduce this danger to a minimum, all timbers should be withdrawn as a place is finished and every effort should be made to cave the roof so as to close the opening.

Drawing all timber will not only prevent the danger of a squeeze, but will give no opportunity for gas to accumulate in dangerous quantities. Also, the value of the timber recovered will generally pay for its removal. There is always more or less danger in maintaining a large open area standing on pillars. Old workings that are not closed or sealed off should be ventilated thoroughly and examined every day. Where gas is found in any place, that place should be securely fenced off to prevent anyone from entering until the gas can be removed by competent persons after the men are withdrawn from the mine.

Another danger that is preventable with proper attention is the accumulation of dust and fine coal on the haulage roads and airways and at the working-face. In dusty mines it is particularly necessary that strict regulations should be enforced in regard to the loading out of all fine coal and dust. Men should not be permitted to stow this fine material in the waste, as it is liable to be thrown into the air by any violent concussion such as may be produced by a heavy or windy shot or a possible blownout shot. When suspended in the air, this fine dust is a menace to the safety of the entire mine. A further precaution to prevent the accumulation of dust on the roadways is to use dust-tight cars for the haulage of the coal, avoid overloading the cars and clean up the roads at regular short intervals.

I have mentioned but three of the more important preventable causes of mine explosions to which all practical mining men should give heed. If gas and coal dust can be taken care of at the working-face and on the roadways in mines by the enforcement of suitable mine regulations, many explosions will be prevented and lives saved.

J. RILEY.

Sullivan, Ind.

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Longwall in Pittsburgh Sea

Letter No. 8—I have been much interested in the question of mining the coal of the Pittsburgh seam by longwall. My attention was particularly drawn to Letter No. 7 by John Oldroyd, COAL AGE, May 15, p. 859.

Mr. Oldroyd states that the only way to work the Pittsburgh seam on the longwall plan is to drive the entries to the property line and work the coal back on the retreating plan. In my opinion, this method would prove too expensive, as in many cases it would require perhaps two or three years for the entries to reach the property line and the work on the coal to commence. In regard to his statement that "No one who has had experience in the working of the Pittsburgh seam would attempt to mine the coal by the longwall advancing method, except possibly someone who has more money than brains," it may be said that there would naturally be more than one opinion on that point.

I want to present a plan that I have designed for working the Pittsburgh seam on the longwall advancing method. The plan possesses the advantage over the common longwall system in that there are no entries to be maintained through the gob, no packwalls to build, and no ripping or brushing of the roof is required. All the coal is mined by machine, and the entire operation, which I claim is feasible, is in compliance with the bituminous mine law of Pennsylvania. The proposed method will yield cheaper and better coal and will prove less dangerous than the common longwall system. I shall be glad to answer any questions in reference to this plan, which may be described as follows:

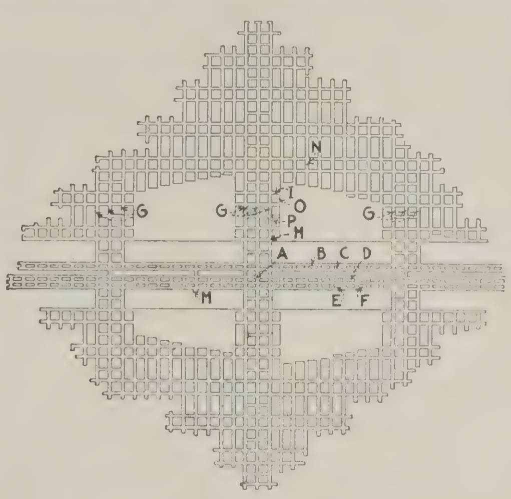

FIG. 1. GENERAL PLAN OF THE PROPOSED LONGWALL PANEL WORK

The development of the mine is shown in Fig. 1, which is not drawn to scale but is designed simply to show the general arrangement of the main butt-entries and face-entries with respect to the longwall face in each panel. A detailed plan drawn to scale and showing one section of the mine is given in Fig. 2. The letters in each of these figures refer to the same items.

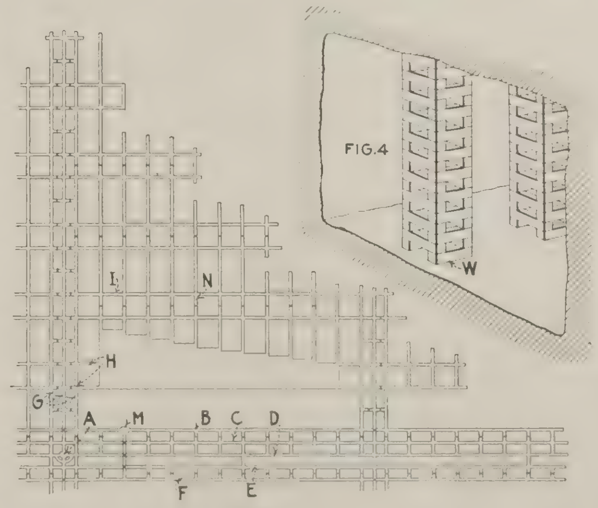

FIG. 2.

FIG. 2. DETAIL PLAN OF SINGLE SECTION
FIG. 4. METHOD OF BUILDING CRIBS

Two shafts were sunk from the surface to the coal. The hoisting shaft *A* is the downcast and the airshaft *M* the upcast for the entire mine. The mine is opened by driving five parallel entries on the butts of the coal. These are marked in the figure *B, C, D, E* and *F*. The middle entry *D* is the manway or traveling road, while the two entries *C* and *E* on either side of this are the haulage roads for each side of the mine. These three entries are all intake air-courses. The two outside entries *B* and *F* are the return airways for each side of the mine.

As shown in Fig. 2, face-entries *G* are now driven three abreast at right angles to the main butt-entries, the first set of face-entries being opposite the hoisting shaft. On each side of this first set of face-entries, other face-entries are driven three abreast, leaving a block of coal 1360 ft. wide between them. All entries are driven 10 ft. wide, the pillars on the main butt-entries being, say 10 yd. and those on the face-entries 8 yd. in thickness.

As shown further in Fig. 2, other butt-entries are then driven in pairs between each set of face-entries. The entries in each pair of butts are driven on 115-ft. centers, or with pillars 105 ft. thick between them. There is a block of coal 210 ft. wide between each pair of butts. Finally, face-entries are driven on 115-ft. centers off these butt-entries.

It will be seen that this plan divides the entire coal bed, as it is developed, into blocks of coal 105x105 ft., which form the pillars of each pair of butt-entries, while the coal between the consecutive pairs of butts is divided into blocks 105x210 ft. Fig. 2 shows about how much the entry work should be developed ahead of the working faces.

In Fig. 3 is shown in detail the method of drawing back the blocks of coal that form the working face in each panel lying between consecutive sets of the face-entries previously mentioned. As shown in Fig. 2, this work of drawing back the several blocks is commenced at the first butt-entry, or about 210 ft. from the main butt-entry *B*, at the point marked *H* on the plan. Each block of coal is undercut its entire width of 105 ft., by machine.

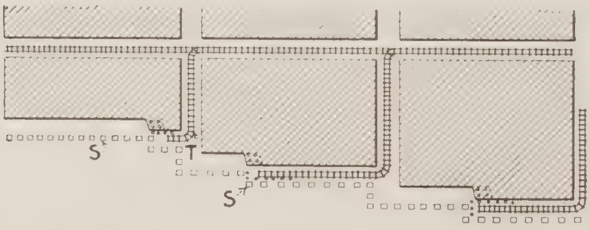

FIG. 3. SHOWING A SECTION OF WORKING-FACE IN ONE PANEL

A clear distance of 7 ft. is maintained between the face and the cribs shown in the figure. This allows 5 ft. for track and 2 ft. of clearance to pass the cars and to set posts on the face side while working. It is important to keep each of these consecutive faces three cuts ahead of the face next following. The cribs are shown at *S*, while the track for hauling out the coal is shown at *T*. As indicated in the figure, the track is taken up and the cribs moved forward a distance of one cut as the work proceeds.

As shown in Fig. 4, the cribs are built of blocks of wood 2 ft. long and 6x6 in. in section. They are set 2 ft. apart, and in order to facilitate their removal as the work proceeds, only one block is placed at the bottom at *W*, the opposite ends of the next blocks above resting on a mound of slate or dirt. These cribs hold the roof in very good shape at the working face and prevent the falls from reaching the face of the coal.

From a casual glance at Figs. 1 and 2, it may appear that there is an enormous amount of narrow work on which yardage must be paid. I think I can show, however, that there is not as much narrow work in this panel longwall system as in the ordinary room-and-pillar system.

HARRY BROWN, Mine Foreman,
Hazel Mine.

Canonsburg, Penn.

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Efficiency in Indiana Mining

In his letter entitled "Efficiency in American Mining," COAL AGE, May 8, p. 818, Samuel Dean contrasts the conditions existing in European mining with those in our own country in the following words:

> The lesson to be learned by these reflections is that if the European mine owner can have a magnificent mine building, palatial bathhouses and offices, garden villages and parked areas, and can still pay his workmen adequate compensation for injuries, extract all his coal, observe strict and burdensome laws in respect to the mining of the coal and yet show a low fatal-accident rate while paying 10 or 20 per cent. on his common stock—surely, that is "efficiency. . . . . If, as is true, numerous coal-mining companies here are tottering on the brink of bankruptcy owing to the ridiculously low selling prices of coal, the question that is of the first importance is, How are conditions exising here to be improved?

I will not attempt to answer this question, as I do not claim the ability to do so conclusively. I desire, however, to go on record as a "booster" for a movement that has been recently inaugurated in Indiana, which is a step in the right direction, if it does not *actually solve* the problem suggested in the above quotation. I refer to the action of Indiana coal operators in their proposed consolidation in respect to the sale of their coal.

An obvious answer to Mr. Dean's question is, Either increase the selling price of coal or reduce the expenses of operation and of marketing the product. Increasing the selling price of coal is a legitimate means of increasing profits *only* when such profits are reasonable, and the consumer always has a right to be shown that such increase is necessary. He cannot be required to pay for the mistakes made in producing the coal or the wasteful methods of mining.

Indiana coal operators have recognized these rights of the consumer, and in the present movement they aim to correct the wasteful methods of production rather than to increase the selling price of the product. This aim is clearly brought out in the statement made that under the system of a single selling agency such as is proposed, the present earnings can be increased fully 10c. per ton without adding to the selling price on the market.

A further answer to Mr. Dean's question would consider reducing expenses, either by cutting wages in the operating department or by eliminating unnecessary expenses in the sales department. But here also no attempt should be made by the operators to shift the burden to other shoulders. If it was expected, however, that a reduction in wages would effect the desired results the attempt would fail, since under the present system of unrestrained competition any reduction in wages would only be followed by a reduction in the selling price of the coal.

In this respect, the proposal of the Indiana operators should find general approval. They do not aim at a reduction in wages, but a consolidation of interests in the marketing of the product of their mines. The proposition will not add any burden to either the consumer or the wage earner, as it contemplates a reduction of unnecessary expenses in the sales department. It may involve standardizing the methods employed in the preparation of the coal in respect to sizing and cleaning it after it is taken from the mine.

A large saving can also be effected by eliminating some undesirable grades for which there is but a slight demand and which at the present time are thrown on the market at a loss in order to supply the demand for other grades. Another consideration would be the providing of storage facilities for those grades for which there is an unsteady demand. By thus storing and holding such grades for a more favorable market, a vast saving would be effected. In this manner, great opportunities are open for the conservation of the coal produced.

Incidentally, the proposed consolidation of interests will reduce the operating expenses as well. At present, operators are required to keep their plants in a state of preparedness to load coal on short notice. This results in a large expenditure with no corresponding income resulting therefrom. With a proper distribution of orders, each mine could be run more regularly for a definite period and then shut down with the knowledge that no sudden call would be made that would require constant preparedness.

The Indiana coal operators estimate that 200,000,000 tons of this nation's fuel supply is being wasted every year. The reason given for this is that present profits do not warrant the mining of coal that is not easily accessible and permits of a low expense of operation. The operators have no desire to violate the law or to form an illegal combine. They invite government investigation and government aid in forming the proposed consolidation, claiming that this would safeguard the interests of those indirectly affected.

Through their secretary, I. F. Callbreath, the operators presented a statement of the conditions that they are forced to meet, together with their suggested plan of coöperation, to the Federal Trade Commission, to the Department of Justice and to President Wilson. It goes without saying that a movement of this sort, brought about by legal means properly restricted to its avowed purpose and which does not infringe upon the rights of others, should receive the hearty support of all interested in good mining conditions.

Geo. N. Lantz.

New Straitsville, Ohio.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

CHEMISTRY OF GASES

The chemistry of all matter treats of the interchange of the atoms constituting molecules, by virtue of which interchange the character and nature of the matter is wholly altered. In other words, the matter is transformed and a new substance created having properties that vary widely from those of the original substance.

Chemical Reaction—The change that takes place when matter is thus transformed is a **chemical change,** and the action is described as a "chemical reaction." It assumes an intimate contact between two unlike substances, under conditions that favor an interchange of atoms. The reaction that takes place is the direct result of the different affinities of the atoms for each other.

Chemical Affinity—The theory of chemical change supposes that all atoms constituting matter have various affinities or **degrees of attraction** for each other. By reason of this difference in the affinities of atoms, an interchange may or may not occur when two unlike substances are brought into intimate relation with each other, according as the atoms of the original substances possess a less or a greater affinity for each other in their present state or grouping. If the atoms of one of these substances possess a greater affinity for atoms of the other substance an interchange of atoms will take place and new substances will be formed that will be wholly different from the original substances.

Influence of Heat to Produce Chemical Change—The theory of heat assumes a wider separation of the particles of matter as the amount of heat in a substance is increased. Thus, it naturally follows that a higher temperature invites a more intimate mingling of two different gases in contact with each other. This intermingling of the gaseous molecules greatly assists the chemical reaction, which otherwise would not take place.

Examples of Chemical Change—The most common and familiar examples of chemical change are those due to the strong affinity of the oxygen of the air for most other matter. The resulting reaction is described as **oxidation.** The more familiar forms of oxidation are the rusting of iron and some other metals in a damp atmosphere. The action results in the "corrosion" or eating away of the metal and the formation of an oxide, which is quite different in its character and properties from the orginal metal.

Combustion—In a general sense, any form of oxidation is combustion, and the latter term does not relate alone to oxidation, but describes generally any chemical reaction in which one substance is consumed either slowly or rapidly by reason of the presence of another substance whose atoms possess an affinity for those of the first that invites reaction.

The substance consumed is termed the **combustible** and the other the **supporter of the combustion,** while the substances produced are the **products of the combustion.** The products of a combustion may be gaseous, vaporous or solid, the last named being the **ash** of an active combustion.

The Coal Age Pocket Book

Slow Combustion—This term implies a slow but continuous wasting away of the substance consumed, the conditions being unfavorable or the affinities of the atoms being insufficient to support a more rapid reaction. Slow combustion is characterized by the generation of **heat** without the production of **flame.**

Active or Rapid Combustion—Active combustion is generally accompanied by the production of flame. The same amount of heat is generated in less time, resulting in a higher temperature, which in turn frequently modifies the products of the combustion.

Spontaneous Combustion—Under certain favorable conditions, combustion may start in a mass of combustible material without the application of flame or other exciting cause. This is due to the natural **generation of heat** within the mass owing to chemical reaction taking place between the substances. The action is explained as being chiefly due to the **absorption of oxygen** from the air by the substance, when the ensuing oxidation generates sufficient heat to ignite both the gas produced by the combustion and the material. The combustion, which is at first slow, may, in time, develop actively and inflame and consume the material.

Chemical Symbols—A chemical symbol is a letter or letters used to designate an element or simple substance. The symbols of the more common elements together with their atomic or specific weights have been given in a table, previously. The symbol written alone expresses a single atom of the substance; but, since an atom is not conceived to exist alone, the symbol of an element should always be written as a molecule.

Symbol of a Molecule—A molecule is assumed to be the smallest chemical division of matter that can exist in a free state. A molecule of any simple or elementary substance is assumed to contain two atoms only. Its symbol is expressed by writing the symbol for that element with a subscript ($_2$) to indicate two atoms; thus for the molecule of carbon, write C_2; oxygen, O_2; etc.

The molecule of a compound substance may contain any number of atoms and is expressed by writing the symbols of its elements each with a subscript figure indicating the number of atoms of that element in the molecule. A single atom of an element is indicated by the symbol only, omitting the subscript figure.

The following examples will serve to illustrate the fact that, while a molecule of any simple substance is taken to contain two atoms only, the molecule of a compound may contain any number of atoms:

Substance	Composition		Symbol
Carbon monoxide,	carbon, 1 atom; oxygen, 1 atom;	= 2 atoms;	CO
Carbon dioxide,	carbon, 1 atom; oxygen, 2 atoms;	= 3 atoms;	CO_2
Ammonia,	nitrogen, 1 atom; hydrogen, 3 atoms;	= 4 atoms;	NH_3
Methane,	carbon, 1 atom; hydrogen, 4 atoms;	= 5 atoms;	CH_4
Olefiant gas,	carbon, 2 atoms; hydrogen, 4 atoms;	= 6 atoms;	C_2H_4

All these gaseous molecules are of equal size, though containing different numbers of atoms.

Inquiries of General Interest

Iron Pipe and Concrete for Mine Posts

If a 4-in. single-strength common wrought-iron pipe 6 ft. long is filled with concrete, will it carry a greater load when used as a mine prop than if the pipe had not been filled with concrete? Will a double-strength pipe filled in the same manner with concrete carry a greater load than the single-strength pipe? What I want to know particularly is whether filling the pipe with concrete increases its strength for use as a mine post.

CHARLES O'NEIL.

Tabasco, Colo.

This is a type known in concrete construction as "armored concrete." By filling the pipe with concrete its capacity for carrying the load is increased by an amount somewhat more than the compressive strength of the concrete, because of the increased rigidity of the column and its greater resistance to bending. The thickness of a standard 4-in. pipe is practically ¼ in.; that of an extra strong pipe, ⅓ in.; and that of a double-extra strong pipe, ⅔ in. These pipes used as columns 6 ft. long and with fixed flat ends are rated to carry loads of 19.7, 27.3 and 49.3 tons respectively.

A concrete composed of one part good hydraulic cement, three parts sharp sand and six parts clean broken stone, or a 1 : 3 : 6 concrete, after having set one month will have an ultimate compressive strength of 1800 lb. per sq.in. and may be assumed to have a safe compressive strength when incased in the pipe of, say, 800 lb. per sq.in. On this basis filling the three kinds of pipe mentioned with concrete will add respectively 5.1, 4.6 and 3.1 tons to the strength of the pipe because of the compressive strength of the concrete. The capacity of 4-in. concrete-filled iron posts 6 ft. in length, for standard pipe, extra strong and double-extra strong, may therefore be estimated as, say, 25, 32 and 52 tons respectively. These pipes filled with concrete will weigh 23.5, 26.8 and 38.3 lb. per ft.

While such posts possess extraordinary strength as compared with wooden props, for use in mines, they undoubtedly possess the disadvantage of being very heavy and difficult to set in position, but especially difficult to remove when they have once taken the weight of the roof. The handling of such props from the surface to the working face in the mine would also prove a considerable item of expense.

⁂

How to Find a Ground in an Armature Coil

Kindly explain the proper course to pursue to find a ground in the armature of a dynamo that gives a shock. At our plant we have no instruments for this purpose, and I would like to ask if a current can be sent through the machine by connecting one terminal to the shaft and rotating the other terminal about the commutator for the purpose of detecting the ground. If this can be done, kindly explain the method.

MINE ENGINEER.

Des Moines, Iowa.

The proper way to detect a ground in the armature of a dynamo is by the use of a millivoltmeter. Not having this instrument, it is possible for an experienced operator to detect the trouble by the use of a small lamp instead of the voltmeter. In any case, the testing current must be one of low voltage, being regulated by several lamps introduced into the circuit until the desired result is obtained. When the voltmeter is used, the voltage of the testing current should be sufficient to give an ample deflection of the needle, say about half across the scale.

Assuming that the motor has been disconnected from the supply line and a low-voltage testing circuit provided, connect this circuit with the armature terminals, so that the current will pass through all the armature coils. The current should be sufficient to enable a satisfactory reading to be taken on the millivoltmeter or galvanometer, which is the most reliable means for locating the trouble in the armature.

Now, ground one of the leads of the millivoltmeter on the armature shaft and proceed with the other lead to explore from bar to bar, passing completely around the commutator. The two bars that give the least deflection of the needle of the voltmeter indicate the approximate location of the trouble and reveal the grounded coil.

In a parallel-wound armature these bars will be adjacent to each other, while in a series-wound armature they will be separated by two pole bases. The ground so indicated, however, may exist in the commutator segment instead of in the coil, and it is therefore necessary to make a further test to determine its exact location.

In order to do this, disconnect the two leads of the coil in question and proceed to test the coil alone. If the trouble exists in the coil, this test will show the same reading as before.

⁂

Mining Engineer Eligible

Kindly advise whether a mining engineer, 23 yr. of age and with 7 yr. experience as such in the bituminous mines of Pennsylvania, is eligible to receive a certificate to act as fireboss on passing the required examination.

MINING ENGINEER.

Avella, Penn.

The bituminous-mine law of Pennsylvania (1911) requires applicants for a fireboss certificate to "have had at least 5 yr. practical experience, after 16 yr. of age, as miners or men of general work and . . . experience in mines in Pennsylvania that generate explosive gas." A mining engineer is eligible under the bituminous law to take the examination and receive a mine foreman's certificate, but he is not eligible for the fireboss certificate.

Examination Questions

Pennsylvania Anthracite Mine Foreman's Examination Held at Scranton, May 18-20, 1915

(*Selected Questions*)

Ques.—What are the three greatest causes of accidents in anthracite mines? Give percentages of each, and state how you would reduce these accidents.

Ans.—The three causes producing the greatest number of accidents in anthracite mines are: 1. Falls of coal and roof. 2. Movement of cars in the mines. 3. Explosions of blasts.

The percentage of accidents from these causes may be generally stated as follows: Falls of coal and roof, 45 to 50 per cent. of all accidents underground due to any cause; accidents due to the movement of cars in mines, 15 to 18 per cent.; accidents due to explosions of blasts in mines, 10 to 12 per cent.

In order to reduce the number of accidents due to falls of coal and roof, every working-place should be inspected at least twice a day while the men are at work. An assistant foreman should be placed in charge of each district of the mine and should see that every working-place is properly secured by props or timber and all loose coal or rock pulled down or made secure. Allow no one to work in a place that is unsafe unless for the purpose of making it secure, as required in General Rule No. 12 of the anthracite mine law. The mine foreman or his assistant should see that every miner has a sufficient number of good cap-pieces of suitable length, width and thickness, as well as timbers of the required size for use in his place. He should see that the miner remains at work in his place with his laborer whenever danger is suspected and always in pillar work. The mine foreman and each of his assistants should enter a daily report signed with ink in a book kept for that purpose, and the mine foreman should read the daily reports of each of his assistants.

In order to reduce the number of accidents due to the movement of mine cars, all gangways and main haulage roads should have a clear space of 2½ ft. between the top rail of the car and the ribs or timbers. This clearance should be maintained throughout the entry on the same side of the road as far as practicable and kept free from obstructions of any kind. Where such clearance cannot be provided, refuge holes should be made in the ribs. These should be of ample size and, as far as practicable, on the same side of the roadway not more than 100 ft. apart and whitewashed and kept free from all obstructions. A similar clearance of not less than 2 ft. should be maintained on roads, in all breasts and kept free from obstructions, such as frequently block the roads in rooms, as timbers, rails, tools, etc. The height of gangways and traveling ways should not be less than 5 ft. 6 in. in the clear. No person under the age of 17 shall be employed as triprunner or driver, and no person except the driver shall ride on the front end of a car, where a seat should be provided if required for safety. No person shall ride between the cars and no driver shall stand on the tailchain when driving. Where persons are lowered or hoisted in slopes, special cars should be provided for that purpose. Platforms if used should not extend over the top rail of cars, and chutes must not extend more than 12 in. over the top rail, except when the chutes are at least 16 in. above the rail. All platforms and chutes extending over the top rail of the cars must be removed when a breast is finished or abandoned.

In order to reduce the number of accidents by blasts, wherever practicable, an electric battery should be provided for firing the blast. Such batteries must be approved by the mine foreman, who shall give the miners all needed instructions for their use. Only one kind of explosive shall be used in the same hole, and all holes shall be tamped to the mouth with clay or other incombustible material. No charge of high explosive that has misfired shall be withdrawn, nor shall any attempt be made to open the hole.

Ques.—What air is traveling through a gangway 12 ft. wide and 7½ ft. high when the anemometer registers 472 ft. per min.?

Ans.—The sectional area of this airway is 12 × 7½ = 90 sq.ft. Without making any allowance for the inertia of the anemometer, the volume of air passing in this gangway is 90 × 472 = 42,480 cu.ft. per min.

Ques.—An airway is 5 ft. wide at the top, 10 ft. wide at the bottom and 6 ft. high. If the anemometer reads 280 ft., what is the quantity of air passing?

Ans.—The average width of this airway is ½ (5 + 10) = 7.5 ft., and its sectional area is 6 × 7½ = 45 sq.ft. The volume of air in circulation in the airway is therefore 280 × 45 = 12,600 cu.ft. per min.

Ques.—How would you proceed to remove a body of firedamp from the face of a chamber 40 ft. wide, in a vein 2 ft. high?

Ans.—Assuming that this chamber is filled with an accumulation of firedamp or a mixture of marsh gas and air in explosive proportions and that the vein is pitching, the first step is to notify and remove all the men working on the return air in this section of the mine. It may be even advisable to withdraw all the men from the mine before attempting the removal of the gas. The method of procedure will depend upon the condition of the chamber, but in any case the intake air must be conducted into the chamber and made to sweep the face of the breast. This can be done by erecting a temporary canvas brattice, starting from the mouth of the chamber on the intake side. The brattice should be extended up the pitch gradually, so as to give time for the complete removal of the gas as the work proceeds. Only safety lamps should be used, and these must be protected against a possible fall of roof that would cause an outrush of gas from the chamber. In so thin a vein, it may be better to employ a small "booster" fan and a collapsible canvas air tube for conducting the air to the face of the chamber, assuming these are available. It is important to employ an air current sufficiently strong for the removal of the gas.

Coal and Coke News

Harrisburg, Penn.

A résumé of the work of the Legislature, which adjourned on May 20, insofar as the coal interests of the state are concerned, shows that the mining industry occupied a prominent position during most of the session.

The most important bill affecting the anthracite region was the Catlin bill to bring the anthracite miners under the operation of the workmen's compensation act. This bill was reported from the conference committee on May 20, the only change being made by this committee, was to make it effective Jan. 1, 1916. The Governor has stated that he will sign this measure.

The bill next in importance to the anthracite region is the Dawson tonnage tax measure. This differs from the Roney bill of two years ago in that the money is to be apportioned among the particular municipalities in which the coal is mined, rather than among all the counties, boroughs and townships in the anthracite counties regardless of whether or not they have mineral resources. The governor made a desperate effort to take the major portion of the tax for the use of the state, but the bill finally passed on a 50-50 basis. The measure levies a tax of 2½ per cent. ad valorem on all anthracite coal mined, and provides that one per cent. of the tax shall be paid to the superintendent of the mine for making the return. The Governor was much pleased with the passage of this measure.

A bill passed meaning much to the anthracite miners was the Beidleman measure to create 21 assistant mine inspectors. Anyone working inside of any anthracite mine will be eligible for election; the duties of this office will be to look after the ventilation. Each assistant inspector will receive a salary of $2000 per annum. The Governor now has this measure on his desk.

The Powell bill providing for four new anthracite inspectors is also in the Governor's hands. Three are to be elected in Luzerne and one in Lackawanna County.

The bill to increase the pay of the mine inspectors' examining boards in the anthracite region from $6 to $10 per day is in the Governor's hands.

The joint resolution introduced by Senator Vare to appoint a commission to investigate the increase in prices of anthracite alleged to be in excess of the anthracite tax passed both houses, but the amount appropriated to cover the expense of this commission was cut from $10,000 to $5000.

The Senate bill amending section 1 of article 4, section 1 of article 5 and section 9 of article 24 of the act of June 9 1911, permitting operators, managers and superintendents free selection of mine foremen, assistant mine foremen and fire bosses and placing mine employees under the supervision and control of the operators so as to bring all bituminous workmen under the Compensation Act has passed both houses and the Governor has assured the mine workers that he will sign this measure.

A bill of great importance to mine inspectors of the bituminous region providing that mine inspectors who have served for 8 years and have passed two examinations shall be exempt from any further examinations, needs only the Governor's signature to become a law.

The Crow bill amending rule 18 has already become a statute.

The McClure bill providing that where clay mines are worked with bituminous coal mines they shall come under the supervision of the bituminous mine inspectors has passed both houses.

The veto of the Horton bill regarding safety devices for trips in slope mines is said to be a disappointment to several operators who have been using a system of broken switches. These operators have been required, in addition to their system of derails, to use the customary sprag in the rear car of the trip. Under this system the man in control of the trip closes the switches when the empties are being lowered into the mine. They are opened for a loaded trip, the theory being that should the rope break, the trip would be derailed upon reaching the first switch. Many operators, it is said, hoped through the Horton bill to be relieved from the necessity of using any other safety device.

Two big constructive measures enacted into law were the Child Labor and the Workmen's Compensation acts. The Governor did not stop with giving the child workers between 14 and 16 years of age a 9-hr. day and a 51-hr. week with 8 hr. of that time for school, but had incorporated in the general appropriation bill an appropriation of $1,000,000 for vocational schools.

The opposition to the Workmen's Compensation bill was not so bitter as that toward child labor, but the Governor succeeded in winning his points, in that the act will go into force Jan. 1, 1916, and not in July, 1916, as was intended by the enemies of the bill, who seemed to let up in their fight during the last days of the session. The six bills are in practically the same shape as drawn by the Attorney General, with the exception of a few minor changes, as to appointive power being placed with the Governor and not with the Commissioner of Labor. There are also a few slight changes in the Insurance bill.

A number of bills, among them being the appropriation of $200,000 to the U. S. Bureau of Mines for the coöperation of that bureau with the Department of Mines in the establishment of an experiment station; the appointing of two assistant chiefs in the Department of Mines; the right of committees of mine workers to inspect bituminous coal mines; filing of maps with adjoining property owners of bituminous coal mines; providing for a new state board of examiners of anthracite mine inspectors; and giving power to sealers of weights and measures to examine and seal scales at coal mines, all passed the House, but never saw the light of day when they reached the Senate. All other mining bills were killed in Committee.

It was apparent that a desperate effort was being made to put through a bill which provided that all portable electric lamps used in bituminous mines should be tested by the U. S. Bureau of Mines, one being introduced in the House and another in the Senate, but each time there was such a strong protest against this that they were sent to the scrap heap.

PENNSYLVANIA

Anthracite

Shamokin—Five hundred employees of the Luke Fidler colliery of the Susquehanna Coal Co. were rendered idle on May 19, when the United Mine Workers threw down their tools, declaring they would not work with men who refused to become members of the United Mine Workers of America. Between 25 and 30 miners were without cards entitling them to work as union employees.

The colliery of the Buck Ridge Coal Mining Co. will be closed down for three months. The reasons for this suspension are certain repairs are to be made to the colliery and the present dull condition of the anthracite business, particularly for red ash anthracite coal. It is contemplated that no shipments will be made from the colliery during the above-mentioned period, but this will be governed somewhat by the conditions of the coal market. In the meanwhile, however, work will be done at the colliery for the development of other veins of coal on this property. A recent report made by one of the most prominent anthracite engineers places the recoverable coal still in the ground at Buck Ridge at an amount exceeding 15 million tons.

Ashley—The large planes of the Central R.R. of New Jersey were temporarily shut down recently because one of the big hoisting engines broke down. Ten locomotives and crews from Mauch Chunk are assisting in getting the coal over the planes to the weigh station on the top of the mountain.

Plymouth—Refused the concession of working 8¾ hr. for a 9-hr. day the driver and breaker boys at Buttonwood No. 23 colliery operated by the Lehigh & Wilkes-Barre Coal Co. went out on strike on May 21 tying up collieries Nos. 21 and 23, employing about 1000 men. This was the fifth strike within a week at this company's collieries. The strikers wanted the 15 minutes off each day in order that they might be prepared to leave the mine and breaker the minute nine hours were up.

Hazleton—The Lattimer No. 4 breaker of Pardee Brothers & Co., Inc., one of the largest and best equipped in the Lehigh coal field, was destroyed by fire of unknown origin May 25. The loss is $75,000, partially covered by insurance. Five hundred hands are thrown out of work.

Harrisburg—There is a prospect that the final decision in the anthracite coal tax appeals will not be rendered for two and a half years. The appeals taken by the 100 or more coal companies interested from the settlements made by the Auditor General under the act of 1913, and involving $6,000,000 or more now in the hands of the companies, are now before the State Supreme Court sitting here at the Capitol. However, a petition will be presented asking that the case go over for argument at the October term of the court at Pittsburgh.

Wilkes-Barre—Declaring that if coal is being mined at the rate for which reductions have been made in the value of coal lands during the last three years the supply will be exhausted within 12 years, the school board of Foster township has demanded from the County Commissioners a fair and equitable valuation, so that when the coal supply is exhausted the coal companies will have paid their fair share of the tax burden. The valuation of coal lands in Foster township has been decreased $253,661 this year.

Scranton—Good Roads Day received a big boost when orders were issued by the Lackawanna and Scranton Coal companies closing down all of their collieries May 26 so that their employees might have a day to devote to the good roads movement. The Lackawanna company's action means that 22,000 men in Luzerne and Lackawanna Counties will be at liberty to handle a pick and shovel on the roads, while the Scranton Coal Co.'s 8000 employees will also find work on the roads.

Bituminous

Uniontown—Receivers of Josiah V. Thompson on May 24 closed a deal with the executors of the estate of W. J. Rainey, deceased, for the sale of 76 acres of coal land in Fayette County. The price given out is $2000 per acre. The tract is known as the Johnson farm and adjoins the Revere plant of the Raineys. This is the first sale of coal in Fayette County of any importance in years.

Activity still continues to make itself felt in this section. The Frick company has ordered more ovens to be fired. Some of these were put in at Grindstone while others are distributed among the different works. Grindstone is at present operating 245 ovens out of a total of 300. Orders from Scottdale are looked for almost daily that will cause the plant to resume in full.

Ferndale—Eight men were killed in an explosion late on Monday afternoon (May 24) in the Valley No. 1 mine of the Smokeless Coal Co. and another lost his life in attempting their rescue, the latter being Gomer Phillips, chief of the first-aid work of the mining department of the Cambria Steel Co. After he entered the mine at the head of the rescue corps of his company, Phillips, it is thought, became confused and pulled off his helmet. He was overcome by the gases and died at the hospital several hours later.

The dead were not taken from the mine for many hours after the explosion. They were all Americans. The mine did not work on Monday, but the men were allowed to enter to load cars, it is said, in order that they might earn a little extra money.

News of the accident was at once telephoned to the Cambria Steel Co. at Johnstown, and a mine rescue corps was immediately rushed to the Valley mine. The rescue team was equipped with oxygen helmets and other apparatus. The rescuers penetrated the workings some distance in spite of the fallen roof and broken timbers and partitions, but found no sign of life. Some of the bodies of the men who had been at work at the time of the explosion were located, but were not removed for some time, for the efforts of the rescuers had to be directed chiefly to saving their own comrades who were overcome.

Superintendent C. H. Crocker of the Cambria company was one of the victims. He was brought to the surface by General Manager H. J. Meehan of the steel company who volunteered to enter the mine without a helmet. Gomer Phillips, John Broderick, John Frear and W. M. Dyer, members of the Cambria crew, were all overcome and taken to the hospital. All were resuscitated with the exception of Phillips.

It is believed that the explosion was due to gas, which accumulated in the right heading of slope No. 2 of Valley No. 1 mine. This slope is located about 2000 ft. from the main entrance.

All must have died almost instantly, as the bodies first encountered showed, but little evidence of the victims having struggled to make their way toward safety. For a time there was no certainty as to the number of victims, it being believed that some of the men at work might have made their way out by an entry leading into another working of the same company.

Greensburg—Complaint has been made by the Pittsburgh & Ohio Coal Mining Co., and the Jamison Coal & Coke Co., with the Interstate Commerce Commission against the Baltimore & Ohio R.R. Co. It is charged by the complainants that the charge of $1 for demurrage on cars at Cleveland, Lorain and Sandusky, during April and October, is unjust and unfair. The statement is made that lake travel is often held up those two months and it is impossible for that reason for cars to be loaded on lake steamers promptly.

Bentleyville—Seven hundred safety lamps were destroyed in the recent fire at the lamp house of the Acme Mine No. 2 of the Westmoreland Coal Co. The damage amounted to about $2000.

Pittsburgh—Heavy shipments of coal and other freight are being made by water from Pittsburgh to lower river points. A total of 160,550 tons of freight left the harbor on May 23, among which were some heavy shipments of steel products.

The miners of the Pittsburgh district are at last enjoying a period of some prosperity. According to recent estimates, about 37,000 coal miners are now employed in this district. While all of these are not working full time, they are at least all making a living. It is anticipated that coal shipments will shortly be made to practically capacity. Should coal operations become much heavier a shortage of men will be experienced.

WEST VIRGINIA

Martinsburg—The last payday at the various mines near Lonaconing was the largest for a long time. It is reported that the Consolidation Coal Co. alone distributed upward of $87,000. This is said to have been the largest pay, save one, that this company has distributed under its present management.

Welch—E. T. Wolfe, night foreman of the Carter Coal Co., at Coalwood, was recently fined $52 and costs for alleged violation of section No. 13 of the mining law. The charge was that the mine fan had been shut down from 5 p.m. to 7:45 p.m., and that Wolfe had sent men into the shaft before he examined the mine. Also that he failed to have a signal at the head of the shaft, according to the mining law.

Charleston—There has been a perceptible increase in the coal business in this section of the state recently. Many of the mines along the route of the Kanawha & Michigan R.R., between Charleston and Gauley Bridge, on both the north and south sides of the Kanawha River, have increased their tonnage to meet the demands of consumers, and it is expected that conditions will continue to improve throughout the summer. The mines at Boomer, Longacre, Carbondale, and other places, are now working full time, and have taken back all their old employees who were laid off last fall.

ALABAMA

Birmingham—There will be a Field Day demonstration held at Birmingham under the auspices of the Alabama Safety Association on May 29, and 78 first-aid teams have entered for the event. Three silver loving cups are to be presented respectively to the best team of white men, the best team of white women, and the best team of colored men. The American Mine Safety Association will meet in Birmingham in October. First aid teams from all parts of the country will attend that meeting also.

In the case of the Tennessee Coal & Iron Co. vs. C. B. Smith, state auditor, the Supreme Court has handed down a decision whereby the Tennessee company recovers $18,000 from the state which was collected for license fees under the statute which was recently declared unconstitutional.

KENTUCKY

Whitesburg—There is the greatest activity in the mines in the Letcher County field and three to four hundred miners have been put to work in the last week or so. The amount of coal going out of this district at present is the greatest in the history of the field. Full time operations are to be the rule shortly.

Owensboro—The Fern Hills Coal Co.'s property, equipment and tipple have been sold for $16,800 by Master Commissioner Clements to T. A. Pedley, receiver. The property included 600 acres of land, with all the coal and mineral rights and the total had been appraised at $25,000. Indiana coal dealers were opposing bidders.

Henderson—The Deep Water Coal & Coke Co. will close the big deal for thousands of acres of western Kentucky coal lands in July, according to a statement attributed to H. F. Allen, president of the company. It had been reported previously that the war in Europe was delaying consummation of the deal.

Lothair—The Ashless Coal Corporation has increased its coal shipments from 2000 to 3000 tons daily since the improvement of the markets of the Great Lake region. A good increase has also been made in the working force.

Benham—The Wisconsin Steel Co. is now shipping more coal than at any time in the history of the plant. It also proposes some increases during the summer months. Three hundred extra miners have gone to work during the past 10 days.

OHIO

Cincinnati—The contract for the sale of the Marmet Coal Co.'s properties to an Eastern syndicate has been presented to the superior court and approved. The approval of the court was made subject to a part payment of 20 per cent. of the purchase price of $1,500,000, failing which public sale of the property will be had. It is reported that the syndicate intends the Marmet properties as a nucleus for large operations, from which coal for the Northwestern markets will be taken. The company's bonds to the amount of $563,500 are to be sold June 8, 1915, by Irwin, Ballmann & Co., of Cincinnati, being covered by a mortgage on all of the company's property, which is presumably to be conveyed to the purchasing syndicate subject to this incumbrance.

INDIANA

Terre Haute—The coal mining properties of the J. K. Dering Coal Co., of Chicago, situated in Sullivan, Vigo, and Vermillion Counties were recently sold at auction to the Continental Commercial Bank of Chicago, for $400,000, following a decree of foreclosure on petition of the bondholders.

Sullivan—The heirs of John L. Woodbridge have filed suit against the Vandalia Coal Co., demanding $20,000 royalty. They allege that their father's farm was leased in 1898 to the Island Valley Coal Co. for 25 years the lessee or his assigns to pay 5c. for each ton that would pass a 1½-in. screen. The Island Valley Co. sold its lease in 1905 to the defendant company which, it is alleged, has mined 400,000 tons of coal on which it has paid no royalty.

ILLINOIS

Pana—Mine No. 1 of the Pana Coal Co. was recently sold by Special Master in Chancery Jas. L. Drennan to Leslie L. Taylor, of Taylorville, at public auction for $30,000. The sale includes all mineral rights amounting to more than 1000 acres of underlying coal, all machinery, together with several tracts of city property.

Belleville—Damage suits aggregating $33,000 have been instituted in the Circuit Court against the Franklin Coal & Coke Co., as the result of the mine accident at Royalton, Ill., Oct. 27, 1914, in which 29 miners lost their lives.

Cuba—Star Mine No. 3 recently hoisted 866 tons of coal in one day, which is the best record ever made at this mine.

IOWA

Albia—A coal deal was recently closed, by which the Smoky Hollow Coal Co. has come into possession of No. 7 Hiteman Mine, which was started a few years ago. This is said to be one of the best mines in Cedar Township.

FOREIGN NEWS

Vancouver, B. C.—Internment of alien enemies on a wholesale scale was begun May 25 in the coal mining district of Vancouver Island. By noon 115 Austrians and Germans in the Southfield, Cumberland and Nanaimo mines had been placed on a special train bound for the internment camps. The alien enemies were taken into the mines a year ago as strikebreakers when the coal pits were tied up by the Western Federation strike. The former workmen are now to resume their jobs.

PERSONALS

John R. Hoffman, oldest mining engineer of the Philadelphia & Reading Coal & Iron Co., has retired because of age.

James Reese has been made general superintendent of the mining operations of the Maderia Hill Coal Mining Co., in the Mahanoy Valley.

C. N. Blanchard, of Binghamton, N. Y., head of Blanchard & Co., which owns the anthracite mine at Archbald, Penn., has retired from the company and will give his whole time to the Seiler-Blanchard Co., of which he is treasurer.

J. S. Roughgarden, for some time Buffalo representative of Whitney & Kemmerer, has resigned. His successor is F. W. Buckalew, who has been traveling salesman from the Buffalo office of the firm.

Edwin Maurer, formerly superintendent of the Lehigh Coal & Navigation Co.'s shops, at Lansford, Penn., was the victim of an accident recently when he was struck by a bicycle, and thrown to the ground. Although seriously injured, Mr. Maurer is expected to recover.

Lloyd G. McCrum, formerly of the McCrum-Howell Co., has just been made general manager of mines for W. H. Bradford & Co. Inc., of Somerset, Penn. Offices have been opened in New York, Philadelphia and Somerset. The plants of the new corporation are all located near Somerset, Penn.

Reese Tasker, general mining superintendent of the Philadelphia & Reading Coal & Iron Co., suffered a stroke of paralysis recently and his condition continues to be critical. Mr. Tasker has been prominent in mining affairs for nearly half a century and has been one of the leading officials of the Reading coal company for 25 years.

Philip N. Case, sales engineer for the Hyatt Roller Bearing Co., will in the future be in charge of all mine car applications, traveling in the western part of Pennsylvania, Ohio and West Virginia. Mr. Gleisen who formerly covered this territory will travel in the eastern part of Pennsylvania, New York and New Jersey.

Thomas I. Scott and G. H. Hodges, superintendents respectively of the Wynn and Kyle plants of the H. C. Frick Coke Co., have been transferred to the engineering department at the Scottdale offices of the company of which both men are graduates. For the present P. J. Locke of the Leith plant will have supervision over Crossland works; Superintendent English, of Oliphant, will have charge of the Wynn plant, and Superintendent Beerbower, of York Run, will look after the Kyle plant.

INDUSTRIAL NEWS

Williamson, W. Va.—The Williamson Coal Co. is advertising for coal miners.

New York, N. Y.—The Bulah Coal Mining Co. is now occupying its new offices in the Equitable Bldg. at 120 Broadway, New York.

Bluefield, W. Va.—The shipments of coal over the Norfolk & Western Ry. for the month of April 1915 amounted to 1,683,958 tons; of this the Pocahontas District furnished 1,069,684 tons; Tug River 285,243 tons; Thacker 216,955 and Kenova District 112,076 tons. The coke tonnage for the month was 61,075 tons.

Huntington, W. Va.—The City Employment Bureau recently received a letter asking for 500 men for work in the Consolidation Coal Co. mines in the vicinity of Jenkins, Ky. A number of men have already been sent to this field, but the majority of those applying for work at the Municipal agencies want jobs within the city.

Uniontown, Penn.—Judge Ruppel of Somerset County has handed down an opinion dismissing the suit brought against Archibald Miller, superintendent of the Loyalhanna Coal & Coke Co. operating at Cairnbrook, by Fish Warden Raymond O. McIntosh, of Johnstown, in which the defendant was charged with polluting the waters of Dark Shade Creek with sulphurous mine drainage.

Somerset, Penn.—The mining interests of W. H. Bradford, the Phœnix Fuel Co. and the Victor Coal Mining Co. have consolidated their operating and selling departments under the corporate name of W. H. Bradford & Co. The mines are located in Somerset County, with operating headquarters in Somerset. The main offices of the company will be in the Commercial Trust Building, Philadelphia.

Huntington, W. Va.—It is reported that the Pocahontas Fuel Co. is now building a fleet of colliers which will be entered in the coastwise and foreign trade, principally that with South America. The Clinchfield Collier Co. is also said to be making plans for the construction of two steel colliers which will be put in the foreign trade immediately on completion. The construction of these fleets will mean much to West Virginia in that they will be the means of transporting fuel to a market which hitherto has been touched by few of the coal interests of this state.

Coal Trade Reviews

General Review

Anthracite reported on demurrage and a dull season is anticipated. Heavy export demand for bituminous stimulates interest among local consumers. Lake movement increasing.

The rigid restriction of output at the anthracite collieries has failed as yet to relieve the pressure on the market. The Lake movement is the only branch on anything approaching a normal basis and it is becoming steadily more evident that the trade is in for an abnormally dull season. There are already reports coming in of coal on demurrage going at sacrifice prices.

The constantly expanding export business continues the leading feature in an otherwise dull bituminous market. The activity in this branch is stimulating some interest among buyers in this country and has already resulted in some relatively small contracts being closed, while requisitions on other contracts are slightly heavier due probably to a disposition to accumulate some stocks. On the other hand the market is undoubtedly slow responding to the reported improvement in general industrial conditions. The failure of the West and Northwest to figure more prominently in the spring business is a particularly discouraging feature of the situation. Some of the higher grade fuels which have been diverted entirely into the export business, have recently appeared again in the local markets.

The settlement of the Ohio labor difficulties is viewed with much concern in the Pittsburgh district where competition with outside districts has already brought the market to a more or less complete standstill. The buying is so slow that shrewd consumers have no trouble in filling their current requirements with cheap coal threatened with demurrage. Even the abnormally low circular figure on Lake coal is being substantially shaded. Requisitions from Canada continue at a low ebb while railroad buying is less than a few months ago, and it is generally evident that the reported improvement in industrial conditions has failed entirely to spread to the coal industry.

There has been considerable buying of a temporary character in various directions including fuel for threshing purposes, which is once more a factor in trade circles for a short period at least. Contracting continues slow because of the cheap coal being offered, and concessions on last year's figures are still obtainable. While the Lake movement is still considerably below normal, there is quite a volume of coal moving in that direction, which is creating a somewhat better feeling in trade circles.

The collapse of the selling organization which was attempting to maintain prices in the St. Louis district was a discouraging development in the Middle West during the week. The market is generadlly flat in all directions, with the exception of screenings, the entire output of which is being absorbed on contracts and none is available in the prompt market. Some uncertainties are developing regarding the labor situation in the Middle West.

BUSINESS OPINIONS

Money still accumulating but business is marking time pending receipt of the German note. Steel industry improving in certain branches.

Boston News Bureau—So far as the financial side of the situation is concerned it is purely a waiting proposition, waiting for the German answer to the American note. Our foreign commerce continues surprisingly large, that is our exports, which means, of course, that an enormous trade balance is running in our favor. Money still accumulates and is bound to increase in volume so long as Europe increases our supplies rather than decreases them. The security market is quiet and naturally sensitive. It is good belief, however, that prices would advance more sensationally if the German reply were even fairly satisfactory than they would decline in case the reply was distinctly disappointing.

Iron and Steel—Contracts for rolling stock by the railroads and foreign governments are the chief feature of interest. More orders for cars have been placed in May than in the entire period between Jan. 1 and Apr. 30, and it looks as though there will be a great deal of business in this line. Moreover, railways have been buying fabricated steel for bridges, and the amount of steel required in car building is probably 5% of the capacity of the steel mills. The pig-iron market has been dull. Some sales of 10,000-ton lots have been made to the pipe founders on the Delaware River, but in general very little iron has moved. The jobbing foundries have purchased a little more freely, particularly those in the Connecticut Valley, probably because there is a demand for machinery castings.

Dun's—The uncertainty regarding the European situation, and the broadening scope of the war, have occasioned some hesitation in general business. The effect of this, however, while adding to the underlying conservatism, has not materially changed the recent trend toward normal conditions in the principal industries and trades. The improvement has held its own, and as the special advices received this week from ninety leading cities clearly show, there is a slow but steady expansion in business.

Bradstreet's—While trade and industrial conditions continue to move along generally favorable lines, the week's developments disclose some irregularity. On the one hand, wet or cool weather has checked distributive trade, and especially retail business, and at the same time unsettled international political matters tend to cause wholesale buyers in some lines to go slow, while the same factor holds up certain speculative projects. But, on the other hand, industry is more active, employment is increasing, and war orders continue to cause extraordinary speed at a number of centers.

Marshall Field & Co.—Current shipments of dry goods total about the same as during the corresponding week a year ago. Sales by our traveling organization show an increase over those of the same week last year. The volume of business that is being booked for fall delivery continues to show a gain. Collections are very satisfactory.

ATLANTIC SEABOARD

More talk of firmer prices due to activity in export market. A few additional contracts closed in New England territory. Georges Creek again available for spot delivery. Pennsylvania grades unchanged. Anthracite coming forward slowly and May orders likely to carry over into June.

Bituminous—A few small contracts closed this week have lent color to the increasing talk of firmer prices. The export business is conceded to be in such good shape that some of the buyers, who hitherto have consistently postponed making season purchases, have now already closed, and others are considering doing so in the near future. As a result $2.80 is nearer the figure f.o.b. Hampton Roads than the $2.65 of a month ago, but at the same time there has been no impetus to the trade. It is only because of extremely dull local conditions that the relatively unimportant contracts placed early in the week have been noticed at all. They are significant, however, as showing the trend of the market.

Delivered prices show no material stiffening. At the distributing points there are fewer cargoes being forced on the trade, but the price range depends mainly on the pressure to sell on the part of the various shippers. Some cargoes have waited an undue season and demurrage charges must be heavy.

Georges Creek is beginning to come to Philadelphia and New York, now that foreign tonnage is being cleared more promptly from the Baltimore terminals. This grade has been practically out of the market for spot shipment a month or more, long enough to create a temporary demand for small lots. There will probably be some movement now from Philadelphia in the next 30 days or so.

In the Pennsylvania grades the market continues heavy. Prices reached a low point some weeks ago and there has been no change worth noting. The quality grades are heard from all over the market, but there will hardly be any improvement in demand until Pocahontas and New River are well established on the $2.85 basis.

Water Freights are unchanged. The supply of barge and steamer tonnage is ample for coastwise needs. Sailing vessels continue to charter off-shore as fast as they become available.

Anthracite—Shipments are being made rather more slowly this month than was anticipated. Apparently the curtailment at the mines is having effect and with the companies who do most of the business in this territory there is prospect now that orders will drag over into June. Less is heard here of prices under the circular. Some of the individual shippers are behind on their orders.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.75@2.85
Boston†	....	....	....	3.60@3.78
Providence†	....	....	....	3.55@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous market continues flat though agencies are still optimistic. Curtailment at anthracite collieries fails to help the market and New York Harbor is choked with coal. Some low prices being quoted.

Bituminous—While there has been no tangible change in the demand for bituminous coal the market has strengthened and the prospects for a still better situation are encouraging. The improvement is principally due to increased orders from regular customers who apparently wish to take advantage of the present situation to enlarge their stock piles. The possibility of many Italians employed in the mines returning to their native country has become something of a factor in the situation.

The export business is constantly increasing. New inquiries are being received regularly, a recent one coming from Italy for about 200,000 tons. A shortage of cars is reported along the Baltimore & Ohio and the Chesapeake & Ohio roads but no serious trouble is anticipated.

Local shippers are encouraged by the increased demand and the resultant slight advance in general quotations. While stray cargoes have been picked up at slightly lower prices the lowest average quotation noted is $2.35 f.o.b.

Quotations on the various grades are as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek	$3.00@3.10	$3.00@3.10	$3.00@3.10	$1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.55@2.65	....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	....	....	1.35@1.50
Nanty Glo	2.75@2.80	....	....	1.20@1.25
Barnesboro	2.65@2.70	....	....	1.10@1.15
Somerset County:				
Quemahoning	....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe	2.45@2.55	....	....	0.90@1.00
Greensburg	2.75@2.80	....	....	1.10@1.15
Westmoreland	2.95@3.20	....	....	1.15@1.40
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	0.70@0.80
Steam		2.45@2.50	2.45@2.50	0.90@0.95
Western Maryland		2.35@2.45	2.35@2.45	0.80@0.90

Anthracite—The hard-coal market is dull. The effects of the suspension of mining inaugurated by some of the companies has not as yet become apparent and New York harbor is choked with coal. There is plenty of all sizes to go around with much to spare. Prospects for a better market are not encouraging until the fall, unless it be in a further suspension of operations.

Shippers have had trouble with the demurrage problem. While much of it has had to do with loaded cars there has been considerable coal loaded in bottoms which has to be disposed of quickly to save extra charges; to get rid of this coal on advantageous terms has been a hard problem and some good grades have gone at what might be called extremely low prices.

Of the prepared coals, stove is in best demand; along the line the demand for this size is better than in the Metropolitan district. Nut and egg are heavy with the individuals selling at less than the April circular. The steam sizes show no improvement. Good grades of pea coal have suffered the heaviest cutting according to reports. There is no market for the buckwheat grades, some shippers being willing to take whatever they can get for them, within reason.

Quotations are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.65		$4.70	
Egg	4.90	$4.80	4.95	$4.85
Stove	4.90	4.80	4.95	4.85
Chestnut	5.15	5.00	5.20	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	2.00@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

PHILADELPHIA

Lack of tone in anthracite. Volume of business decreasing, although domestic sizes are well taken up on the curtailed mining. There is no indication of any change in bituminous.

Anthracite—The past month has been in marked contrast with the corresponding period of a year ago. At that time, the demand persisted well into June, but now curtailment has been found necessary even as early as the middle of the current month. The companies are handicapped for facilities to store their surplus sizes. The market is more than absorbing the production of broken, egg and stove on curtailed mining, and doubtless could do more than this, if the other sizes could be disposed of. Chestnut at this season of the year, usually finds a ready outlet in the Lake business, but it is understood that the large stocks carried over at the head of the Lakes have resulted in light orders. The movement of buckwheat and rice is good under the curtailed mining; chestnut and pea seem to be the most difficult to dispose of, with the latter quoted at anywhere from $1.65 to $2 at the mines.

Prices at Tidewater are about as follows:

	Circular	Individuals
Broken	$4.35	$4.35
Egg	4.60	4.60
Stove	4.60	4.60
Chestnut	4.85	4.60@4.70

Bituminous—Prices are uniform, although still at a low level. Considerable coal is moving on contract, and spot business is improving, but the indications for better conditions in the near future are not bright.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Julia Park	British	Baltimore[1]	River Plate	1868	$8.16
Adriatic	British	Baltimore[1]	Italy[2]	1921	10.80
Llanishen	British	Baltimore[1]	Italy[2]	2434	10.80
Nina	Italian	Baltimore[1]	Italy[2]	2171	
Mobile	Cuban	Philadelphia	Santiago	1363	
General Hubbard		Philadelphia	New Orleans	1396	
George E. Dudley		Philadelphia	Nassau	387	
Roselands	British	Norfolk	Genoa	2827	
Hartington	British	Philadelphia	Tarragona	2500	10.80
Isle	British	Baltimore	Alexandria	2485	
Gledhow	British	Baltimore[1]	River Plate		8.76
Woudrichem	Dutch	Baltimore[1]	River Plate	2524	7.56
Ryton	British	Baltimore	Montevideo	2505	8.76
Ryton (option)	British	Baltimore	La Plata	2505	8.64
Ioannis P. Goulandris	Greek	Baltimore[1]	Italy	2026	10.80
Camilia	Norwegian	Baltimore	Port Limon	1550	
Noordijk	Dutch	Baltimore	River Plate	1383	
Balto	Norwegian	Baltimore	Gothenburg	2242	
Westmount	British	Philadelphia	Havana	1171	
Esther Ann		Norfolk	Savannah	631	
Alf	Danish	Baltimore	Havana	1337	
Eveline	British	Baltimore	River Plate	1660	
Upo Mendi	Spanish	Virginia	Spain[3]	2562	10.20
Alice B. Phillips		Philadelphia	Martinique	451	
Stanley M. Seaman		Philadelphia	Porto Rico	953	
Edward Stewart		New York	Halifax	353	1.60
Egyptian Transport	British	Atlantic Range	San Diego	2924	6.46
Songa	Norwegian	Virginia	River Plate	1850	8.40
Ryton	British	Baltimore	Montevideo	2505	10.80
Dewa	British	Atlantic Range	Italy[2]	2340	
Fert	Italian	Atlantic Range	Italy[2]	3542	
Talisman	Norwegian	Baltimore	Havana	1178	
Lindisfarne (bark)	Russian	Baltimore	Buenos Ayres	1631	
Evie B. Hall		Philadelphia	Halifax	360	1.50

Note—Steamers are indicated by **bold face type,** all others being schooners.
[1] Or Virginia. [2] West coast. [3] Or Mediterranean port.

BALTIMORE

Anthracite conditions poor and betterment comes but slowly to the bituminous trade. Failure of the Northwest to figure in the spring trade is felt. Export business holds good.

Hard-coal agencies are far from satisfied with conditions. Many consumers are showing a disposition to withhold all save emergency orders. The result has been a dull period in offices of anthracite shippers.

In bituminous there is but slow response to the much talked of betterment of industrial conditions. Prices remain steady as compared with the previous week. As contracts are closed that make the market for best grade coals a little more restricted, there is a growing tendency to hold those fuels a little tighter, but ordinary and medium grades are still offering freely at low figures. Failure of the West, and Northwest more particularly, to figure heavily in the early spring trade is being felt. West Virginia gas coals, especially, have failed of their usual spring rise.

Export business continues good. Last week the foreign movement ran close to 47,000 tons, and there is no longer any doubt but that the total for May will run considerably over the 200,000-ton mark, the first time that such a tonnage has ever been shipped from this port. Italy and the Argentine still absorb the best part of the foreign movement. Most of the coal going from this port to Italy is for street railway and electric lighting plant use which only a successful invasion of Italy could well halt.

Charters for the past week included the following:

Vessel	Nationality	To	Rate
Monkshaven	British	River Plate	$9.54
Evaline	British	River Plate	9.60
Fert	Italian	West Coast of Italy	....
Camilla	Norwegian	Port Limon	....
Egyptian Transport	British	Tiburon	....
Enrico Parodi	Italian	West Coast of Italy	10.80
Dewa	British	West Coast of Italy	10.80
Ocland	Norwegian	Daiquiri	.....
Alf	Danish	Havana	..
Iolannis P. Goulandris	Italian	West Coast of Italy	10.80
Panughi Lykiardopoulus	Greek	River Plate	9.36
Balto	Norwegian	Gothenburg, Sweden	...
Isle of Jura	British	Alexandria, Egypt	11.00
Gledhow	British	River Plate	9.60

HAMPTON ROADS

Export shipments still large. Government takes coal for west coast. No change in prices. Coal going in storage at Sewalls Point.

Dumpings over the piers at tidewater have made a good showing during the week although the coastwise shipments are perhaps not so heavy as anticipated. The export movement from Hampton Roads is still large, especially to the Italian market which has taken over 60,000 tons during the week. The movement to the Canal Zone and Brazilian ports has shown up well and while a number of the cargoes to Brazil have been handled by schooners one large cargo of 6000 tons went by steamer to Santos. The largest cargo of the week, however, went to the Canal Zone by the new collier "Ulysses." This vessel took 12,021 of cargo and 979 tons of bunker coal.

The export movement is all Pocahontas or New River mine-run. The New England coastwise shipments have consisted of high volatile mine-run, smokeless and also prepared coals and nut and slack, and have moved to Boston, Calais, Me., Providence, Portland, New Bedford, and Everett. Bunker vessels coaling during the week have taken in some cases as much as 1800 tons and over, due probably to scarcity of coal in European ports.

There has been practically no change in prices at tidewater. The accumulation of coal on the railway yards is still somewhat in excess of normal with a fair quantity moving from the mines. There is, however, a heavy amount of vessel tonnage due which should cut well into the accumulation. Coal is now being dumped into the storage plant at Sewalls Point and it is expected this will be continued during the summer or at least until the demand is such that coal cannot be gotten forward from the mines fast enough to supply vessel tonnage as it arrives.

Coal shipments from Hampton Roads week of May 14 to 21 were:

Norfolk			Norfolk		
Vessel	Destination	Tons	Vessel	Destination	Tons
Carmen[1]	Genoa	7008	**Procida**	Genoa	5471
Ulysses	Cristobal	12021	Pendleton Sisters	Lisbon	1391
Solone	Genoa	4678	**Swindon**	Messina	6880
Belgier[2]	Genoa	8455	**Berwindvale**	Havana	8100
Rosalia	Santos	6080	**Juno**	Cagliari	4634
Vittorie	Cagliari	3383	S. P. Bowers	San Juan	919
Enricheta	Messina	6700	**Nea Ellas**	Piraeus	5496
Bygland	Kingston	3600			
Angeesea	Genoa	7859	**Margaret Thomas**	Pernambuco	1840
Teno	Valparaiso	1095	E. W. Hinckley	St. Michaels	1095
Howth Head	Las Palmas	5689			
Ella M. Wiley	Rio Janeiro	911	Newport News		
Maude Palmer	Para	2416	**Ydun**	Tampico	1733
W. H. Sumner	Maranhan	720	**Stromboli**	Genoa	7200

Note—Steamers are indicated by **bold face type**, all others being schooners.

Shippers—[1] Flat Top Fuel Co. [2] Pocahontas Fuel Co.

Railroad Tonnages—Dumpings over the local piers for the past several weeks were as follows:

	Week Ending			
Railroad	May 1	May 8	May 15	May 22
Norfolk & Western......	....	208,179	151,113	162,921
Chesapeake & Ohio......	60,967[1]	88,609[2]	80,045	84,286
Virginian..............	65,099	45,116	57,903	39,431
		341,904	289,061	286,638

[1] Week ending Friday. [2] Nine days.

OCEAN FREIGHTS

South American charters easier. Activity in negotiations for Spanish and Italian tonnage.

The export coal trade is growing daily and numerous steamers have been chartered for this business since our last report.

South America—These rates are softer and steamers can now be secured at concessions under last fixtures.

Mediterranean—A number of steamers were chartered since our last report at $10.80 to west coast of Italy, and it is too early to state what effect the entrance of Italy into the war will have upon freight rates to this destination. Seven or eight steamers were recently chartered to take coal to Spanish ports, some for four voyages at $9.60 and others for single voyages at $10.20. We daily have boats offered us at $9.60 for single voyages and at $9.24 for four voyages to Spanish ports, other terms being 500 tons per day discharge at 1 peseta, Spanish dues for account of cargo.

Cuba and West Indies—A few steamers were chartered for these destinations during the past week, and rates are unchanged.

To	Rate	To	Rate
Havana...............	$2 00@2.25	Bermuda..............	$3.50@3.75
Cardenas or Sagua......	3.00@3.25	Vera Cruz..............	**3.50**
Cienfuegos.............	2.75@3.00	Tampico...............	**3.50**
Port au Spain, Trinidad.	3.75@4.00	Rio...................	8.64@9.12
St. Lucia..............	3.50@3.75	Santos................	8.88@9.12
St. Thomas.............	**3.25**	Montevideo............	**7.92**
Barbados...............	3.75@4.00	Buenos Aires or La Plata	8.16@8.40
Kingston...............	2.75@3.00	Rosario...............	8.40@8.64
Curacao................	3.75@4.00	Mediterranean*.........	**10.80**
Santiago...............	2.75@3.00	Spain**...............	9.36@9.60
Guantanamo.............	2.75@3.00	Valparaiso†............	**6.72**
Demerara...............	5.25@5.50	Marseilles.............	**10.80**

Note—Rates noted in **bold face** type are only approximate.
* To a direct port on the West coast of Italy.
† With 800 tons per day discharge.
**Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

LAKE MARKETS

PITTSBURGH

Pittsburgh market adversely affected by Ohio settlement. Prices not quotably changed, however. Mining at 50 to 60% of capacity.

The Pittsburgh district coal trade, already in poor shape, cannot expect to be improved by the settlement of the labor troubles of so long standing on the other side of the state line. It has frequently been stated in Pittsburgh coal circles that the troubles of the Pittsburgh district's coal market have arisen, not so much from competition within, as from competition without. It has been difficult for the Pittsburgh district to meet the other districts in competitive markets, and the consumptive area directly tributary to Pittsburgh is naturally far from sufficient to operate the mines even at one-half capacity, particularly when the steel industry and its customers are operating at only about 70% capacity.

Pittsburgh coal prices are not quotably changed, except that slack, with the growth of the Lake season, has softened a trifle further. Prices on free coal are about as follows: Slack, 55@65c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district. On Lake coal the usual asking price is $1.15 and while this is an extremely low price compared with other seasons, it has been shaded occasionally. On contracts with regular consumers to run to Mar. 30 the usual asking price is $1.15 on mine-run, but this can also be shaded. The mines are operating at 50 to 60% of capacity.

BUFFALO

Improvement in trade hardly perceptable though some shippers report better conditions. Anthracite continues as dull as ever.

Bituminous—The consumer is very slow about buying. There is no stocking up and sellers have to depend on a temporary business. Concessions in prices are necessary to get rid of lagging shipments and consumers now refuse to buy at all except at reduced prices. The railroads are not buying as much coal as three months ago, though stocks of fuel must be getting low.

There is no improvement in the Canadian trade, which was poor before the European war began, and has been growing steadily worse right along. The Canadian view of the situation is that an actual state of war exists and nothing but emergency measures should prevail.

Bituminous prices are still based on $2.70 for Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack.

Anthracite—There is no improvement as yet and a very quiet summer is in prospect. The movement by Lake is the only branch that shows activity. The rail-line trade has fallen off still more of late, so that the Lake loadings did not take care of the surplus and some of the companies have been forced to curtail operations, which is rather unusual for this time of the year.

The city trade is so quiet that the retailers are obliged to turn their teams to other work earlier than usual, which is not easy to do. On the other hand the natural-gas operations in this section are very active. This week a new well came in near here with a flow of 1,000,000 ft. of gas daily. Other wells are going down in the same district and they tell heavily against the anthracite trade.

The Lackawanna and Lehigh Valley docks are very active in loading coal for the Upper Lakes, the total for all companies being 156,500 tons for the week.

TORONTO, CAN.

Demand substantially less than normal and the outlook generally discouraging.

Market conditions are unchanged and trade in all lines continues quiet, the demand being considerably below normal. Enforced economy among working people, owing to unemployment or decreased earnings, has reduced sales of anthracite for domestic uses and manufacturing, except in a few lines is inactive, many consumers buying merely from hand to mouth. Prices for best grades are as follows: Retail anthracite egg, stove and nut $7.50; grate, $7.25; pea, $6; bituminous steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars, three-quarter lump, $3.56; screenings, $2.90.

TOLEDO

Light Lake movements. Contract coal not selling well just now. Prices holding close to list on sales made.

The coal market here continues dull, the movement is light and the Lake movement is very slow. Threshing coal is in fair demand and it is believed that railroad contracts will be made within a few months. The opening of the Pittsburgh No. 8 mines will not make much difference in the Toledo situation except that more of that coal will be handled, but it will be at the expense of the West Virginia product. There is no heavy movement of smokeless coal although some of the prepared sizes are difficult to secure. Hocking grades are moving slow. Cambridge and Kentucky coals are in fair demand and list prices are being fairly closely maintained on all lines. There are not many contracts being made.

CLEVELAND

The market is unchanged with fluctuations confined to narrow limits. The Lake trade is slowly improving.

The market is just holding its own. The supply of coal that ordinarily goes to the Lakes and leaves the Cleveland market with a surplus of fine coal is not as large as in other years. There were ample stocks of all kinds of coal, and buyers were able to get practically the same prices on anything they wanted.

No. 8 operators and miners formally signed the contract in Cleveland last week. This officially ended the strike and all No. 8 operators are about ready to ship some coal. So far no No. 8 coal has come into the open market. The larger companies that have Upper Lake dock connections are planning to restock the docks which have not received any No. 8 coal in more than 18 months.

Lake shipments are slightly better than two weeks ago, but some of the shippers are confining themselves to such coal as they are forced to take. The supply of boats exceeds the number of cargoes except small boats. These are not in operation and shippers are not able to move cargoes under 4000 tons as promptly as they would like to.

Quotations for shipments to jobbers are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	.....	.....	.....	.....
Lump, ¾ in.	.....	$2.20@2.25	$2.00	$1.80@1.85	$1.75@1.85
Egg	3.10	.....	.....	.....	.....
Mine run	2.65@2.70	2.10	1.85	1.85@1.90	1.75@1.85
Slack	.....	1.65@1.70	1.60	1.65@1.70	.....

COLUMBUS

Buying for school purposes and the approach of the stocking season cause better demand for domestic grades. Steam business is still slow.

One of the features of the trade during the week was the better feeling in domestics because of school buying. Considerable outside buying is also being done for delivery during the coming month. This has given a certain firmness to domestic grades and causes a better feeling in coal circles generally. Some attention is being given to the stocking season, which is expected to be earlier than usual.

Retail trade is quiet but prices are holding up firm on all grades. Retailers' stocks are not heavy and they must come into the market before the stocking season arrives. Another feature is the demand from rural sections for threshing purposes, which is a noticeable factor in Ohio during June and July.

Steam business is quiet all along the line. Manufacturing is still slow, with the exception of war materials and consequently fuel requisitions are not large. Railroads are taking the normal tonnage for freight movement; practically all of the railroad fuel contracts have now been closed. Contracting for steam tonnage is slow because of cheap coal; contracts are being made at a less rate than prevailed last year.

Lake trade is quiet although a larger tonnage from Ohio mines is going to the Northwest. Chartering of boats is not very active because of the uncertainty of the future. A number of Ohio operators do not expect to do any Lake business until after July 1. Docks at the Upper Lake ports are still congested and the interior movement is slow.

Production in Ohio fields has not been increased with the exception of the Pomeroy Bend district which now reports 50 to 60% of the average. In the Hocking Valley the output has been 35% and the same is true of Jackson and Cambridge fields. In the Crooksville field the output is 30%. The production in most fields is expected to be increased as soon as the stocking season opens in full blast.

There is a better demand and higher prices for the small sizes due to curtailed production.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.65
Coarse slack	.55	.60	.55

CINCINNATI

A slight improvement in the steam market. Supplies still in excess of demand, due to progress of the Lake movement of domestic. Contracting is noticeably slow and backward.

Close observers are of the opinion that the industrial situation has improved to some extent and that there has been an increase in steam consumption. Lack of confidence seems to be the principal trouble. Contracting is more backward than for several years, many large consumers refusing to tie themselves up for a supply of coal in spite of a general feeling that the trend of prices from now on will be toward higher levels. Hand-to-mouth purchasing continues the rule although price concessions are not believed to be so general. The domestic market is to some extent affected by the same disinclination of the trade and consumers to buy ahead.

LOUISVILLE

Somewhat better tone to the market generally though retail trade is heavy.

The week has seen a turn for the better in the Kentucky coal market, both as to the industrial and the domestic trade. The stocking movement of the retailers has begun on a more or less extensive scale, which is having the result of increasing the supply of steam coals and reducing their prices, while at the same time the working periods are being extended. The Illinois Central has announced that it will store no coal this summer but increase in its current requirements has been of assistance to western Kentucky.

Prices, f.o.b. mines, range about as follows: Block, $1.40 to $1.85; No. 1 steam run of mine, $1; four-inch, 80 to 85c. and nut and slack, 50 to 65c. The retail situation is said to be most distressing with coal in Louisville cheaper than for many years.

COKE

CONNELLSVILLE

Furnace coke market dragging, with fair activity in foundry coke contracting.

The Connellsville coke market still drags. There is more or less inquiry for furnace coke, but it all seems to be of a desultory character. Foundry coke continues its activity as to contracting, but as it is still more than a month until present contracts expire the buying is of a quiet character, and chiefly by consumers who always take the best grade of coke, of which there is only a limited supply. The four operators making a specialty of the highest grade foundry coke are asking $2.40, but some will close freely for the twelvemonth and others are trying to limit contracts to six months, with only a moderate degree of success. We quote: Furnace coke, prompt, $1.50@1.55; to July 1, $1.60; to Jan. 1, $1.75; foundry coke, prompt, $2@2.40; contract, $2.20@2.40, per net ton at ovens.

The "Courier" reports production at 297,554 tons and shipments at 295,967 tons for the week, showing no material change from the preceding week.

Buffalo—The recent slight stir in coke has not been maintained and the market has settled down again to the old quiet state, with prices still at the bottom, on the basis of $4.15 for best Connellsville foundry and $3.15 for stock coke.

Chicago—The coke market is dull and weak, with no signs of improvement. Very little, if any coke is being sold at present, but some contracts for foundry coke are being discussed. Prices are as follows: Byproduct, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

MIDDLE WESTERN

GENERAL REVIEW

Screenings active at strong prices but domestic sizes flat. Some buying from the Northwest. Anthracite moving slowly.

Prices are generally well maintained considering the lack of demand. Some operators are confronted with the problem of having to meet a normal demand for screenings when practically no orders are being received for the coarse sizes. Retal trade is on a very moderate basis, and it is said that some of the yards are slashing prices to keep their equipment busy. It is hoped that consumers who usually buy during the low-priced periods will begin to lay in their supplies next month. The movement of soft coal via the Lakes is still very slow.

The volume of domestic trade is less than usual at this time of the year. The dealers are probably awaiting what is usually termed the "summer storage season" before stocking. Last year considerable high priced coal was carried through the winter and dealers will be careful to avoid a repetition of this state of affairs.

Contracting is still delayed. A few buyers from the Northwest have appeared to look over the situation, make inquiries and close some contracts for the coming season's supply. There is a tendency on the part of these buyers to make their purchases direct from the operators instead of dealing with jobbers. The consumption of railroad coal has fallen off generally since May 1, and the best informed do not expect an increased consumption until late mid-summer.

CHICAGO

Heavy demand for screenings. Railroads holding off for lower prices. Some activity in contracts on smokeless.

Conditions in the Southern Illinois field have changed but little; screenings are the feature of the trade, and have been soaring around the highest mark of the year. Prices for other sizes are well maintained, although the demand is nil.

The situation in Indiana continues about the same, with the domestic trade dwindling to almost nothing and no improvement anticipated before the middle of June. There is no activity in the steam coals except screenings, although the limited production is holding prices steady. There has been some price cutting in order to move a few shipments of domestic coal to retail yards in Indianapolis.

The railroads are not placing contracts for Springfield coal as fast as anticipated, and are evidently out for lower prices. Screenings are the feature of this district, bringing around 85c. with the prospects of going higher.

The smokeless situation is much stronger, and there is no record of any lump or egg having been offered in the Chicago market during the last week at less than $1.70. The retail yards are reported to have little of this coal on hand, and it is felt that they will soon be ordering heavily. There is quite a little contracting for smokeless coals, some retailers evidently believing that they had better get under cover before it is too late, in view of the export situation.

There is little buying in splint coals, and some spot shipments have been sold at off prices.

The Hocking situation is unchanged from last week, and prices are variable without, however, any spot coal on the market to be sacrificed.

Eastern Kentucky coals are offered at all kinds of prices but little tonnage is being taken.

Anthracite is slow, but no doubt the closing days of this month will find orders largely increased. The retailers are buying very small quantities for current consumption, and have not yet placed their storage orders. Circular prices are being maintained by the independents.

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Greene Co.
Lump......	$1.25@1.35	$1.15@1.30	$1.35@1.50	$1.25@1.50	....
Steam lump	....	1.15@1.20	1.15@1.25	1.10@1.25	....
2½-in. lump.	....	....	1.20@1.30	1.15@1.25	....
1¼-in. lump.	....	....	1.05@1.25	1.10@1.15	....
Mine-run...	1.10	1.00@1.10	0.85@1.10	1.00@1.10	....
Egg.......	1.25@1.35	1.15@1.25	1.15@1.25	1.15@1.25	....
No.1washed	1.25@1.35	....	1.50@1.60	....	....
No.2washed	1.20@1.30	....	1.75	....	....
Nut.......	....	1.00@1.05	0.95@1.10	1.00@1.10	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	.90@1.00	0.85@0.90	.80@0.95	0.85@0.95	....

	Harrisburg Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.35	$1.15@1.35	$1.70	$1.50	1.35@1.50
1¼-in. lump.	1.15@1.25	1.15@1.25	....	....	....
Mine-run...	1.00@1.10	....	1.25	1.15@1.25	
Egg.......	1.10@1.25	0.95@1.10	1.60@1.70	1.40@1.60	1.25@1.40
No. 1 nut..	....	....	....	....	1.15@1.25
Screenings..	0.85@0.95	....	....	....	....

Greene County 5-in. lump, $1.25@1.35; 3-in. lump, $1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.05@1.15; mine-run, $1@1.10; screenings, 85 to 95 cents.

INDIANAPOLIS

Slight improvement in both steam and domestic demand. Situation still generally heavy.

Conditions show little change, week by week and mine operations are down to the summer level though the mine owners seem quite cheerful as to the future. There is a slight improvement in the demand for steam grades and if this keeps up, the industry will eventually be on a normal basis again. May has been much cooler, relatively, than April and even March, and there has been an unexpected call for domestic lump. Screenings are still in first class demand at prices ranging from 80c. to 95c. Conditions do not justify throwing coal on the local market and operators prefer to limit the output of the mines to the current necessities of the trade. The mines are running three to four days a week. Money is plentiful and the crop outlook satisfactory.

ST. LOUIS

Selling combine in the Standard district collapses. Good movement on retail storage orders. Steam business weak.

The break-up in the selling organization for the mines in the Standard district is the feature of the market. Parties to the agreement commenced cutting prices on the excuse that they had coal to move and must meet competition. The independents claim it is a price-cutting war to force them into the arrangement. There is very little domestic coal moving either in the city or country. The steam demand is exceptionally light and prices are weaker. Carterville is held at about 85 to 95c., and Standard 80 to 85c.

Anthracite is doing fairly well; it is not being pushed too hard so the tonnage moving is easy. Smokeless tonnage is slightly better than a year ago, but not in the volume that it formerly moved.

In the retail trade advance storage orders for future delivery are good; present delivery is about the same as 1914, which showed a remarkable falling off from previous years. This would indicate that business conditions are considerably below normal, and that the future is somewhat of an uncertainty to the ultimate consumer.

KANSAS CITY

Business somewhat improved and trade rather better than usual.

The retail business in Kansas City showed a slight improvement during the week, due to the cool rainy weather, but it was hardly great enough to be noticed and did not affect prices in any way. The wholesale business is gradually increasing and the companies report that they are selling all the coal that is coming into this market. Both the retail and the wholesale prices are still down to the low point and most of the operators will leave them there for the summer trade.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during April and the previous two months:

	February		March		April	
	1915	1914	1915	1914	1915	1914
Coal.......	1,906,210	2,385,243	2,094,607	3,173,972	2,159,914	2,131,812
Coke.......	232,111	265,380	257,099	356,164	289,369	343,962
Total....	2,138,321	2.650.623	2,351,706	3,530,136	2,449,283	2,475,774

IMPORTS AND EXPORTS

The following is a comparative statement of coal imports and exports of the United States for March, 1914-15, and for the nine months ending March, 1913-14-15, in long tons:

	Nine Months			March	
Imports from:	1913	1914	1915	1914	1915
United Kingdom	7,451	9,691	29,950	1,231	2,680
Canada	1,061,411	746,286	842,440	91,645	99,940
Japan	42,657	83,208	68,251	1,732	4,050
Australia and Tasmania	117,158	197,925	141,880	25,798	17,749
Other countries	3,257	3,430	1,507	1,420	60
Total	1,231,934	1,040,540	1,084,028	121,826	124,479
Exports:					
Anthracite					
Canada	3,324,179	2,607,383	2,411,403	162,152	125,114
Argentina	....	....	212	....	212
Brazil	....	....	6	....	....
Uruguay	....	84	....	....	....
Other countries	58,947	46,639	41,710	1,279	1,869
Total	3,383,126	2,654,106	2,453,331	163,431	127,195
Bituminous					
Italy	....	....	706,960	....	72,371
Canada	8,295,614	9,577,352	6,581,129	620,366	273,395
Panama	340,259	281,394	218,397	23,690	47,600
Mexico	264,537	235,122	305,953	29,978	34,899
Cuba	915,889	902,437	781,559	115,303	110,585
West Indies	456,013	425,071	323,960	44,614	46,563
Argentina	....	99,388	217,797	22,978	33,404
Brazil	....	196,837	273,015	11,150	42,827
Uruguay	....	40,492	40,767	18,453	10,273
Other countries	741,597	905,457	513,103	132,080	20,937
Total	11,013,909	12,663,550	9,962,640	1,018,612	692,854
Bunker coal	5,377,071	5,754,530	5,031,390	643,942	579,027

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for March and the nine months of the fiscal years 1914 and 1915, in short tons:

	March				Nine Months			
Destination	1915	%	1914	%	1915	%	1914	%
Tidewater	314,726	22	323,567	20	2,675,382	17	2,587,748	19
East	205,419	14	242,136	15	1,885,871	12	1,987,701	15
West	811,645	57	931,657	59	10,111,010	65	8,163,886	60
Total	1,331,790		1,497,360		14,672,263		12,739,335	
From Connections								
Bituminous	104,007	7	98,733	6	833,501	6	825,951	6
Anthra. (local)	158				406			
Anthracite	283		945		10,706		11,421	
Total	1,436,238	100	1,597,038	100	15,517,063	100	13,576,707	100
Coke	18,373		40,658		134,996		292,105	

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during March and the first three months of the last two years, in short tons:

	March		3 Months	
Anthracite	1914	1915	1914	1915
Baltimore & Ohio[1]	149,483	88,592	407,542	307,448
Chesapeake & Ohio[1]	945	441	3,051	2,172
Erie[2]	740,234	664,440	2,128,608	1,910,876
Pennsylvania[1] [3]	1,086,344	814,872	2,706,391	2,480,729
Virginian[2] [1]	43	......	52	85
Total 5 roads	1,977,049	1,568,345	5,245,644	4,701,310
Bituminous				
Baltimore & Ohio[1]	3,338,058	2,238,382	8,952,917	6,702,615
Buffalo, Roch. & P.[1] [2]	923,513	636,918	2,495,420	1,811,524
Buffalo & Susq.[1] [2]	150,187	76,810	432,926	271,844
Chesapeake & Ohio[1]	1,596,093	1,435,797	4,390,821	4,514,474
Erie[3]	6,096	10,300	28,203	30,166
Hunt. & Br'd T. Mt.[1] [2]	127,110	72,733	329,957	237,885
New York Central[3]	918,706	708,397	2,492,765	2,203,206
Norfolk & Western[1] [2]	2,112,118	1,904,752	5,744,407	5,412,711
Pennsylvania[1] [3]	4,740,313	3,243,270	12,414,492	9,845,684
Pitts. & Lake Erie[1] [2]	1,304,413	592,546	3,090,822	1,736,916
Pitts. Shaw. & North[1] [2]	256,971	166,783	791,255	592,098
Virginian[1] [2]	336,952	309,414	1,003,817	936,983
Western Maryland	317,335	281,634	843,232	846,988
Total 13 roads	16,127,865	11,677,736	43,011,034	35,143,094
Coke				
Baltimore & Ohio[1]	356,164	257,099	896,499	710,605
Buffalo, Roch. & P[1] [2]	28,878	35,006	79,699	100,424
Buffalo & Susq.[1] [2]	41,162	53,906	110,859	150,654
Chesapeake & Ohio[1]	40,658	18,373	111,108	44,119
Norfolk & Western[1] [2]	103,070	71,124	317,684	209,924
Pennsylvania[1] [3]	1,027,339	876,532	2,700,237	2,303,835
Pitts. & Lake Erie[1] [2]	521,626	380,827	1,341,139	959,545
Western Maryland	9,402	4,176	24,138	8,201
Total 8 roads	2,128,299	1,697,043	5,581,363	4,487,307

Total Coal and Coke 13 Roads	1914	1915
January	18,157,998	15,685,798
February	15,446,830	13,702,789
March	20,233,213	14,943,124
Total 3 months	53,838,041	44,331,711

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 250,919 short tons of bituminous coal during March, 1914, and 537,162 short tons during the three months ending March.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for April of the current year and the four months of 1914 and 1915, in short tons:

	April		Four Months	
	1915	1914	1915	1914
Anthracite	1,126,690	1,050,365	3,607,419	3,705,806
Bituminous	3,358,062	3,437,040	13,203,746	14,967,184
Coke	832,427	910,560	3,136,262	3,593,030
Total	5,317,179	5,397,965	19,947,427	22,266,014

I. C. C. Nos. 5572, 5584, 5651—Campbells Creek Coal Co., Campbells Creek R.R. Co., H. C. Dickinson vs. Ann Arbor R.R.

Upon rehearing; **Held,** That through routes and joint rates should be established for the transportation of coal from points on the line of the Campbell's Creek R.R. to the interstate destinations mentioned in Kanawha & Michigan Ry. tariff I. C. C. No. 31 and supplements thereto, and such joint rates should not exceed the main-line or district rates now applied from points on the lines of the Coal & Coke and the Kanawha & West Virginia railroads to the same destinations.

I. C. C. No. 6415—E. I. Du Pont De Nemours Powder Co. vs. Wabash R.R. Co., Et al.

The Wabash R.R. Co. filed and posted a tariff naming a through rate of 90c. per net ton on bituminous mine-run coal in carloads from Springfield and Riverton, Ill., to Mooar, Iowa, in which the delivering line was not named as a party and had not concurred. Charges were collected on shipments from and to the points named on the basis of the combination of intermediate rates. Reparation awarded against the carrier which issued the tariff, on showing that complainant relied on the through rates published, to its injury.

FOREIGN MARKETS

GREAT BRITAIN

Rearrangement of export business under the new rules. Opening of navigation at Archangel.

May 14—The chief feature of the coal markets throughout the country this week was dullness and lack of all activity on account of foreign business, by reason of the uncertain position created by the new coal-export regulations. It is stated that already a good many lincenses to ship coals to Scandinavia on near dates have been promptly received, though there are reports that some licenses for Sweden have been refused. The news that the port of Archangel, through the special efforts of the icebreakers, has now been opened to navigation marks the commencement of activity from Newcastle district to the White Sea. Trading has already commenced, and several steamers are on their way from this country.—"The Iron and Coal Trade Review."

Exports—British exports for April and the first four months of the past three years were as follows:

	April			Four Months		
To	1913	1914	1915	1913	1914	1915
Russia	347,247	218,445	5,404	792,367	771,000	5,404
Sweden	435,533	281,932	264,286	1,322,657	1,028,010	1,021,563
Norway	186,251	185,219	228,765	827,169	880,543	921,109
Denmark	270,312	193,853	258,217	1,053,446	913,622	991,224
Germany	804,747	691,939	......	2,682,372	2,566,953	......
Netherlands	156,411	134,516	102,532	711,731	552,708	540,184
Belgium	177,612	102,393	......	792,286	594,384	......
France	1,124,623	977,847	1,478,279	4,352,416	4,769,297	5,398,042
Portugal[1]	117,098	111,833	65,823	494,570	464,695	365,130
Spain[4]	295,067	292,197	167,567	1,322,086	1,251,119	706,610
Italy	793,528	659,192	462,391	3,222,576	3,051,507	2,222,413
Aus. Hung.	65,413	86,036	......	465,498	304,226	......
Greece	67,490	65,684	38,647	217,325	252,713	150,425
Roumania	16,644	29,348	......	23,932	75,673	......
Turkey	13,420	45,741	3,073	47,096	217,375	3,073
Algeria	107,471	88,068	108,356	482,990	409,922	361,051
Portuguese[5]	33,719	23,682	7,598	111,360	86,658	73,135
Chile	68,615	37,207	9,139	211,558	184,065	21,979
Brazil	234,089	93,327	94,551	730,608	487,546	258,055
Uruguay	71,901	54,148	30,275	254,346	238,260	158,950
Argentine	338,859	312,518	201,020	1,258,061	1,324,264	738,891
Channel Is.	16,066	9,434	12,454	48,848	50,885	44,749
Gibraltar	35,021	48,132	31,708	140,950	145,445	134,468
Malta	66,064	31,443	13,101	312,313	180,366	41,795
Egypt[2]	352,066	263,695	120,815	1,092,081	1,146,699	517,512
Aden[3]	9,461	10,761	24,746	42,075	63,412	46,841
India	12,146	26,659	261	77,787	66,959	11,171
Ceylon	11,259	36,508	......	72,380	123,224	17,131
Miscell'ous.	122,736	102,261	40,756	426,994	442,857	238,585
Coke	70,200	67,615	70,523	352,390	369,364	305,697
Briquettes	184,145	164,095	145,559	691,347	666,276	388,907
Total	6,605,214	5,445,728	3,985,846	24,633,615	23,680,027	15,684,094
Bunker	1,795,946	1,624,282	1,175,764	6,747,177	6,659,730	5,154,395

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.

Note—The figures in the above table do not include Admiralty and certain other shipments.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let Section on page 12.

+Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
475	Rock Island Arsenal	Rock Island	Ill.	200b	675
475	Rock Island Arsenal	Rock Island	Ill.	100c	675
599	J. M. Robin, Nort. & Co.	Louisville	Ky.		794
600	The American Elec. Co.	Chicago	Ill.	150*	794
601	Clinton Sugar Refin. Co.	Clinton	Iowa	70,000	794
603	Inter-Sou. Life Ins. Co.	Louisville	Ky.		795
606	Bash Fert. & Chem. Co.	Fort Wayne	Ind.		795
608	Lou'v'e. Cereal Mills	Louisville	Ind.	125†	795
610	McDonald Mfg. Co.	Dubuque	Iowa		795
614	Board of Education	Titusville	Penn.	2,000	795
617	Municipal Government	Kalamazoo	Mich.	2,000	795
621	Municipal Government	Luverne	Minn.	1,500	795
623	Municipal Government	Newton	Iowa	140†	795
624	Board of Education	Providence	R. I.	8,500a	795
640	City Government	Fall River	Mass.	8,000b	834
680	Bd. of School Comrs.	Utica	N. Y.	3,200ab	876
705	Board of Education	Corning	Iowa	200	877
716	Bur. of Sup. & Accts.	Puget Sound	Wash.	100c	916
717	Board of Education	Burlington	Iowa	2,200	916
725	County Comrs.	Northampton	Mass.		916
729	3rd Miss. R. Dist.	Vicksburg	Miss.	10,000b	916
751	United States Navy	Washington	D.C.	12,155a	917
751	United States Navy	Washington	D. C.	200b	917
752	United States Navy	Washington	D. C.	7,470c	917

a Indicates anthracite coal. b Indicates bituminous. c Indicates coke. * Per month. † Per week.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

+**No. 664—Washington, D. C.**—Complete list of bids on this contract (p. 836) are given in the accompanying tables. The B.t.u. value of the coal on which the bid is made is given under each quotation.

CLASS 1—45,000 tons, for power plant, Brooklyn.

CLASS 2—50,000 tons steaming coal, (a) for delivery, f.o.b. lighters at Navy Yard, Brooklyn, (b) for delivery in New York Harbor, in lighters alongside vessels, (c) for delivery in New York Harbor, coal unloaded, stored, and trimmed on following vessels, 1, "Solace," 2, "Gloucester," 3, "Culgoa," 4, "Machias," 5, "Wasp," 6, "Tonopah."

CLASS 3—45,000 tons steaming coal, (a) f.o.b. barges at piers, Philadelphia, (b) f.o.b. lighters alongside at Navy Yard, Philadelphia, (c) f.o.b. cars, Navy Yard, Philadelphia.

CLASS 4—35,000 tons steaming coal, Philadelphia Navy Yard, (a) for delivery f.a.s. wharf, (b) f.o.b. cars.

CLASS 5—7500 tons steaming coal, (a) f.o.b. U. S. naval barges at Baltimore, (d) in supplier's barges, f.a.s. ships or wharf, Annapolis, Md., (e) f.a.s. ships or wharf, to be stored and trimmed on ships or stored ashore at contractor's expense.

CLASS 6—75,000 tons steaming coal, Baltimore, (a) f.o.b. barges at piers, (b) in vessels alongside vessels in harbor, (c) in lighters alongside in river between Sparrows Point and Harbor Limits including discharging and trimming in bunkers, (d) in lighters alongside within Harbor Limits, including discharging and trimming in bunkers.

CLASS 7—7500 tons steaming coal, f.o.b. cars, Washington Navy Yard.

CLASS 8—400,000 tons steaming coal, (a) f.o.b. vessels or barges under chutes at piers, Hampton Roads, (b) f.o.b. vessels under chutes at piers, Philadelphia.

CLASS 9—Item 1, 8000 tons semibituminous coal, f.o.b. cars, Navy Yard Charleston, S. C., item 2, 4000 tons semibituminous coal, (a) f.o.b. lighters alongside U. S. naval vessels in Charleston harbor, (b) delivered to vessels alongside contractor's wharf, Charleston, S. C.

CLASS 10—25,000 tons semibituminous coal, Indian Head Md.

CLASS 11—2500 tons, bituminous coal, Chelsea, Mass.

CLASS 12—1300 tons bituminous coal, Lake Denmark, N. J.

CLASS 13—1500 tons bituminous coal, Naval Experiment Station, Annapolis, Md.

CLASS 14—12,000 tons bituminous coal, Naval Academy Annapolis, Md.

CLASS 15—2500 tons bituminous coal, Naval Medical School, Washington, D. C.

CLASS 16—30,000 tons bituminous coal, Navy Yard, Washington, D. C.

CLASS 17—15,000 tons semibituminous coal, Norfolk, Va., (a) f.o.b. cars in navy yard, (b) f.o.b. barge at water front,

BIDS ON CLASSES 1, 2, 6 AND 12

Class	1	2								6				12
		a	b	c1	c2	c3	c4	c5	c6	a	b	c	d	
W. Hall Bradford										$2.53 14,560	$2.68 14,560	$3.13 14,560	$3.03 14,560	
Com. Coal Co.				$3.39 14,000	$3.39 14,000	$3.39 14,000	$3.39 14,000	$3.39 14,000						
Dexter Carpt.¹		$3.15	$3.55	3.65 14,550c	4.10 14,550c	3.60 14,550c	3.65 14,550c	4.20 14,550c	3.70 14,550c	2.73 14,550d	2.88 14,550d	3.33 14,550d	3.23 14,550d	
Empire Coal Mining Co.	$2.97 14,300													$3.75 14,500
Greensburg Coal & Coke Co.	2.93 14,600													3.54 14,500
Greensburg C.& C. Co. (alternate)														3.54 14,500
Geo. D. Harris & Co.	3.05 14,450													3.55 14,500
Geo. D. Harris & Co. (alternate)														3.50 14,500
W. P. W. Haff	3.10 14,500	3.10 14,500	3.50 14,500	3.60 14,500	4.10 14,500	3.60 14,500	4.10 14,500	4.10 14,500	4.10 14,500					
Keystone C. & C. Co.		3.27	3.67	3.47 14,500e	4.07 14,500e	3.47 14,500e	4.07 14,500e	4.07 14,500e	4.07 14,500e					
A. McNeill & S. Co.		3.14	3.49	3.54 14,700	3.99 14,700	3.54 14,700	3.64 14,700	4.14 14,700	3.80 14,700					
Penn. Coal & Coke Corp.										2.68 14,700	2.83 14,700	3.28 14,700	3.18 14,700	
Penn. Fuel Co.	3.10 14,500	3.10 14,100	3.60 14,400	3.43 14,400	4.00 14,400	3.43 14,400	3.50 14,400	4.00 14,400	3.49 14,400					
Piedmont & George's Creek Coal Co.	3.20 14,500	3.20 14,500												
Quemahoning C. Co.		3.19	3.54	3.62 14,500	4.19 14,500	3.54 14,500	3.67 14,500	4.29 14,500	3.67 14,500	2.57 14,300i	2.70 14,300i	3.17 14,300i	3.07 14,300i	
J. H. Weaver & Co.		3.20	3.60	3.70 14,567	4.25 14,567	3.70 14,567	3.80 14,567	4.25 14,567	4.25 14,567					
Chas. J. Wittenberg	3.10 14,150	3.15 14,150	3.50 14,150	4.15 14,150	3.50 14,150	3.65 14,150	3.65 14,150	4.40 14,150	3.65 14,150					

1 Alternate bid 5c. per ton more.
c Alternate and original are the same. d On alternate bids. e On alternate bid 14,800. i To 14,500.

(c) stored, piled and trimmed in bins at contractor's expense.

CLASS 18—2500 tons semibituminous coal, Naval Hospital, Norfolk, Va.

CLASS 19—13,000 tons bituminous coal, Naval Training Station, Great Lakes, Ill., (a) delivered f.o.b. cars, (b) f.o.b. mines.

CLASS 20—10,000 tons semibituminous coal, Navy Yard, Charleston, S. C.

CLASS 21—1000 tons, naval hospital, Annapolis, Md.

CLASS 22—3000 tons, Navy Yard, Pensacola, Fla.

Address Paymaster General of the Navy Samuel McGown, Washington, D. C.

Miscellaneous Bids—Atwater & Co., Class 8, $2.70 (14,800 B.t.u.). John P. Agnew & Co., Class 15, $3.65; Class 16, $3.05. Chesapeake & Ohio Coal Agency, Class 8, $2.83 (14,800 B.t.u.), on 50,000 tons. Commercial Coal Mining Co., Class 4a, $2.70 (14,600 B.t.u.); Class 4b, $2.85. Baker Whiteley Coal Co., Class 5a, $2.68 (14,500 B.t.u.); 5d, $2.98. Blaine Mining Co., Class 1, $2.96 (14,200 B.t.u.). Crerar Clinch & Co., Class 19b, $1.17 (12,800 B.t.u.). Consumers Coal Co., Class 9 (14,800 B.t.u.) item 1, $3.94; item 2a., $5.10; item 2b, $4.90; Class 20, (14,800 B.t.u.) $3.36; alternate bid on Class 20, $3.36; Consolidated Coal Co., Class 7 (14,533 B.t.u.), $3.30 and $3.20; Class 10 (14,533 B.t.u.), $3.20. Commercial Coal Co., Class 15 (14,450 B.t.u.), $3.75 and $3.80. J. Maury Dove, Inc., Class 15 (14,300 B.t.u.), $3.75; Class 16 (14,900 B.t.u.), $3.05. Enterprise Fuel Co., Class 13 (14,500 B.t.u.), $3.28; Class 14, $2.85; alternate bid on Class 13, $3.25; Class 21, $2.88; alternate bid on Class 21, $2.86. O. W. Guy Co., Class 18 (15,100 B.t.u.), $3.12 and alternate bid the same. Georges Creek Coal Co., Class 13, $3.34; Class 14 (14,500 B.t.u.), $2.94. Greensburg Coal & Coke Co., Class 4a (14,600 B.t.u.), $2.67; Class 4b, $2.82; Glen Brook Coal Co., Class 4a (14,600 B.t.u.), $2.69; Class 4b, $2.85. Hafer & Sons Coal Co., Class 19b (12,000 B.t.u.), $1.23. Peabody Coal Co., Class 19b (12,850 B.t.u.) a and b, $1.18; alternate bids, $1.12. Rutter & Co., Class 19a (12,500 B.t.u.), $2.75; alternate, $2.60;

BIDS ON CLASSES 1 TO 5

Class	1	2		3			4		5		
		a	b	a	b	c	a	b	a	d	e
W. Hall Bradford	$2.94 14,560			$2.59 14,560	$2.69 14,560		$2.63 14,400		$2.49 14,560	$2.79 14,560	$3.29 14,560
Berwind C. M. Co.	3.40 14,700			2.85 14,700	3.00 14,700	$3.10 14,700	3.00 14,700	$3.10 14,700			
Dexter & Carp., Inc	3.15[1] 14,550c	$3.15 14,550c	$3.55 14,550c	2.75 14,550d	2.85 14,550d	2.75 14,550 l	2.88	3.03	2.58	2.88	3.38
Dexter & Carp., Inc. (alternate)							2.95 14,550c	3.10 14,550c	2.68 14,550c	2.98 14,550c	2.48 14,550c
Keystone C. & C. Co.	3.00 14,500	3.27 14,500e	3.67 14,500	2.40 14,300	2.50 14,300	2.75 14,300	2.70 14,500	2.85 14,500			
Logan Coal Co.	2.84 14,560						2.66 14,440	2.80 14,440	2.50 13,850	2.80 13,850	3.30 13,850
A. McNeill & S. Co.	2.98[2] 14,500	3.14 14,700	3.49 14,700	2.64 14,700	2.74 14,700	2.99 14,700	2.70	2.85			
A. McNeill & S. Co. (alternate)							2.51 14,500	2.66 14,500			
Charles W. Mills				2.85 14,700	2.95 14,700	3.10 14,700	2.85 14,400g	3.00 14,400g			
B. Nicoll & Co.	3.11[3] 14,500h			2.43	2.53	2.78	2.63 14,400	2.78 14,400	2.36 14,400	2.64 14,400	3.14 14,400
B. Nicoll & Co. (alternate)				2.65 14,500h	2.75 14,500h	3.10 14,500h					
Penn. C. & C. Corp.	3.00 14,600			2.75 14,700	2.87 14,700	3.10 14,700	2.95 14,700	3.10 14,700			
Quemahoning C. Co.	3.05 14,200i	3.19 14,300i	3.54 14,300i	2.65 14,300i	2.75 14,300i	3.05 14,300i	2.73	2.88	2.58 14,300i	2.87 14,300i	3.38 14,300i
J. Tatnall Lea & Co.	2.90[4] 14,300j			2.64	2.74	2.89	2.74	2.89			
J. H. Weaver & Co.	3.00 14,560	3.20 14,567	3.60 14,567	2.75 14,567	2.85 14,567		2.72 14,560	2.87 14,560			
John Wills	2.78[5]			2.83 14,610			2.88 14,610	3.03 14,610	2.69 14,560		
Weston, Dodson Co.				2.74	2.84	2.99	2.74	2.89			

[1] Also $2.95 [2] Also $2.79 [3] Also $2.89 [4] Also $3.06 [5] Also $2.86.
c Alternate and original are the same. d On alternate bid. e On alternate bid 14,800. g To 14,690. h Bid "D" 14,400. i To 14,500. j On bid "A"; on bid "B" the B.t.u. was 14,500.

BIDS ON CLASSES 7 TO 10, 12 TO 14, 16 TO 18 AND 20 AND 21

Class	7	8		9	10	12	13	14	16	17		18	20	21
		a	b							a	b			
W. Hall Bradford			$2.58[1] 14,560		$3.23 14,560			$3.14 14,600						
Cast., Cur. & Bullitt		$2.83 14,850								$2.80 14,850	$2.97 14,850	$3.12 14,850		
C. & O. C. & C. Co.	$2.99 14,900	2.71		$3.77 14,900					$2.99 14,900	2.71 14,900	2.88 14,900		$3.77 14,900	
Crozer-Poca. C. Co.		2.60 14,800		3.81 14,800						2.80 14,800	2.97 14,800		3.81 14,800	
Dexter & Carp.					3.27	$3.60	$3.30	3.05[6]					3.40	$2.90[9]
Dexter & Carp. (alternate)						$3.60	$3.30	3.05[6]						2.90[9]
Johns Bros.				3.80 14,800						2.80 14,800	2.97 14,800	3.16 14,800	3.80 14,800	
Keystone C. & C. Co.														
Logan Coal Co.						3.50		2.80						
Logan Coal Co. (alternate)						3.45 14,400		2.75 14,400						
A. McNeill & S. Co.		2.80 15,000			3.30 14,600				3.20[8] 14,650					
E. P. Murphy & Son, Inc.	3.05 15,000			3.81 15,000					3.05	2.80			3.81	
E. P. Murphy & Son, Inc. (alternate)									3.05 15,000	2.80 15,000			3.81	
B. Nicoll & Co.						3.48 14,400	3.22	2.80[7] 14,400						2.82
Quemahoning C. Co.						3.60 14,300	3.34	2.93 14,300						2.98 14,300
Smokeless Fuel Co.		2.85[6]		3.81 15,000	3.40 15,000				3.05	2.80	2.97		3.52	
Smokeless Fuel Co (alternate)									3.05 15,000	2.80 15,000	2.97 15,000		3.52 14,600	
White Oak Coal Co.	3.05 15,000	2.83 15,000		3.81 15,000					3.05	2.80				
White Oak Coal Co. (alternate)									2.90 15,100	2.65 15,100				
John Wills	2.99 14,560								3.08					
John Wills (alternate)									2.99 14,610					
Weston Dodson Co.		2.83				3.90	3.75	3.15	3.10					
Weston Dodson Co (alternate)						3.90	3.75	3.05 14,600	3.00 14,600					
C. G. Blake Co.	3.05 14,850	2.89[3] 14,850		3.80 14,850					3.05 14,850	2.80 14,850	2.98 14,850		3.80 14,850	

[1] 50,000 tons. [3] On 120,000 tons. [4] Also $2.70 and $2.75 for 50,000 tons each. [5] On 100,000 tons. [6] Also $2.90. [7] Also $3.05. [8] Also $3.10. [9] Also $3.05 and $3.15.

Note. Keystone C. & C. Co. bid $2.60 on Class 8 (b) and $2.45 on 200,000 tons. Penn. C. & C. Corp. bid $2.80 on Class 12. J. H. Weaver & Co. bid $2.63 on Class 8 (b). Chesapeake & Ohio C. & C. Co. also bid $4.33 on Class 19 (b).

Class 19b, $1.35, and alternate $1.23. Sterling Coal Co., Class 4a, $2.72; Class 4b, $2.85. Smokeless Fuel Co., Class 8 (14,900 B.t.u.), $2.85 for 100,000 tons. Same company Cincinnati, Class 9 (15,000 B.t.u.), item 1, $3.81. Whitney & Kemmerer, Class 12 (14,300 B.t.u.), $3.55; alternate the same. White Oak Coal Co., Class 9 (15,000 B.t.u.), item 1, $3.81. Willard Bros., Class 1 (14,500 B.t.u.), $3.15. John Wills, Class 1, $2.86; same, Philadelphia, Class 6a, $2.69. Gulf Smokeless Coal Co., Class 8, $2.85 for 200,000 tons. C. G. Blake Co., Class 9, item 1, $3.80. William Johnson & Co., Class 9 (14,850 B.t.u.), Item 1, $3.90; Item 2a, $5.05 Item 2b, $4.85; Class 20, $3.90 with alternate bid of $3.88. Johns Bros., Class 17c (14,800 B.t.u.), $3.04. J. E. Lewis & Co., Class 11 (14,850 B.t.u.), $4.44. F. R. Long & Co., Class 1 (14,700 B.t.u.), $3.21. Lynch & Read, Inc., Class 10 (14,650 B.t.u.), $3.24; Class 16, $2.93; Class 21, $2.89. Martin-Howe Coal Co., Class 19a (13,000 B.t.u.), $2.77; Class 19b, $1.29. Marshall-Matlack & Co., Class 1 (14,400 B.t.u.),. $2.98; Class 4a, $2.69. E. P. Murphy & Son, Inc., Class 9 (15,000 B.t.u.), Item 1, $3.81. Metropolitan Coal Co., Class 11 (14,750 B.t.u.), $4.35. New England Coal & Coke Co., Class 17a (14,850 B.t.u.), $2.85. New River Coal Co., Class 8 (14,800 B.t.u.), $2.85 for 60,000 tons. Nottingham & Wrenn Co., Class 17a (14,800 B.t.u.), $2.80; Class 17b, $2.97; Class 18, $3.15; alternate bids, Class 17a, $2.75; alternate bids, Class 17b, $2.92; alternate bids, Class 18, $3.10. O'Gara Coal Co., Class 19a (13,500 B.t.u.), $2.94, alternate, $2.91; Class 19b, $1.29, alternate, $1.26. Peerless Coal Mining Co., Class 14 (14,500 B.t.u.), $2.94. Hite & Rafetto, Class 1 (14,040 B.t.u.), $2.96. Punxsutawney Coal Mining Co., Class 3a (14,200 B.t.u.), $2.50; Class 3b, $2.60.

+No. 363—Toledo, Ohio—The letting of this contract (p. 566), which provides for furnishing the Water-Works Department with about 15,000 tons of bituminous and anthracite coal, is still being delayed pending the completion of very exhaustive experiments which are being conducted with different fuels. Address Water-Works Board, Valentine Bldg., Toledo, Ohio.

+No. 508—Philadelphia, Penn.—Bids on this contract (p. 665) will be received until 2 p.m., June 7. No bid of $500 or more will be considered unless accompanied by a certificate to the effect that the provisions of Rule 3 of the Board have been complied with. Address Supt. of Supplies A. F. Hammond, Room 392, City Hall, Philadelphia, Penn.

+No. 574—Cincinnati, Ohio—Bids on this contract (p. 749) were as follows: DISTRICT NO. 1—Reliance Coal & Coke Co., New River mine-run, $2.93; splint lump, $2.64; splint nut, pea and slack, $2.17. Ulland Coal Co., Pocahontas mine-run, $2.81; splint lump, $2.68; splint nut, pea and slack, $2.20. DISTRICT NO. 2—Ulland Coal Co., Pocahontas mine-run, $2.90; Reliance Coal & Coke Co., Pocahontas mine-run, $2.93; splint lump, $2.73; splint nut, pea and slack, $2.17. DISTRICT NO. 3—Reliance Coal & Coke Co., Pocahontas mine-run, $3.07; splint lump, $3.23. J. M. Mueller, Pocahontas mine-run, $2.94; splint lump, $3.25. J. J. Weis, Pocahontas mine-run, $2.92; splint lump, $3.50. DISTRICT NO. 4—Reliance Coal & Coke Co., Pocahontas mine-run, $2.97; splint lump, $3.17. Hyde Park Supply Co., Pocahontas mine-run, $2.94; splint lump, $3. Address Business Mgr. C. W. Handman, Bd. of Edu., Cincinnati, Ohio.

+No. 665—Watseka, Ill.—We are advised that the trustees have not yet taken up the matter of letting this contract (p. 836), which provides for furnishing the fuel requirements of the Hospital during the ensuing year. It has not been decided when the matter will come up for consideration. Address Pres. of the Bd. A. F. Goodyear, Iroquois Hospital, Watseka, Ill.

+No. 673—Buffalo, N. Y.—The call for bids on this contract (p. 836), which provides for furnishing the requirements of the City Poor Department, was responded to by only two bidders, the Buffalo Fuel Co. and C. & A. M. Kaiser. The lowest figure was submitted by the latter, being $5.62 for April delivery, but all the bids submitted were on a sliding scale arrangement. Address Overseer of Poor Louis Kengott, Buffalo, N. Y.

+No. 679—Dayton, Ohio—Bids on this contract (p. 876), which provides for furnishing about 6000 tons of coal to the local Board of Education, will be received until noon, June 10. Bids are to be submitted covering cost of delivery in the bins at the several schools and also f.o.b. Dayton, Ohio. Address Clk. C. J. Schmidt, Bd. of Edu., Dayton, Ohio.

+No. 696—Salem, Mass.—The bids on this contract (p. 877), which provides for furnishing the County Commissioners with 2000 tons of steam coal and 100 tons of anthracite, were: John Girdler, Georges Creek, Cumberland, $4.55 to $4.65; G. L. Gage Co., New River Coal, $4.95; Cross Coal Co., New River coal, $4.95; Atkinson Coal Co., New River coal, $4.70 to $4.42; Theberge Bros., New River coal, $5.14; Charlotte Fairfield, anthracite, $6.85; M. O'Mahoney, anthracite, $8.45; E. H. Humphrey, $7. Address Clk. H. E. Thurston, Essex County, Salem, Mass.

+No. 706—New York—Owing to a legal technicality it has been decided to readvertise for bids on this contract (p. 915). Complete list of bids on the original contract was made up ready for publication, but withdrawn when it was announced that all bids would be rejected. Copies of the original bids will be furnished interested parties on application to "Coal Age." Slight changes in the tonnages required are to be made and it is expected the new bids will be opened at noon on June 8. Specifications will be ready in a few days. Address F. R. Leach, Secy., Central Purchasing Committee, Room 1226, Municipal Bldg., New York City.

+No. 715—New York—Bids on this contract for Ellis Island (p. 916) were opened May 24 with the following result, quotations being made at both the upper and lower ports:

	Stove 100 Tons		Pea 2400 Tons		No. 1 Bkwht. 1500 Tons	
	Upper	Lower	Upper	Lower	Upper	Lower
Pattison & Bowns...	$6.17	$6.17	$3.79	$3.79	$2.93	$2.73
W. P. W. Haff.......	6.31	6.31	3.84	3.84	3.09	2.77
Clarksburg Coal Mining Co.		7.00	4.50	3.80	3.30	2.80
Commercial Coal Co.......		5.89	4.09	...	3.34	...
Weston Dodson & Co......		5.86	...	4.07	3.01	2.76
Garfield & Proctor Coal Co.		...	...	3.98	...	...
George D. Harris & Co....		...	...	...	3.23	2.82
Charles D. Norton & Co...		...	...	...	...	2.78

For furnishing 2200 tons of pea coal for the tug "Immigrant," Pattison & Bowns bid $3.69; Clarksburg Coal Mining Co., $3.70; Commercial Coal Co., $3.89, and Burns Bros., $3.89. Address Commissioner of Immigration, Ellis Island, New York Harbor, N. Y.

No. 726—New York—This contract (p. 916), which provides for furnishing coal for fireboats, calls for 5300 gross tons of anthracite egg or stove size, to be delivered at three points, on or before Apr. 1, 1916. Bids are to be opened at 10:30 a.m. June 1. Address Fire Comr. Robert Adamson, Municipal Building, New York City.

New Business

+No. 756—Cedar Rapids, Iowa—The Iowa Ry. & Light Co. at this place will contract some time next month or in July for approximately 75,000 tons of 1½-in. screenings. Address Iowa Ry. & Light Co., Cedar Rapids, Iowa.

+No. 757—Bloomfield, Iowa—The City Electric Light & Water Plant at this place will be in the market some time during next month for 2500 tons of coal. The business is done on a competitive basis, and Novinger, Mo., mine-run coal is customarily used. The present coal was bought at $1.67 per ton at the mine; the freight rate is 50c., and the wagon haul 28c. per ton. Address Treas. R. C. Bristow, City Light & Water Plant, Bloomfield, Ia.

+No. 758—Springfield, Ohio—Bids will be received by the trustees of the local hospital until noon, June 15, for furnishing the coal required during the period ending June 1, 1916. Address Clk. William H. Mahoney, Hospital Bd., Springfield, Ohio.

+No. 759—Waterbury, Conn.—The Board of Education at this place will be in the market some time during June for approximately 2000 tons of Lehigh stove coal. The business is let on competitive bids among the local dealers. Address Comptroller of City, Waterbury, Conn.

+No. 760—New Bedford, Mass.—The Board of Education at this place will be in the market some time during next month for 2600 tons of Lehigh egg coal, which is usually bought at about $6.95 per ton. The call for bids is advertised in the local papers, and the business done on an annual contract. Address Committee on Fuel, City Council, William St., New Bedford, Mass.

+No. 761—Webster City, Iowa—The Electric Light & Water Works Plant at this place will be in the market some time next month for about 4600 tons of mixed steam coal, which is usually purchased at $1.20 per ton. The call for bids is advertised. Address Webster City Electric Light & Water Works Plant, Webster City, Iowa.

+No. 762—Springfield, Tenn.—The City Water Works & Electric Plant at this place will be in the market some time during next month for approximately 2500 tons of western Kentucky mine-run coal. A very high grade product is required, and the usual price is about $2 per ton f.o.b. Springfield. Address City Water Works & Electric Plant, Springfield, Tenn.

+No. 763—Americus, Ga.—The Local Water & Light Plant at this place will be in the market some time during the summer for 4000 tons of steam coal, and 1800 tons of gas coal. The business is usually done at about $3 per ton on the steam grade, and $3.70 per ton on the gas coal. Address the City Water & Light Plant, Americus, Ga.

+No. 764—Franklin, Ohio—The contract of the Franklin Board & Paper Co., at this place, expires on July 1, and bids will be received on June 1. Its requirements are about 1000 tons of nut and slack coal per year. Address Secy. Fred. B. Zartman, the Franklin Board & Paper Co., Franklin, Ohio.

+No. 765—Martinsburg, W. Va.—Bids will be received until noon, June 14, for furnishing the local Board of Education with seven carloads of Georges Creek Coal. Quotations should be made f.o.b. Martinsburg. Mine-run coal is required, and bidders should specify the mines from which they propose furnishing the coal. Adress Secy. W. A. Pitzer, Bd. of Edu., Martinsburg, W. Va.

+No. 766—South Bethlehem, Penn.—Sealed bids were received up to May 28 for furnishing 30 tons of pea coal, 20 tons of chestnut and 10 tons of stove, for the Northampton Heights schools. Address Secy. George E. Borman, Bd. of Edu., South Bethlehem, Penn.

+No. 767—Welland, Ont., Can.—Bids will be received until noon, June 2, for furnishing the county buildings with about 200 tons of anthracite coal. Address County Clk. Robert Cooper, Welland, Ont., Can.

+No. 768—Washington, D. C.—Sealed proposals will be received until noon, June 16, for furnishing the Government 4000 short tons of bituminous coal. Variations of 20% greater or less than this amount may be required at the option of the Government. Address Col. H. C. Newcomer, Corps of Engrs., Room 305, Southern Bldg., Washington, D. C.

+No. 769—Towson, Md.—Sealed proposals were received until 11 a.m., May 26, for furnishing Baltimore County with coal as follows: 35 tons of white ash, 10 tons of nut, 80 tons No. 1 white ash, 40 tons No. 3 white ash, 160 tons No. 1 white ash. Deliveries are to be made in some instances, and in others quotations should be f.o.b. railroad switch. Bidders should specify exactly what coal they propose furnishing. Address Chief Clk. C. W. J. Fox, County Comrs., Towson, Md.

+No. 770—Peterboro, Ont., Can.—Sealed proposals were received until noon, May 26, for furnishing 600 tons of either select three-quarter Youghiogheny lump or smokeless coal, to be delivered to the local schools as required. Address Secy.-Treas. G. H. Thompson, Bd. of Edu., Peterboro, Ont., Can.

+No. 771—Waynesboro, Penn.—Bids were received until 6 p.m., May 27, for furnishing the schools of Washington Township with coal during the coming school year. Address Henry Hess, Bd. of Edu., Waynesboro, Penn.

+No. 772—Boston, Mass.—Sealed proposals will be received by the Metropolitan Water and Sewerage Board until 1:30 p.m., June 2, for furnishing coal as follows, in gross tons: For Water-Works at Chestnut Hill Pumping Station, 5000 tons; at Arlington Pumping Station, 450 tons; at Hyde Park Pumping Station, 150 tons; at Spot Pond Pumping Station, 800 tons; at Natick Station of Boston & Albany R.R., 80 tons; sewerage works at Deer Island Pumping Station, 2700 tons; at East Boston Pumping Station, 3000 tons; at Charlestown Pumping Station, 1200 tons; at Alewife Brook Pumping Station, 425 tons; at Ward Street Pumping Station, 2300 tons; at Quincy Pumping Station, 450 tons; at Nut Island Screen House, 550 tons. Specifications and complete information may be had on application. Address Secy. William N. Davenport, Metropolitan Water and Sewerage Bd., 1 Ashburton Place, Boston, Mass.

+No. 773—Denver, Colo.—Bids will be received by the Board of Education at this place for furnishing fuel to the local schools during the fiscal year beginning June 1, until noon of that day. Address Secy. W. A. E. Stutt, Bd. of Edu., 19th and Stout St., Denver, Colo.

+No. 774—Washington, D. C.—Sealed proposals will be received by the Department of the Interior until 2 p.m., June 22, for furnishing the Indian Service with approximately 106 tons of blacksmith coal, 38,763 tons of bituminous coal and 4947 tons of anthracite; the contract is to run during the fiscal year beginning June 30. Schedules giving all the necessary information may be had on application and bids should be submitted on government blanks. Address Indian Office at Washington, D. C., or United States Indian Warehouses at Chicago, St. Louis and San Francisco.

+No. 775—North Yakima, Wash.—The Board of Education will receive bids until 7 p.m., June 3, for furnishing and delivering approximately 800 tons of coal to the various school buildings in the district. All bids must be accompanied by a certified check for 5% of the bid, and complete descriptions of the coal must be included. Address Secy. B. F. Kumler, North Yakima, Wash.

+No. 776—Ridgefield Park, N. J.—Sealed bids will be received until 8:30 p.m., June 11, for furnishing approximately 300 tons of coal to the local schools during the ensuing year. White ash, pea, stove, nut and egg coal are required, and deliveries are to be made as directed. Address District Clk. G. H. Noethling, Bd. of Edu., Overpeck Township, Ridgefield Park, N. J.

+No. 777—Washington, D. C.—Sealed proposals will be received until 2 p.m., June 1, for furnishing approximately 25,000 tons of bituminous coal to the U. S. Capitol Power Plant during the fiscal year ending June 30, 1916. Bids should be made on the long-ton basis and all bidders must specify the name of the coal and location of their mines. Quotations should be made on sidings at the Capitol Power Plant, situated in Garfield Park. All proposals must be accompanied by a certified chick for $100. Address Elliott Woods, U. S. Capitol Bldg., Washington, D. C.

+No. 778—Lapeer, Mich.—Sealed bids will be received by the Michigan Home and Training School until 10 a.m., June 10, for furnishing the Institution with approximately 7000 tons of bituminous, nut, pea, and slack and 100 tons of No. 1 chestnut (anthracite) coal. Bids must be submitted on blank forms which may be obtained on application. Address Steward H. S. Evans, Michigan Home and Training School, Lapeer, Mich.

+No. 779—Onawa, Iowa—Bids will be received until June 7 for furnishing the local Electric Light Plant with coal during the fiscal period beginning June 1 of the current year and ending Mar. 31, 1916. Address City Clk. C. L. Collins, Onawa, Iowa.

+No. 780—Boston, Mass.—Sealed proposals were received until noon, May 27, for furnishing the Suffolk County Jail with 650 tons of furnace coal, 100 tons of screening and 300 tons of Pocahontas or New River semibituminous. The price should include cost of delivery and be made on the gross ton basis. All proposals must be accompanied by a certified check for $300 and a bond for one-quarter the amount of the contract must be furnished by a satisfactory surety company. Address Sheriff John Quinn, Jr., Court House, Pemberton Square, Boston, Mass.

+No. 781—Seattle, Wash.—Sealed proposals will be received by the United States Army until 11 a.m., June 2, for furnishing 158,500 lb. of the best quality Cumberland (or equal) smithing coal sacked for delivery to various army posts in Alaska, Washington, Wyoming, and on the Puget Sound. Deliveries are to be made during the fiscal year commencing July 1. Bids should be made on the basis of 100 lb. including cost of sacks, and the Government reserves the right to vary its requirements, as stated, 20%. Blank forms and specifications may be had on application. Address Col. George B. Davis, Depot Quartermaster's Office, U. S. Army, 3122 Arcade Bldg., Seattle, Wash.

Contracts Awarded

Note—Successful bidders are noted in **bold face type.**

+No. 461—Boston, Mass.—This contract (pp. 627, 748, 794), which provides for furnishing and delivering 41,300 tons of coal to the various city departments has been awarded as follows: **Metropolitan Coal Co.,** Children's Institute (800 tons) $4.09; Ferry Service (11,000 tons) $3.74; Calf Pasture Sewer Division (8000 tons) $3.75. **Darrow-Mann Co.,** Penal Institute, (6500 tons) $3.70. **Gorman-Leonard Coal Co.,** Infirmary Department (6000 tons) $3.84; City Hospital, (9000 tons) $3.76. Address Supt. of Supplies D. Frank Doherty, Room 808, City Hall Annex, Boston, Mass.

+No. 607—New Orleans, La.—This contract (p. 795), which provides for furnishing the U. S. Coast Guard with 2500 tons of bituminous coal, has been awarded to the **New Orleans Coal Co.** Address Special Deputy Collector Calhoun Fluker, Custom House, New Orleans, La.

+No. 609—Munhall, Penn.—This contract (p. 795), which provides for furnishing the Local Board of Education with lump and slack coal has been awarded to **Harvey Hall & Co.** Address Secy. Bd. of Directors John Bell, Jr., 1302 Louise St., Munhall, Penn.

+No. 647—Worcester, Mass.—This contract (pp. 835, 918), which provides for furnishing the County Commissioners with coal, has been awarded, in part, to **F. E. Powers Co.,** for furnishing 300 tons of anthracite to the Court House at $6.92½ per ton and $6.67 per ton for 30 tons required at Oakdale for the training school. Announcement of the remaining awards has not been received. Address County Commissioners, Court House, Worcester, Mass.

+No. 668—New York, N. Y.—This contract (p. 836), which provides for furnishing white ash anthracite and Cumberland coal, has been awarded to **J. S. Conabeer,** for $8558.25. Other bidders on this contract were: O. J. Stephens, $8695.70, and Burns Bros., $9120. Address Pres. Douglass Matthewson, Crotona Park, 177th St. and Third Ave., New York City.

+No. 669—Sleepy Eye, Minn.—This contract (p. 669), which involves approximately 1000 tons of steam coal for the Electric Light Plant, has been awarded to **R. H. Bingham & Sons** on Youghiogheny 2-in. screenings at $4.20 per ton f.o.b. Sleepy Eye. Address City Recorder H. Peterson, City Council, Sleepy Eye, Minn.

+No. 674—New York—The lowest bids on this contract (pp. 795, 876), which provides for furnishing the fuel requirements of the local Board of Education, were as follows: MANHATTAN BOROUGH—Entire Borough, Burns Bros., $152,308.90. The total of lowest bids by items is $716.40 less than the lowest borough bid, as follows: Broken coal, Burns Bros., $106,930; egg coal, George D. Harris & Co., $187.50; stove coal, Harris & Co., $1875; pea coal, Burns Bros., $11,475; No. 1 buckwheat, Harris & Co., $26,625, and semibituminous, Harris & Co., $4500. BOROUGH OF BRONX—Burns Bros. are the lowest at $55,784.25, or $1255.75 less than the next lowest bid. For supplying 3000 tons No. 1 buckwheat, M. L. Bird bid $140 less than Burns Bros., and on 4800 tons of No. 1 buckwheat he bid $60 less than Burns Bros. BROOKLYN BOROUGH—Bacon Coal Co. bid $143,524.80. The lowest bids by districts were: No. 1, A. J. & J. J. McCollum, $39,245.40; No. 2, J. F. Schmadeke, $51,455; No. 3, McCollum, $32,793.30, and No. 4, Schmadeke, $22,815; a total of $146,408.70. BOROUGH OF QUEENS—Entire borough, Bacon Coal Co., $83,577. Lowest bidders by districts were: No. 1, Burns Bros., $29,408.90; No. 2, S. Tuttle's Son & Co., $28,780.50, and No. 3, Tuttle's Son & Co., $25,295.50. BOROUGH OF RICHMOND—Richmond Ice Co. was the only bidder, at $20,140.25. Address Supt. of School Supplies Patrick Jones, Park Ave. and 59th St., New York City.

LATER—Awards have been made as follows: MANHATTAN, **Burns Bros.**, $152,308.90; BRONX, **Burns Bros.**, $55,784.25; BROOKLYN, **Bacon Coal Co.**, $143,524.80; QUEENS, excepting 3000 tons of semibituminous coal, **Bacon Coal Co.**, $72,057; **George D. Harris & Co.**, 3000 tons semibituminous coal, $11,520. The bid of Richmond Ice Co. of $20,140.25 for Borough of Richmond was laid over for further consideration. Address Supt. of School Supplies Patrick Jones, Park Ave. and 59th St., New York City.

+No. 698—Toronto, Ont., Can.—This contract (p. 877), which provides for furnishing about 500 tons of semibituminous coal, has been awarded to local agencies. Address Secretary, Public Library, College St., Toronto, Ont., Can.

+No. 703—Lowell, Mass.—This contract (p. 877), which provides for furnishing the Lowell Jail and the Training School of North Chelmsford with coal, has been awarded as follows: **Fred Horne,** 150 tons of bituminous at $4.94, 20 tons of anthracite furnace at $6.70; **John P. Quinn,** 500 tons of bituminous at $4.94, 20 tons of anthracite furnace at $7, 30 tons of stove at $7.30. Fred Horne's contract covers the Lowell Jail and the John P. Quinn contract provides for the requirements of the Training School. Address County Commissioners, Middlesex County Court House, Lowell, Mass.

No. 708—North Adams, Mass.—The contract (p. 878), which provides for furnishing coal to the several public buildings at this place has been awarded to **W. J. Nichols** on the following basis: Egg and stove $6.15 per ton; chestnut, $6.40; bituminous, $4.15. This was the lowest of the four bids submitted. Address Com. of Pub. Wks. John Martin, North Adams, Mass.

+No. 712—Boston, Mass.—This contract (p. 878), which provides for furnishing the local Immigration Station with 250 tons of anthracite egg coal, has been awarded to the **Burton Furber Coal Co.** at $6.87 per gross ton. Other bids on this contract were: Wellington Wilde Co., $6.90; Metropolitan Coal Co., $6.97; Chelsea Iron & Coal Co., $7.75. Deliveries are to be made as ordered. Address Commissioner of Immigration, Long Wharf, Boston, Mass.

No. 737—Charleroi, Penn.—This contract (p. 917), which provides for furnishing the local school board with coal during the ensuing year, had been awarded to **T. J. Crombie** at $5.73 per ton of mine-run. Other bidders on this contract were John Redd, $6.25; Charles Reid, $5.74. Address Secy. T. M. Faddis, Bd. of School Directors, Charleroi, Penn.

Contract Notes

Buffalo, N. Y.—The city Fire Department received only one bid for supplying its anthracite requirements, this being from C. A. & M. Kaiser, $5.40 per ton for stove and egg sizes and $5.65 for chestnut, covering April, 1915, with the usual 10c. sliding scale. For bituminous the lowest bidder was the Rochester & Pittsburgh Coal & Iron Co., $4 per ton for selected, hand-picked lump; $2.90 for lump screened and delivered to the fire boats.

Washington, D. C.—Telegraphic bids were requested by the Navy Department for either the transportation of coal, or the coal and transportation, for delivery at the Naval Coaling Depot, Key West, Fla. Coal must be of the Navy standard, and bidders were requested to state the name of the mines from which the coal originates, name of the company, etc. The tonnage involved aggregates approximately 5000 tons and delivery is to be made between June 1 and 15. A daily discharge rate of 350 tons is guaranteed at Key West. Telegraphic bids were also requested until noon May 5 for the transportation of one cargo of coal (5000 to 7000 tons) from the Atlantic Range ports to the Naval Coaling Depot, San Diego, Calif., or Tiburon, Calif. A daily discharge rate of 400 tons is guaranteed. Address Paymaster Gen. Navy., Samuel McGowan, Navy Department, Washington, D. C.

Buffalo, N. Y.—Pickands, Mather & Co. has announced the following prices for Lake steamboat fuel for the season of navigation, delivered to bunkers: $2.80 for three-quarter, $2.70 for mine-run and $2.50 for slack. This is 10c. less than for last season. The three-quarter size is in most use.

Mechanicsville, N. Y.—The contract for the annual supply of coal for the Board of Education at this place has been awarded to **W. G. Morton,** of Albany at $4.10 for pea coal, and $5.45 for egg coal. The contract calls for 350 gross tons of pea, and 150 tons of egg.

New Haven, Conn.—The contract for furnishing 544 tons of coal to the Public Works Department at this place has been awarded to **A. H. Powell Co.,** the total consideration being $2,265.60.

Washington, D. C.—The Navy Department received telegraphic bids until May 15 for transportation of one cargo of coal of from 5000 to 7000 tons from the Atlantic range ports to the Naval Coaling Depot, San Diego, Calif.

Baltimore, Md.—Baltimore City has awarded the contract for supplying coal to the city water-pumping stations to the **Cumberland Coal Co.,** at from $2.90 to $2.92, according to location. The Bay View Hospital contract was given to the same company at $2.90, and the Cumberland company will also supply the schools of the six city districts at prices ranging from $3.35 to $3.45. The contracts cover about 40,000 tons. The George's Creek Coal Co. will supply the ice boats and harbor tug at $2.95, and the Enterprise Fuel Co. the Health Department tug at $2.92 a ton.

+Buffalo, N. Y.—As a result of irregularity in bids, the award of the contract for the County Institutions which was to have been made on May 21 has been postponed for a week, and it is expected that one or more of the bids will be thrown out.

+Trenton, N. J.—The local School Board has awarded the contract for 450 tons of coal for delivery at the schools in Hamilton Township, to the Tattersall Co. and Anderson Bros., on the basis of $5.81 for Highland coal and $5.25 for Jeddo.

Albany, N. Y.—Bids for furnishing the City Hall, Fire Department, Pumping Station and Filtration Plant with 600 tons of coal were as follows: Frank Dessault, $4233.75; F. B. Peck Coal Co., $3878.45; M. V. Van Santvoord, $4035.35; F. B. Marsolais, $4224.25; M. S. Younglove Coal Co., $3956.90.

Export Trade—Press reports are to the effect that the Consolidation Coal Co. will supply 150,000 tons of coal to Italy and the Berwind-White Co. 50,000 tons.

New York—The Vernon Metal & Produce Co., 90 West St., announces the appointment of Hugh L. Kirby as manager of their coal department. They specialize on New River smokeless coal.

Brazil—The Central Ry. of Brazil, a Government line has recently approached an American concern here with a proposition to purchase 20,000 tons of American Pocahontas coal. The price is said to be $15.09 per ton. The Central Ry. has had special permission from the Government to make its purchases of coal for cash, and to meet payments therefor out of its actual cash receipts, month by month. The director of the road states that it consumes 300,000 tons of coal per year.

New York—Bids were opened May 6 in the office of the United States Coast Guard Service for supplying bituminous coal for the revenue cutters in this harbor, with the following result: George D. Harris & Co., $3.10 per ton in bunkers at dock; $3.69 in bunkers in stream. C. J. Wittenberg, $2.98 and $3.86 respectively; Commercial Coal Co., $3.48 and $3.56 respectively; Penn Fuel Co., $2.90 and $3.75 respectively. Deliveries are to begin July 1.

Argentina—Two offers for the supply of 25,000 tons of steam coal were presented to the Argentine Minister of Public Works at the end of last week—one from a British firm and the other from a North American. The latter offer is understood to have been the more favorable one.

Classified Ads

Positions Wanted, 3 cents a word, minimum charge 50c. an insertion in advanc

Positions Open, (Civil Service Examinations), **Employment Agencies** (Labor Bureaus), **Business Opportunities**, **Wanted** (Agents and Salesmen—Contract Work), **Miscellaneous** (Educational—Books), **For Sale**, 5 cents a word, minimum charge, $1.00 an insertion.

Count four words for keyed address care of New York; five for Chicago. Abbreviated words or symbols count as full words.

Copy should reach us not later than Saturday noon for ensuing week's issue. Answers addressed to our care Tenth Ave. at Thirty-sixth Street, New York or 1144 Monadnock Block, Chicago, will be forwarded (excepting circulars or similar literature).

No information given by us regarding keyed advertiser's name or address.

Original letters of recommendation or other papers of value should not be inclosed to unknown correspondents. Send copies.

Advertisements calling for bids, $3.60 an inch per insertion. C A

POSITIONS WANTED

AS ENGINEER AND SUPERINTENDENT; 21 years' experience in coal mines; excellent references on request. P. W. 408, Coal Age.

AS CHIEF ELECTRICIAN; 31 years of age; strictly sober; 12 years' practical experience winding, installing and maintaining electrical mining equipment; can handle men and get results; can give reference. P. W. 412, Coal Age.

COAL MINE MANAGER open for engagement June 15; 32 years old, married, technical graduate. Experience in Pennsylvania, Kentucky, Arkansas, Oklahoma and Nova Scotia. Can handle men. References. P. W. 414, Coal Age.

EXPERIENCED MINE SURVEYOR and mapper desires position with established coal company; $125 per month. Capable to take charge of all engineering work about coal mines. References. P. W. 415, Coal Age.

A FIRST-CLASS ELECTRICIAN AND MACHINIST wants position with a large coal company; age 33; sober and reliable; technical education in electrical and mechanical engineering, 16 years' experience in upkeep, armature winding and all other possible repairs; experience with all makes of mining machines and haulage motors; experience in installing power and substations; reference. P. W. 417, Coal Age.

MINING ENGINEER OR SUPERINTENDENT, 31, married, desires change. Technical education. Varied experience in bituminous mines, prospecting to operation. Specialty construction. P. W. 416, Coal Age.

CONTRACTS TO BE LET

Bids received until June 10, 1915.

Coal Proposals Wanted

BITUMINOUS AND ANTHRACITE

Lapeer, Mich.

Sealed Proposals will be received by the Board of Control of the Michigan Home and Training School (a State institution), Lapeer, Michigan, until ten o'clock A.M. Thursday, June tenth, 1915, for furnishing the institution full requirement of nut, pea and slack (bituminous) coal for the year beginning July 1st, 1915. Approximate requirement 7000 tons.

Sealed proposals will be received at same time for 100 tons No. 1 Chestnut (anthracite) coal.

Proposals must be made on blanks furnished by the institution.

For blanks address H. S. EVANS, Steward, Lapeer, Michigan.

⁂

PROPOSALS FOR COAL—Department of the Interior, Office of Indian Affairs, Washington, D. C., May 20, 1915.—Sealed proposals, plainly marked on the outside of the sealed envelope: "Proposal for coal," and addressed to the "Commissioner of Indian Affairs, Washington, D. C.," will be received until 2 o'clock p.m. Tuesday, June 22, 1915, and then opened, for furnishing the Indian Service with, approximately, 106 tons blacksmith coal, 38,763 tons soft coal, and 4947 tons hard coal during the fiscal year ending June 30, 1916. Bids should be made out on Government blanks. Schedules giving all necessary information for bidders will be furnished upon application to the Indian Office, Washington, D. C., and the U. S. Indian Warehouses at Chicago, St. Louis, and San Francisco. The department reserves the right to reject any and all bids, or any part of any bid. CATO SELLS, Commissioner.

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COAL AGE

Volume 7, No. 23
Issued Every Saturday
Hill Publishing Company

NEW YORK, JUNE 5, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

TRADE MARK REGISTERED
FAIRMONT
MINING MACHINERY CO.
FAIRMONT W.VA.

June 5, 1915.

Coal Mine Owners and Operators,
Everywhere in America.

Gentlemen:-

YOU have difficult problems to solve in the development of your coal mines and in the mining and preparing of your coal for market.

WE have an Engineering Department devoted exclusively to the design of Up-to-the-Minute Coal Handling Equipment and every man in the department is a specialist in that line.

YOU have YOUR problems, WE have the means of solution of YOUR problems--Why not start a "Lets-get-together" game right now.

YOU tell us what your problems are and what you want to accomplish and WE will do the rest.

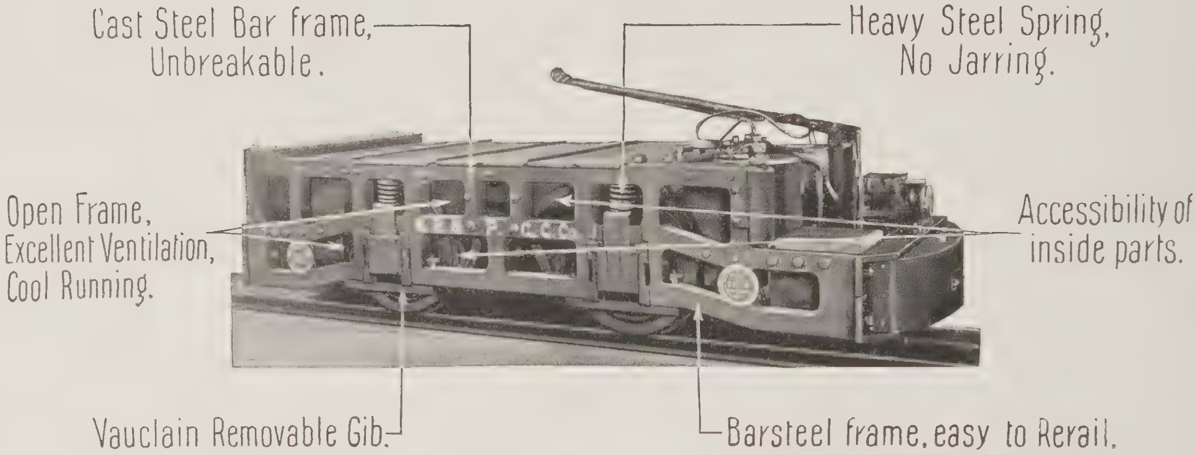
FAIRMONT Tipple Equipments, Car Hauls and Conveyors are designed to meet the most exacting demands and deliver all grades of coal to the railroad cars in such a manner that your Sales Department can guarantee absolutely clean coal properly sized and have no apologies to make when the coal is delivered.

Soliciting your inquiries for either new or improvement work, we are,

Yours very truly,
FAIRMONT MINING MACHINERY CO.

P.S. All up-to-date mines should be equipped with Fairmont Steel Ties, Railroad Car Retarders, Portable Electric Gathering Pumps and the other "FAIRMONT SPECIALTIES." If you are not using them you are dropping behind in the race for reduced costs and efficiency. "Let's get together."

Barsteel Locomotive Advantages
Reliability plus Accessibility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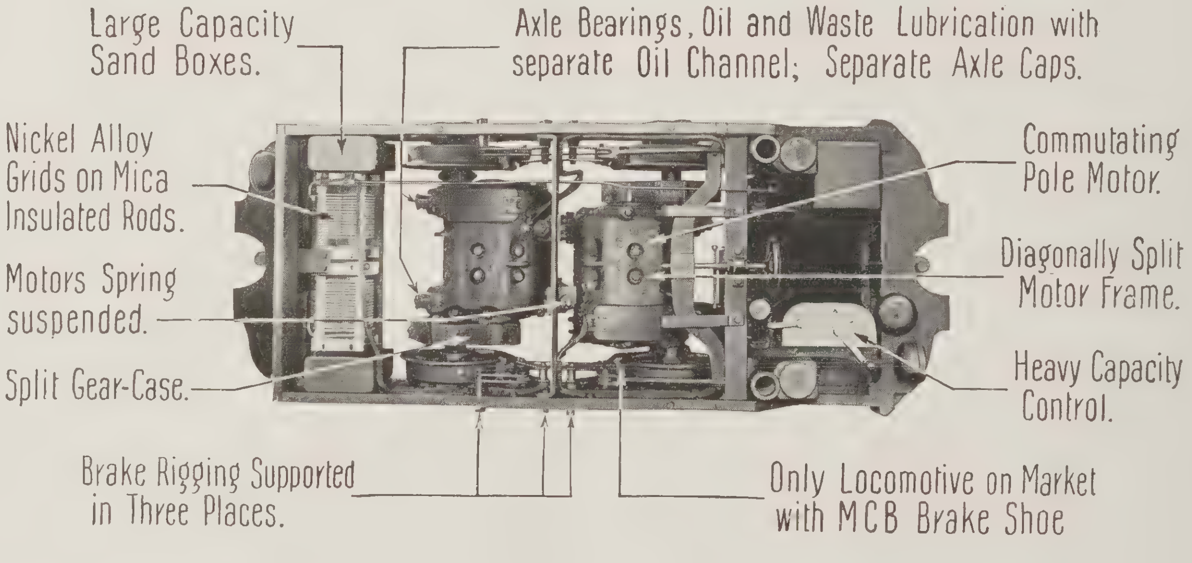
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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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Give Us the Opportunity

COAL AGE

Vol. 7 NEW YORK, JUNE 5, 1915 No. 23

The Old Men

MANY MINING COMPANIES carry the idea of employing all young men to a ridiculous extreme. They contend that youth has strength, hope, ambition and enthusiasm, and that these qualities are possessed to a lesser degree by men advanced in years. Let none of us forget that in the mining business today there are scores of men of recognized merit who are well past the 60-year mark. Their physical strength may be less, but they possess vigorous mental power, a well-tempered sense of duty and a precious practical knowledge gained through years of faithful service. Efficiency, not age, should determine the worth of an employee.

First Aid

By
C. P. Shockley

I COME as a soothing angel. I am the initial step in relieving mankind's suffering caused by accidental misfortune. A few years since few but men of science could practice my art; now many know and love me. Governments, corporations, organizations, individuals are among the well-wishers of and conjointly work for my advancement. In the hot mills, in the remote workings of the mines, in all places of industry at this time am I a necessity.

I am the fruit of the power to awaken pity, to desire to be helpful, to inculcate in each the feeling of brotherly devotion.

Throughout the land men unselfishly consecrate a portion of their time that I may exist, and by my conjuration dispel the lines of class and spread o'er humankind the mantle of faith and affection.

I encourage the thought of community feeling—the bond of common interest. It is my province to establish belief that man should aid man and that my brother's welfare is my welfare.

I am an incentive to higher ideals, to more advanced education. To future generations will I be taught in all schools, that the young shall know my value.

Though I am mighty and far-reaching, yet some are greater than I. Before first-aid should come care, the exercise of which means self-preservation, and until all men assimilate this truth will I be a necessity.

Efficiency

By
Geo. N. Lantz

THE TERM "EFFICIENCY" too often brings up in the popular fancy a picture of rushing, shouting, swearing, sweating men, working to the point of exhaustion; of creaking, groaning, whizzing, grinding, crushing, overloaded machinery; of noise everywhere; of excitement and high tension; of a shop, factory or mine where every other principle is subordinate to that of "maximum output."

Maximum capacity, it is true, is one of the objects of efficiency. Efficiency often has a "punch." But it seeks a minimum cost. And cost of production includes cost of equipment, maintenance of equipment, the wages of men, the lives of men.

Efficiency does not impose impossible conditions. It does not mean more cars than the motor-brake can control on a down-grade. It does not mean the destruction of a $5,000 machine for $1,000 worth of coal. It does not mean the loss of a $100 mule to save the cost of $10 worth of labor. It does not mean "gouging" the mine for a capacity of 1,000 tons daily this month and a drop to 500 tons next month.

It does not mean waste. Efficiency means a high average. It means adequate equipment. It means well-timbered and well-lighted entries. It means recovering rails from falls. It means a careful use of supplies. It means contented workmen. Efficiency does not indulge in loud shouting and self-praise.

The mushroom is efficient. It comes up in a night, through constant, gentle and quiet pushing. Thoroughness, accuracy, consistency, cheerfulness, cleanliness, carefulness, honesty, calmness, sobriety, safety—all these are component parts of efficiency. Efficiency and good judgment are synonyms.

Evolution of Coal Preparation in West Virginia

By H. Reisser*

SYNOPSIS—Within a comparatively short time the demand for coal has changed from run-of-mine to prepared sizes. The first attempts at preparation were by means of bar screens. At the present time, however, these have given way to shaking screens, picking tables, loading booms and other devices the object of which is to secure a clean and large-sized product.

It is surprising in how short a period the demand for a better grade of bituminous coal has been evolved. It seems but yesterday that on passing through the coal fields one noticed the majority of operations of any magnitude consisting of the time-honored horn dump, made up principally of two T-rails bent to a circumference about the size of the mine-car wheels. This was placed at the side of the coal car high enough up to allow a small dumping bin to be rigged up under it, to which was fastened a chute generally of wood with a cast-off piece of sheet iron spiked to its bottom. This arrangement well served the purpose of filling the railroad cars.

If the vein of coal lay lower than the tracks, mules usually furnished the hauling power, one car at a time being the capacity. If the vein was high above the tracks a gravity plane with one or more cars in a trip was installed, the loads that went down taking up a corresponding number of empties. Then followed the "barney," or leader, which consisted simply of a huge mass of timber mounted on rollers traveling on a narrow-gage track which gradually disappeared as it neared the terminal of the run at the bottom and allowed the car or cars it brought down to travel the remaining distance to the dumping point by gravity. In some places where the vein lies too high to utilize a mechanical haul or conveyor these barneys are still in use.

The increasing demand for a bigger capacity gradually brought the "monitor" into use. This consisted usually of a large round tank much like a boiler mounted on wheels, holding from 5 to 10 tons of coal. This eliminated the necessity of bringing the mine cars down the incline and thus did away with much wear and tear and the frequent wrecks caused by their jumping the track on their way down. Furthermore the monitor in large measure removed the necessity for keeping the mine cars away from the working-faces for long periods. This method of operation made it necessary to construct bins at the top of the inclines so that the monitors could be loaded quickly and allowed the dumping of the cars to continue without interruption or delay.

Another bin at the bottom big enough to hold the contents of the monitor increased the rapidity of operation. Run-of-mine was the product secured, so that one or two more knocks for the coal didn't matter. The issue was to load the railroad cars and as many of them as possible, all the hauling, gathering, etc., being accomplished by mules and the coal being worked out by picks, which was the miner's entire tool chest.

One of the Early Chain Conveyor Installations

General View of a Chain Retarding Conveyor

With the perfection of electric transmission and later of electric gathering and haulage locomotives, cutting machines and drills, the capacities were again increased, and long chutes down the hillsides were installed as well as large bins. These became the rule of the day, the bins over the tracks being usually built so that the mine could continue to work even though railroad cars were not immediately available.

First Preparation Was by Means of Bar Screens

The opening of the West as a market for domestic coal brought the gravity bar screen into use. This usually consisted of a long run for the coal where the smaller sizes were removed and often again separated by additional screens under the larger ones.

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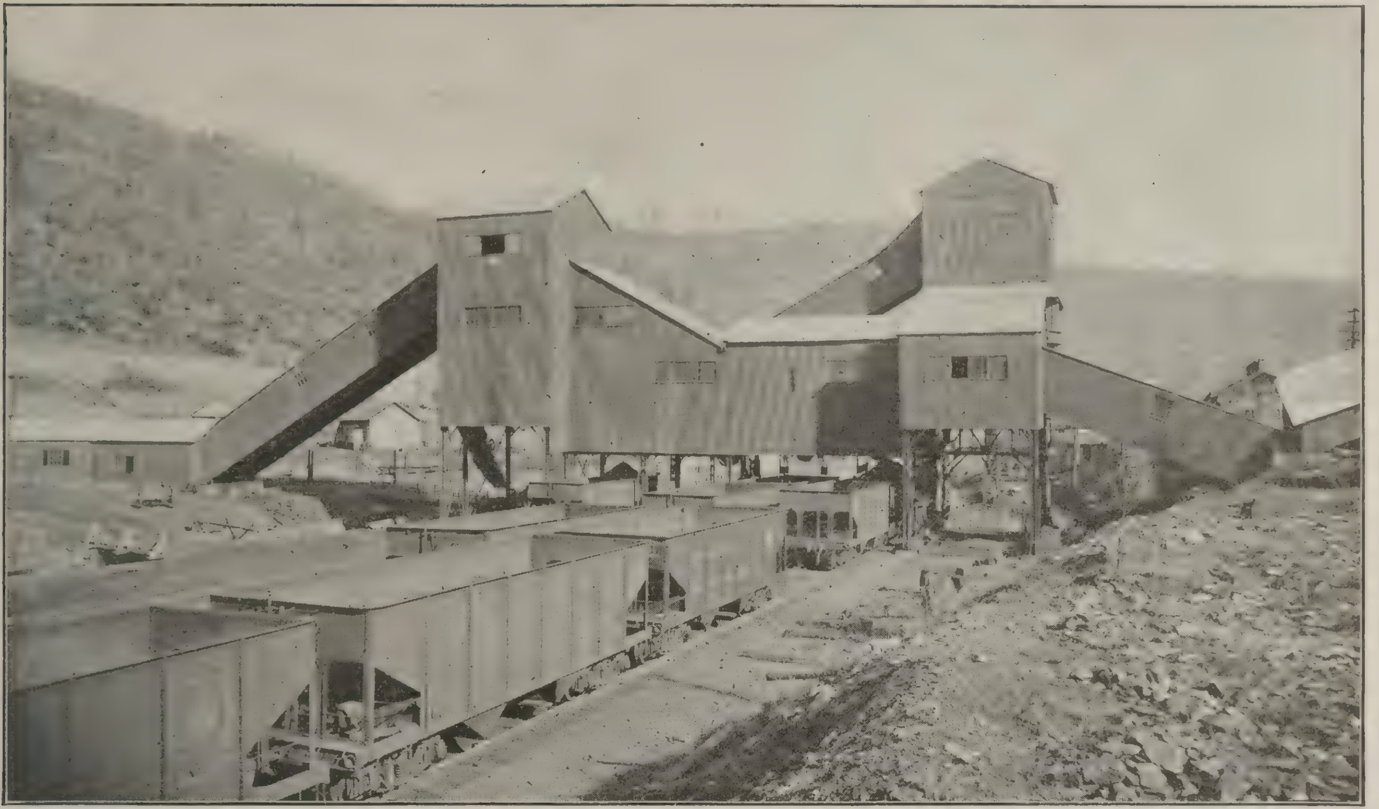
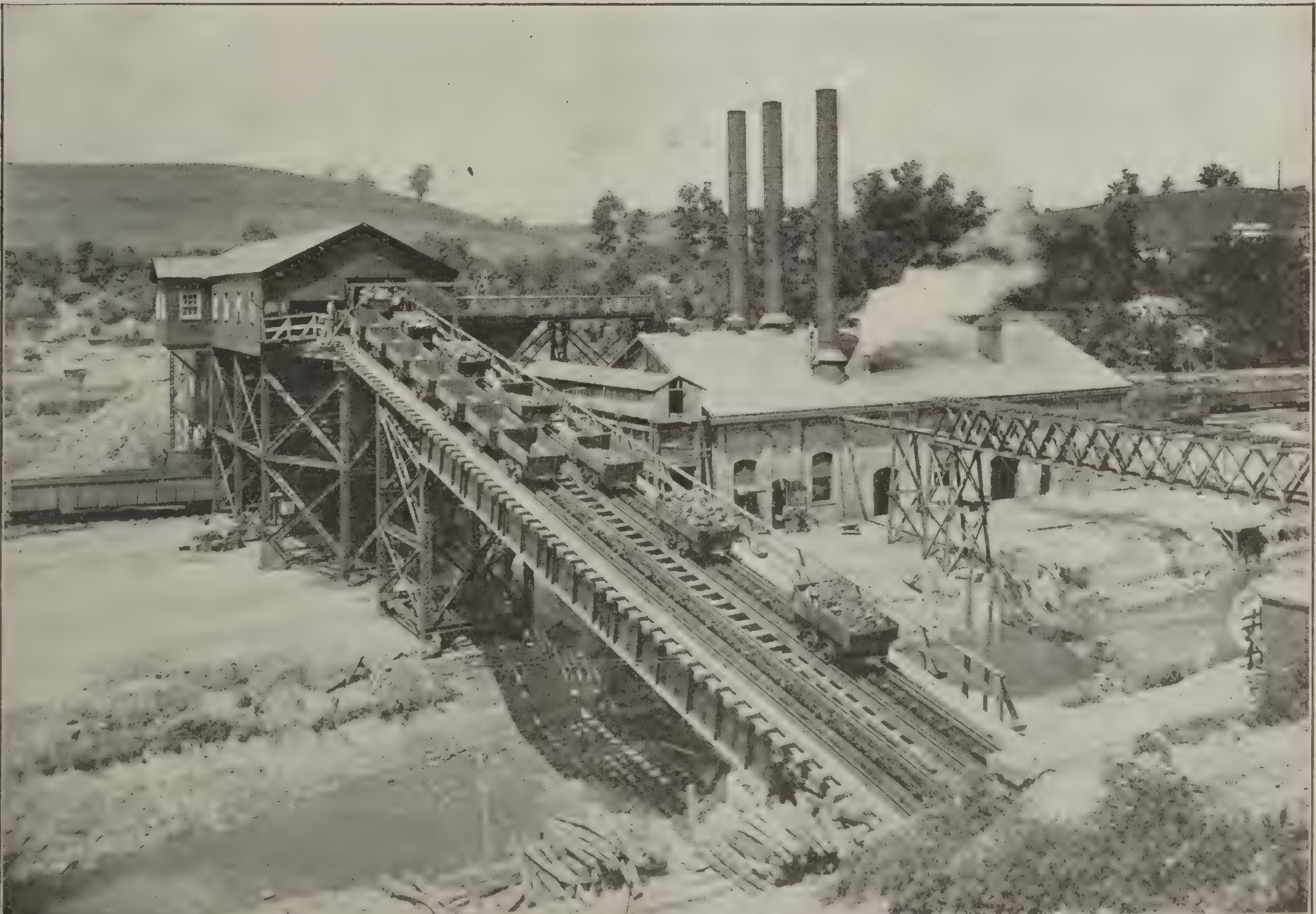
*Engineer, Link-Belt Co., Philadelphia, Penn.



A Modern Plant Where Apron Conveyors Are Employed to Elevate the Coal from Seam Elevation to Screening Height



Chain Car-Haul of a Slope Mine. One Strand Raises the Loaded Cars to Dumping Height, the Other Returning the Empty Cars

Shaker Delivering Lump onto Picking Table

Loading Boom in High Position Topping Off Car

Apron Conveyor Moving Upward from the Mine

Apron Conveyor Employed as a Retarding Conveyor

Picking Coal before It Is Remixed

Picking Nut and Egg Coal

For the types of tipples where the coal lay high above the tracks mechanical conveyors were tried successfully and were installed at many places. The favorite types were either double strands of endless chain with scraper flights placed between them at regular intervals or a single strand of wire rope with circular disks fastened to it at equal spacings. Both of these devices traveled in steel troughs.

These conveyors can of course be extended to almost any length by building them in two or more sections as the case may require. They are economical, durable, not liable to get out of order and often require little or no power to operate, this depending of course on the angle of inclination of the hillside.

In slope mines, chain or cable hauls bringing the mine cars up into the tipple were installed. In the tipples were located the gravity screens discharging the respective mixtures and sizes into the railroad cars.

In the Fairmont region this form of tipple still survives in many cases, owing mainly to the fact that the gas coal of this section is extremely hard and rough handling does not seem to appreciably deteriorate the product.

With the development of a market for domestic sizes of lump, egg and nut the demand for a gentle handling of the coal increased, and the gravity screening equipments did not meet the requirements. This was especially the case in the Pocahontas and New River fields, where the friability of the product is excessive. Breakage in these fields resulted in large percentages of slack, and the amount of this size produced made prices for it extremely low. Even then it was hard to dispose of.

Coking, of course, took a large amount of this slack, and the coke business was flourishing at that time. There were few operations that did not include a set of beehive ovens in the equipment. The activity in this particular branch of operations has to a large extent disappeared, for the reason that the coke was fragile and did not carry well.

The anthracite fields in Pennsylvania and the bituminous fields of Illinois had tried the shaking screen successfully, and this device began to appear in various places elsewhere with good results. The shaking screens eliminated the long runs of the gravity bar screens with the resulting smashes for the product. They consequently made a superior sized coal and more of it. The screen usually used was of a type with either round or oblong perforations, depending on what market the individual operator had for the respective sizes.

Lately these screens have been supplanted in many cases by what is known as the "flanged lip" screen, consisting of tapered slotted holes formed in steps of from 8 to 12 in. in length, thus turning over the product and removing any fines which may cling to or ride upon the larger pieces.

At the end the screens discharge into "spiral end loading chutes" which have hinged adjustable extension chutes, allowing the coning of high or low cars. These still continue to be the loading appliances for the hard veins of coal and for run-of-mine plants.

Loading Booms Take the Place of Chutes

Loading chutes for the lump and egg sizes, and in many cases for nut, are being rapidly discarded for the "hinged loading boom." This consists of a moving apron traveling partly on a horizontal fixed portion and the remainder moving on an adjustable steel frame which can be raised or lowered at will by either an electric or a hand-operated hoist.

An additional advantage of these machines is the fact that a splendid chance to clean and pick the coal can be secured by extending the horizontal portion a suitable length so as to allow three or four pickers to stand at the sides of this apron and remove all foreign material.

All operators now consider the picking of lump, egg and in many cases the nut coal indispensable and to make a perfect product install these machines at the ends of the picking tables. As an additional refinement they install short sections of screen just before the different products pass onto the tables, to remove any remaining fines which may have been made in the previous process.

The resulting amount of the refuse, draw slate, etc., is disposed of either by means of bins under the picking tables with a series of openings at the sides of the tables or by a cross conveyor which carries this product to a suitably located bin. It is either taken finally to a suitable dumping point by wagons or mine cars, or in some cases it is crushed and is used for boiler fuel.

A Double Strand Flight Retarding Conveyor Looking Uphill

Apron Conveyors Are Now Often Employed

Probably the latest development in the carrying of coal for either slope or drift openings is the apron conveyor. These machines will handle the product with less breakage than any machine yet tried, since the coal once on the apron does not move until it is discharged at the terminal end. Such conveyors are especially adaptable and satisfactory to the slope mine, since they eliminate the necessity of bringing the mine cars to the surface unless it is for repairs, and in some cases the repair shops for them have been placed underground.

In these cases the scales, if used, as well as the dumping hopper are placed at the elevation of the coal bed.

Whether it be a slope or a drift mine, apron or plate feeders can be installed under the dump hoppers. The discharge can be thus fed over a short section of either lip or bar screen, allowing the fine coal to fall upon the apron first, in this manner forming a cushion for the larger sizes going over the screen. This method gains the opportunity to clean the coal before it is placed on the shaking screens preparatory to being sized or loaded into the railroad cars.

The demand of the trade today calls for a perfectly cleaned and screened coal, and the operator offering the market such a product is the one who runs full time and gets good prices.

The demand of the operator for less breakage and a cleaner product is causing the manufacturer of coal-preparing equipment to exercise the height of ingenuity in handling, cleaning and loading the output of the mine.

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Extracts from a Superintendent's Diary

During our strike last year two nonunion miners were shot while en route to work. There were a number of witnesses to the shooting, and any number of people knew all of the circumstances connected with the plot that led to the killing as well as the details of the actual murder.

Several months after the strike was called off the man who suggested the killing of the two men was arrested, and yesterday he was sentenced to life-imprisonment for his connection with the crime.

Immediately following his arrest most of the papers of the state began to print editorials deploring the fact that an arrest had been made, and some of them went farther and intimated that it was a plot of the mine owners to get further revenge upon the miners' organization, as the strike settlement had failed to crush the union completely.

Today I have found in every paper that I have been able to obtain an editorial upon the verdict, and most of them denounced the judge and the jury in no uncertain terms, and then, as if not satisfied with that, led off on long dissertations as to the terrible consequences that would surely follow because of this hounding of the union by the operators. The picture of the retribution that is to follow, suggested by some of the editorials, is almost too terrible to contemplate. Surely anyone who took the more radical of these editorials seriously should be ready and willing to take up arms against the terrible operators and drive them into the ocean.

During the progress of the trial the more conservative editorial writers argued that the case should be thrown out of court because its continuance could have no result other than to keep open old sores; the strike had been settled and the operators should be willing to forgive any overt acts and allow the miners to begin again with a clean slate. Now that the final conviction has come, even the conservative papers could not refrain from hinting that the trial looked like a frame-up by the operators.

Because of the fact that I know personally every man who was connected with the crime in any way and also know every witness and every other person who took part in the trial, I know positively that a fairer trial has never been staged and the verdict could not have been otherwise if the evidence were considered, and moreover I know that the miners know to a man that the verdict was just.

Knowing this, I am wondering what would be the inevitable result if this convicted man were pardoned by our governor as a result of popular clamor and editorial influence. Might not the time come when strikers would be so imbued with the idea that they need have no fear of the courts that all strikes might become bloody and vindictive to a degree that in comparison the present suggestions of some of the I. W. W. officials would seem tame indeed.

And as to the issue that is being raised about the revengeful operators taking an interest in the trial and thus making it impossible for the accused to receive fair treatment, pray how is anyone ever to be brought to justice if the injured ones are always to be discredited and treated like Black-Hand men without being granted a hearing or even allowed to suggest persons who should be interviewed?

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Dry Cleaning Bituminous Coal with Spiral Separators

By J. V. Freeman*

Of the various methods proposed for the dry cleaning of bituminous coal, such as bumping tables, electrostatic and separation by air, the spiral separating system is one of assured practical application. This process of concentration of coal is an adaptation from the anthracite fields, with modifications so as to be applicable to bituminous coal.

A very successful installation of this spiral gravity process in Illinois is at the mining plant of the Old Ben Mining Corporation, at West Frankfort, Franklin County. The plant and details of operation have been fully described by Mr. Richards in the Success Issue of Coal Age of Apr. 13, 1915, by Mr. Hall in Vol. 3, page 719, and by Mr. Buchannan, who first developed it on a large scale and who relates interesting information concerning its establishment in Vol. 3, page 750.

The spiral system for the preparation of domestic coal is ideal, producing a clean, uniform-sized coal which finds a ready market. Other advantages greatly in its favor are as follows: Operates without expensive machinery and oils, the entire process depending on gravity; highly suited for the concentration of coal in dry localities, where water cannot be obtained in sufficient quantities to use the regular washing system; low labor cost; reasonable initial cost as compared with a coal washer, doing away with expensive jigs, etc.; as no water is used there is no added expense for dewatering the cleaned product.

As to the suitability of spiral separators in preparing coal for coke-oven purposes, definite and final information is yet to be had. The percentage of reduction of impurities in this method is considerably less than that of the water process. If its efficiency in this respect could be improved it would be more generally adopted, having in its favor the delivery of a coal in which the moisture content has not been increased over that of the originally mined coal.

Further, the spiral system will not admit of the treatment of fines, say coal under ⅜-in. size, nor is it possible at present to handle anything over 6 in. As in any other new process, its adaptability to treat all kinds of coal and under different climatic conditions is yet to be determined. I say climatic conditions, because extreme cold or moist conditions might retard the travel of the coal down the iron plate spirals, reducing the efficiency of separation.

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*Joliet, Ill.

Retarding Conveyor at a West Virginia Mine

By William Brasack*

SYNOPSIS—An interesting installation where coal is lowered without breakage from the pit mouth on a hillside to railroad cars in the valley below. The rope conveyor is 1410 ft. long. This is supposed to be the longest retarding conveyor ever installed.

The problem of lowering the coal from the pit mouth on a hillside into the railroad cars is best solved by a retarding rope and button conveyor which delivers the coal at an even flow without any shocks to the screens or loading chute. Other methods such as inclined planes or monitor cars have the disadvantage of being intermittent, and as a consequence require storage bins and repeated dumping of the coal, besides additional labor. The longest retarding conveyor of this type ever installed, to my knowledge, was designed, built and erected by the Fairmont Mining Machinery Co. for the Carbon Coal Co., at Carbon, W. Va.

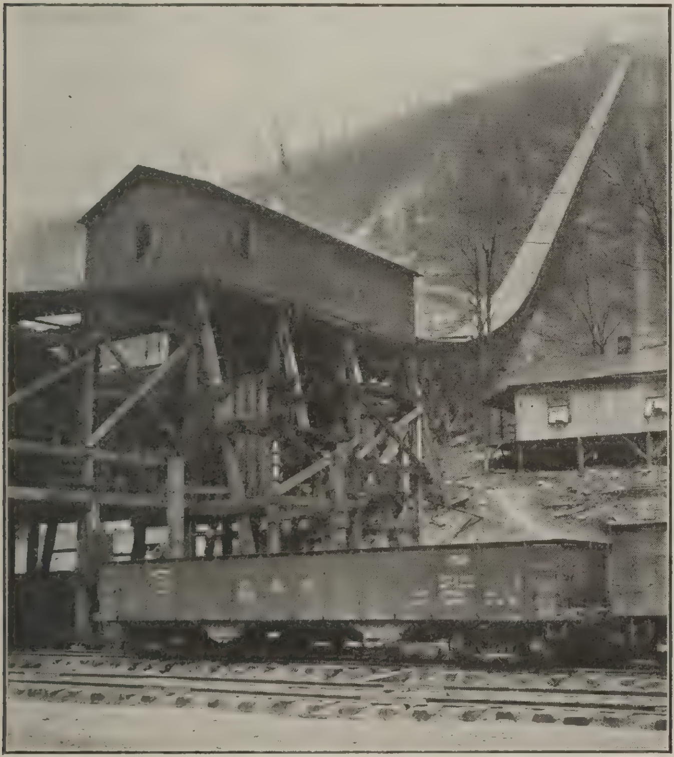

Fig. 1. Carbon Coal Co.'s Tipple and Retarding Conveyor

The equipment consists of a headhouse containing dumps, feeder and picking table, the conveyor gallery down the hill, and the tipple proper, which is equipped with shaker screens and loading booms, insuring careful screening and loading of the coal. Fig. 1 shows a general view of the plant taken just after it was put in operation.

The method of operation is as follows: Coal is brought in mine cars to the headhouse and dumped over a short chute and a bar screen 6 ft. wide and 12 ft. long, equipped with 2-in. Akron screen bars which can be set at 1 in. or 2 in. clear mesh. The slack slides over a chute onto a picking-table conveyor, while the lump is gathered in a weigh basket suspended from a tipple scale. After being weighed the lump is lowered into a feed hopper with a capacity of about two mine cars. Under this hopper runs a short apron conveyor feeder consisting of single-beaded flights mounted on two strands of steel thimble roller chain. The feeder carries the lump coal out of a 3x3-ft. opening and delivers an even flow of coal onto the picking table. As the slack has been put on the picking table before, it acts as a cushion for the lump and facilitates picking at the same time. The picking table is made of double-beaded flights mounted on two strands of steel roller chain. It is 5 ft. wide in order to spread the coal as much as possible, has a clear picking space of 15 ft. and runs at a speed of 30 ft. per min. After being picked the coal is discharged over a suitably formed chute into the rope and button conveyor.

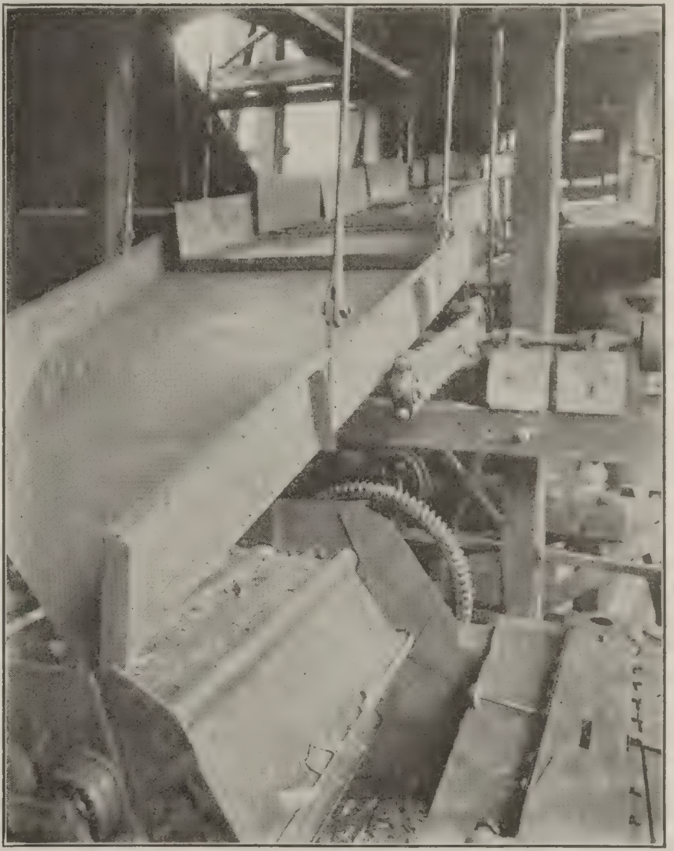

Fig. 2. Coal Is Discharged from Small Shaking Chutes to Loading Booms

Fig. 3 shows the end of the picking table with discharge chute and the conveyor rope with buttons attached, running in a steel-lined trough. The rope conveyor has a total length of 1410 ft. between sprocket centers and a slope down the hillside of 31 deg. The cable is 1¼ in. diameter and runs at a speed of 80 ft. per minute. The buttons are 12 in. in diameter and spaced 4 ft. apart.

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*Engineer, Fairmont, W. Va.

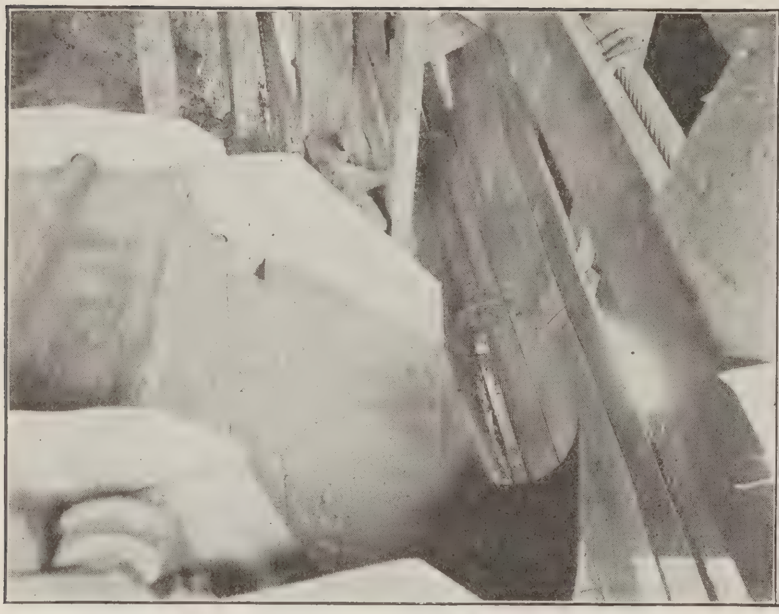

Fig. 3. End of Picking Table Showing Discharge to Rope Conveyor

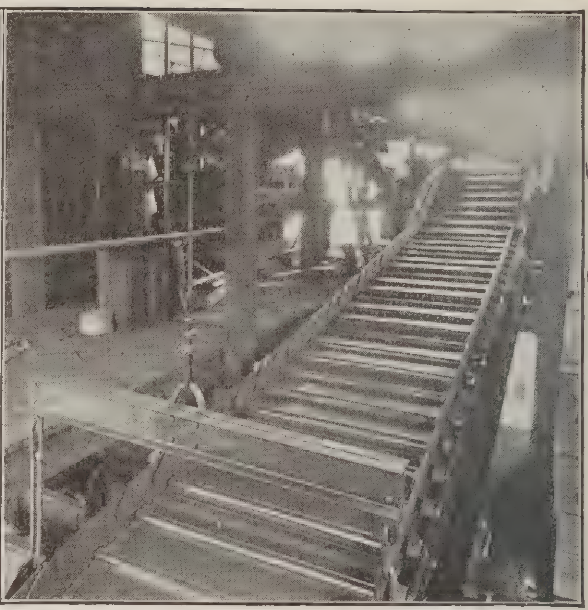

Fig. 4. Lengthwise View of Adjustable Loading Boom

Head and foot sprockets have four pockets each for the engagement of the button and are of a diameter of 5 ft. 1 in. The engaging teeth are flexible and made of manganese steel to avoid wear and tear. The conveyor is driven at the top end by two gear and one belt reductions from a General Electric 35-hp., 3-phase, alternating-current, 60-cycle, 250-volt motor, which is controlled by a self-starter with pilot circuit control.

By simply throwing in or out a knife switch at the trimmer's platform or near the picking table the motor can be started or stopped. When the conveyor is fully loaded the motor will generate power back into the line, and an electric shunt brake is provided to keep the conveyor from running away in case the power supply should fail; as an additional safeguard a hand-operated emergency brake has been installed.

Coal Is Separated into Four Sizes

At the lower end of the rope and button conveyor the coal is delivered to a set of shakers equipped with slack, nut and egg stepped screens 5 ft. 6 in. and 6 ft. wide. These are driven by eccentrics on a drive shaft running at 100 r.p.m., in turn driven through one gear and one belt reduction from a 35-hp. motor, a duplicate of the conveyor-drive motor. The screens separate the coal into four sizes—slack, nut, egg and lump. Slack and nut are delivered by chutes into bins or cars, while the egg and lump coal are discharged onto small shaking chutes with bevel discharge end, thus assuring even distribution on the loading booms without breakage.

There are two loading booms for both egg and lump coal, each 4 ft. wide and running at a speed of 40 ft. per min. Each loading boom consists of a double-beaded apron conveyor with removable sides. The hinged part is counterbalanced and suspended at the outer end by a bail from a rope leading to an electrically driven hoisting rig. The hoisting machinery is operated by a small motor and raises or lowers the boom at a speed of 15 ft. per minute. The shaker screens are equipped with veils so that any desired mixture or run-of-mine can be made.

For each loading-boom track a Fairmont railroad car retarder has been installed, which controls the railroad cars from the trimmer's platform and insures even loading and practically no drop of coal to the car. When desired, run-of-mine coal can be loaded over an emergency spiral loading chute into cars on a slack track without operating screens or booms.

The tipple equipment has a capacity of 200 tons per hour and has been in successful operation since its installation. The coal being very friable, every possible precaution has been taken to avoid unnecessary drop and breakage, and this plant may be considered one of the most uptodate of tipple equipments.

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German Byproduct Practice under War Conditions

The importance of the byproducts of coke and gas works in relation to political economy in Germany has grown since the outbreak of the war. Such byproducts as benzol and tar oil replace gasoline, the importation of which has ceased, and sulphate of ammonia is taking the place of Chile saltpeter, to be used as fertilizer and in the manufacture of explosives.

For these reasons efforts are being made to increase the use of coke, in order to obtain the above byproducts. In such a way, the government buildings and railways, etc., are now obliged to use coke, together with fuel of other kinds, and orders have been issued regulating the proportion of coke to be used in the mixture. German manufacturers have followed the example of the government.

Although the change from coal firing to coke represents some difficulties, proper methods have been adopted to equalize the minor calorific value of coke. Factories with stationary boiler plants have either increased their working hours or have increased the heating surface of the boilers, and with the help of forced draft the desired horsepower can be attained.

Gas coke possesses a higher calorific value than coke-oven coke, and experience has shown that in firing locomotives, a mixture of two-thirds coal and one-third coke will insure satisfactory operation.

Loading Bituminous Coal

By Miner Raymond*

SYNOPSIS—Modern arrangements now enable coal to be loaded into large railroad cars without subjecting the fuel to any destructive fall. Details of a new-style loading boom.

The problem of minimizing breakage in the preparation of lump coal for the market has been the subject of much discussion in recent years and has had a marked effect on tipple design. It is not in the scope of this article to analyze the trade conditions which have made this point of such importance to coal producers, but rather to sketch the development of one feature of tipple design directly traceable to this insistent demand for less breakage.

From the time the coal enters the dump as run-of-mine until it reaches the end of the last screen as lump it is subjected to no great shock and the breakage is so slight as to be of little consequence. At the start, the lumps are cushioned by the finer coal, and progress over the shaking screens is no more than a slide, urged on by the vibration of the screens. In transferring the lumps from the last screen to the car, however, it is a case of "letting 'em down easy," and the old quotation, "If you can't make it easy, make it as easy as you can," is not applicable; for it must be "easy" in the fullest sense of the word if breakage is to be avoided.

The problem is requiring more and more attention with the growth of railroad equipment, as constantly greater clearances over the rails have been demanded owing to the development of coal cars from low 30-ton wooden gondolas to towering steel "hopper bottoms" of 60-ton capacity. In many cases, clearances for the passage of big locomotives are now demanded, whereas not very many years ago cars were backed in for loading. This was the case in the early tipples, wherein a straight chute was extended from the lower screen to a point 3 ft. above the car and 2 ft. to one side of the center line of the track. This allowed a drop of 3 ft. greater than the depth of the car for the first coal loaded in successive positions of the car as it was moved along under the chute.

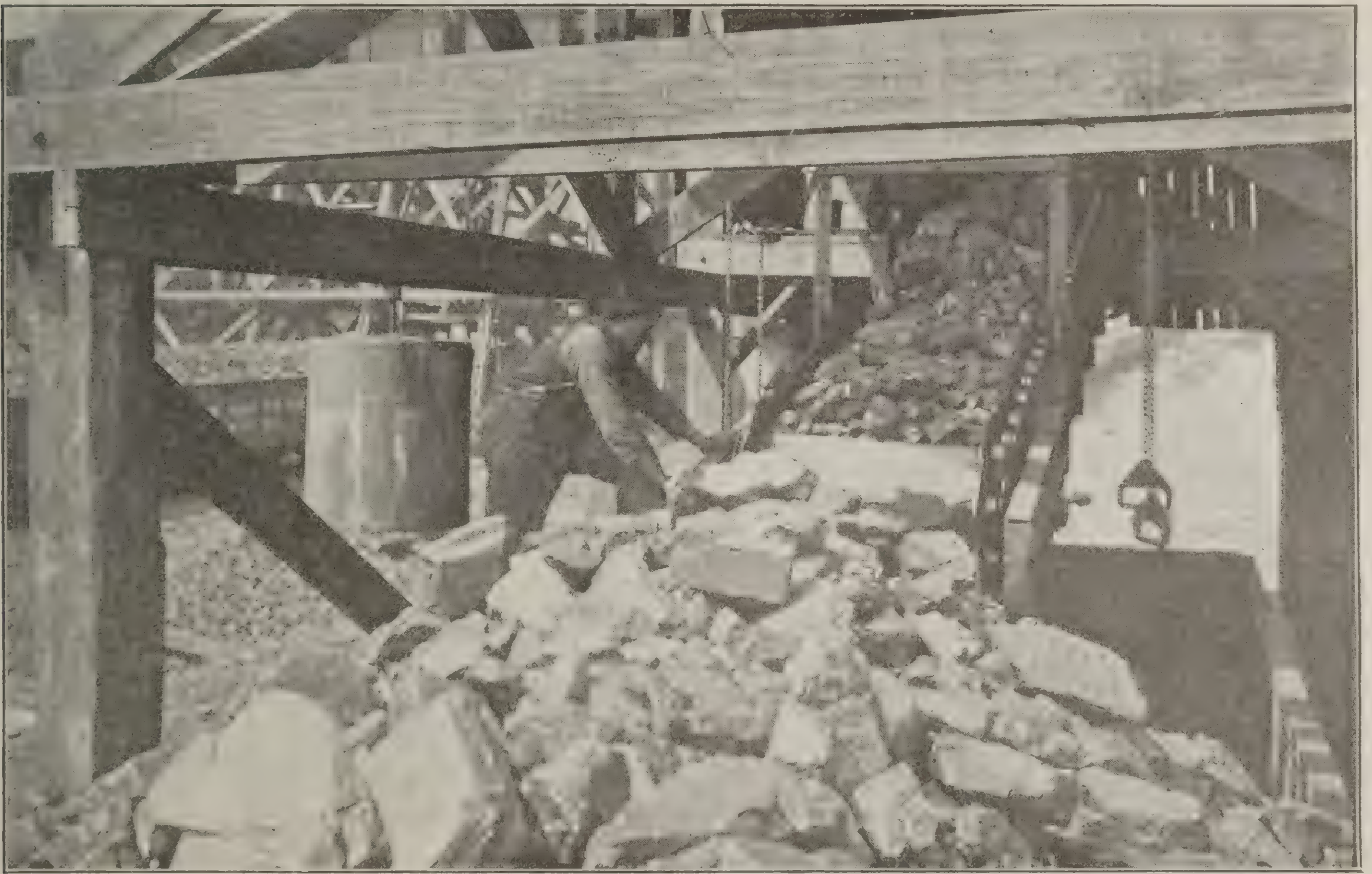

Fig. 1. Loading Boom Discharging Lump Coal to a Car. This Shows Also the Loading Boom Counterweight and the Handles Controlling the Boom Hoist

The Stages of Development

The first step in "easy loading" was to extend the end of the lower screen into a 90-deg. spiral chute terminating 3 ft. above the center of the car. With this arrangement, the coal flowed in a direction parallel to the rails and as soon as a "cone" of coal was formed in the end of the car, the latter was gradually moved along so that the lumps rolled down the pile already formed, but the drop was still as great as before, until the end "cone" was formed.

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*Tiffin, Ohio.

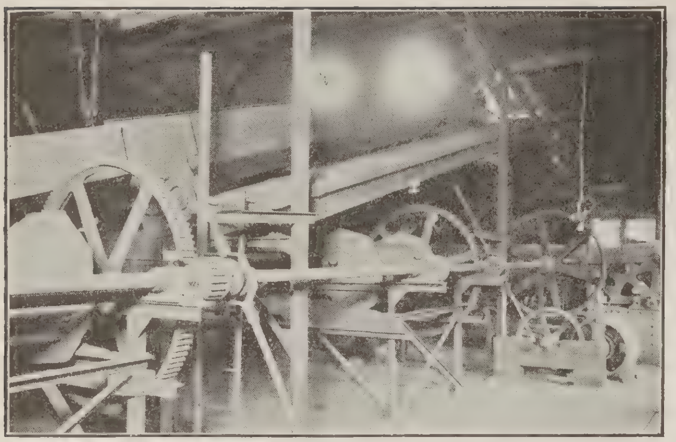

Fig. 2. Arrangement for Driving Two Booms from One Motor

When the high 50-ton cars began to appear, the rail clearances were increased and the objectionable drop became correspondingly greater. A sliding extension was then added to the spiral chute, and this arrangement overcame to some extent the breakage experienced in building up the first cone, but other than this it had no marked advantage over the spiral chute.

The modern method of loading lump is an outgrowth, not only of the earlier chutes outlined in preceding paragraphs, but also of the development of methods of picking. At first the coal was picked on the car, and later picking-belts made their appearance. About the year 1897 the old Tom's Creek Coal & Coke Co. picked the run-of-mine before screening, and used for this purpose a double-beaded apron conveyor consisting of steel pans carried between the strands of chain, the conveyor being practically identical in general construction with those used today. In the next few years, designers of tipples placed this steel picking table immediately below and at right angles to the end of the lower screen, replacing the spiral chute, but retaining the extensible chute for loading the cars.

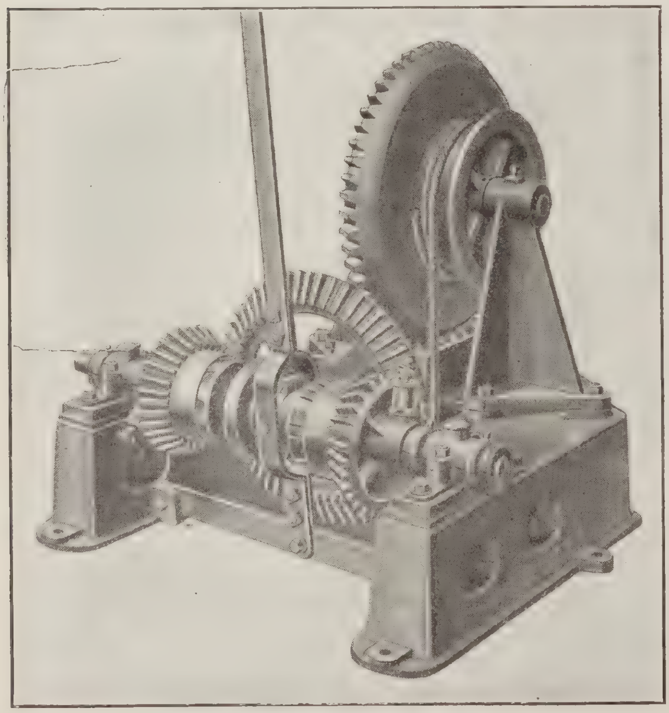

Fig. 3. The Boom Hoist

The next step in the solution of the problem brings us to modern practice. The picking table was extended to a suitable length and hinged at some point between head and foot shafts, the upper or stationary part acting as the picking table and the lower or hinged portion being mounted on a steel boom, which could be raised to a level position when not in use or lowered into the car while loading. Driving mechanisms and raising and lowering devices for this type of loader have been brought to a high state of mechanical efficiency.

The accompanying cuts illustrate some of these modern loading booms, which were made by the Webster Manufacturing Co., of Tiffin, Ohio. Fig. 1 depicts a car nearly full of lump at the tipple of the United Collieries Co., St. Charles, Va. The illustration clearly shows how the demand to "let 'em down easy" has been met. With an "empty" in position, the boom is lowered into one end of the car floor and gradually raised as the cone grows to its limit. The boom is held stationary at this point and the car is moved along until it is loaded to capacity with unbroken lump. There is no chance for breakage. Fig. 4 is from a photograph of the boom used by the Howard Colliery Co. at its Chattaroy, W. Va., tipple, and here the boom is shown free of coal and fully raised to permit the passage of a locomotive on the track beneath.

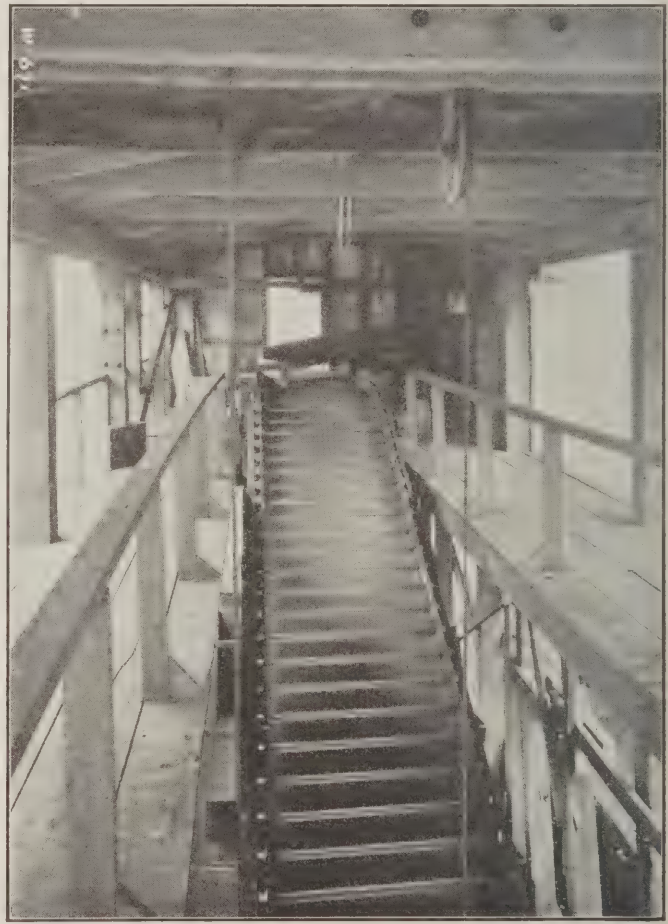

Fig. 4. View Looking Up Loading Boom

How the Booms Are Operated

In general, these booms consist of beaded steel aprons mounted between two strands of steel-bar roller chain, the inside link of the chain being extended to form the end of the pan (Fig. 4). The conveyor, with its head and foot shafts and their sprockets, is carried on a structural steel frame hinged at a point suitable for dividing the mechanism into its two component parts of stationary picking-table and loading-boom. The lower end of the boom is fitted with a bail (Fig. 4) with wire ropes leading over guide sheaves to the counterweight (Fig. 1) and to the boom hoist (Fig. 3). These hoists are reversible, the controlling lever serving to shift a double cone-clutch into one or the other of two bevel pinions which are always in mesh with a bevel gear. This gear, in turn, operates the winding-drum through a worm and wheel. This worm-gear drive also serves as a lock for the hoist in any position. The control lever is operated from the car by the handles shown in Fig. 1.

The apron is driven at the upper end. Fig. 2 shows the arrangement for driving two booms from one motor, with clutches on the driving pinions so that either one may be operated as may be desired. This view was taken in the tipple of the Standard Pocahontas Coal Co., at Caples, W. Va.

The large number of these loading-booms that have been installed in the last few years proves conclusively their great value to the mine that desires to prepare coal so that it will recommend itself to the dealer or consumer.

Crushing Coal at the Mines

By M. J. Williams*

SYNOPSIS—Many industrial plants are equipped to burn screenings, and screenings only. The supply of this grade of fuel fluctuates considerably, and but few mines are equipped with storage facilities. To these, provision for crushing the larger sizes is an economic necessity when the demand for screenings is large and the supply small.

The subject of the crushing of coal at the mines is one that most operators should be interested in for the very good reason that with the adoption of the crusher they have screenings at their command the year round.

In my opinion a crusher located at some convenient place in the tipple is as necessary to the average mine as any other piece of machinery. I shall no doubt meet with much opposition on this point as most mine owners have in the past put the crusher proposition up to the other fellow who uses the coal, to such an extent that perhaps less than 15 per cent. of the mines throughout the United States are now equipped with crushing facilities.

The purchaser of coal should be in a position to buy such fuel as he may require, but he should be compelled to pay a reasonable price, and until the mine operators adopt in some cases crushers and in others storage facilities, they cannot expect to command the right prices for their smaller grades of coal.

It is common knowledge that during the fall, winter and spring seasons the average mine is shipping such quantities of lump and sized coal that it accumulates a large tonnage of screenings or the finer grades of coal. These grades are used principally in chain-grate or other types of mechanical stokers, and as all mines are reaching their maximum production at this season of the year, it is quite natural that the market is flooded with screenings and the prices are low. Then during the summer months, when the demand for lump and sized coal falls off, the mines quite naturally cannot produce any great quantity of screenings; hence the price goes up and the production down.

How many operators have found themselves short on screening contracts in the summer and wished that they had saved some of the hundreds of tons of this fuel they dumped on the market the previous winter? I dare say that 80 per cent. of our mine owners have often come face to face with this situation.

In Chicago and vicinity ordinary screenings in the fall, winter and spring sell at ridiculously low prices, perhaps reaching at times as low as 20 cents per ton and from that price up to 50 and 60 cents; in fact, I am informed that one large power company last fall would not offer over 20 cents for screenings and got about all it could store at that figure.

At the present time screenings range anywhere from 80 cents to $1 per ton, for the scarcity is now being felt, and in another month or six weeks the percentage of screenings at the mines will be low and the prices higher. This condition I believe to prevail at the average mine.

I grant that many of the larger mine operators have realized the situation for years and have taken steps to protect their interests by storing some of their screenings during the busy season and holding them for the summer months, rehandling them into cars as desired, but the average mine, especially the smaller operation, is not prepared to store screenings, nor has the owner the inclination or capital to do so.

Storage Is Natural Solution of This Problem

Storage naturally is the greatest step toward relieving the situation, but there are three important factors to be considered in the matter of storage:

1. The enormous space required to accommodate any considerable supply of screenings.
2. The cost of necessary handling machinery for reloading screenings into cars. This will average, I would estimate, from $10,000 to $15,000.
3. The element of danger from fire in the screenings pile and the deterioration of coal so stored.

There are perhaps many other factors in this storage proposition with which I am not familiar, but I am of the opinion that storage is necessary to every mine that has the room, capital and inclination.

This coal, I am quite certain, can be rehandled from the storage pile to the cars at a price in the neighborhood of 3 or 4 cents per ton. In some instances, in large operations the cost is no doubt less, and in the smaller operations it may reach a higher figure, but 3 to 4 cents I believe to be a fair average. Of course, this rehandling must be done mechanically as far as possible, as loading such coal by hand would reach at least 15 to 20 cents per ton.

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*Williams Patent Crusher & Pulverizer Co., Old Colony Building, Chicago, Ill.

It is my opinion that the storage proposition wherever it can be employed will be a prime factor in supplying the demand for screenings the year round and that it will be the means of keeping the price of this product at a more stationary figure, and one in which there will be at least a reasonable profit. The large industrial plants, I am sure, would much prefer to buy their coal as they require it and not put in the expensive and extensive storage systems that they are now compelled to employ. Especially is this true when conditions in the coal trade are normal.

The operator who is not prepared to use storage for want of sufficient space, capital or desire is the man most interested in the crusher. There are already many large industrial plants with sufficient storage to take care of the surplus screenings of the man without storage at his mines, and by the adoption of the crusher these operators can make small sizes, crushing at such times as they are not screening this product from their mine product and thereby filling throughout the entire year their screenings contracts at a substantial figure.

Many Types of Crushers Are Suitable

There are many different crushers that may be used for this purpose, such as the single roll, double roll, breakers with stationary arms and the hammer crushers, any of which will answer the purpose. Those who have used the hammer type, however, consider it the best machine by reason of its extra heavy construction and its facilities for trapping or throwing out the stray iron so often disastrous to the roll crusher, and also by reason of its adjustability. The hammer crushers may be adjusted and manipulated to crush in extreme cases as coarse as 8 in. in size and from that size down to 3/4 in. This same crusher may be set at any intermediate point between these limits, making a large number of given sizes and with a minimum of fines.

Of course, one must thoroughly understand the hammer mill and its possibilities in order to accomplish these results on the same crusher, but it can be done and is being done every day in the year. Hammer crushers are made in sizes to meet any capacity desired from 10 tons per hour up to 500 tons per hour.

The first question that arises in the mind of an operator considering a crusher at the mine is the cost of crushing. This compares quite favorably with storage and rehandling, for coal may be crushed at approximately 2 to 3 cents per ton, including cost of power, maintenance, interest on investment and depreciation.

The cost of power is around 3/4 to 1 cent per ton, depending upon the price of power at the mine. Oil and maintenance including labor and adjusting is 1/2 to 1 cent per ton, while interest on the investment and depreciation should not exceed 1/2 cent per. ton.

These figures I believe to be a fair average. One hundred tons of coal may be crushed per hour with less than 40 hp. As the journals are self-oiling the oil is used over and over again, and since the crusher is substantially built and adjustable, replacement of parts is but a small item, and renewal from natural wear and tear is a matter in some cases of 6 months to 1 year. As the crusher is generally located in some convenient place in the tipple the coal enters and discharges automatically, no labor being required nor are skilled mechanics necessary to attend the machine. The engineer can give it a few moments of his time at the end of each day's run.

Interest on the investment and depreciation are exceptionally small, as the sum involved in the purchase price, installation and motive power for a 100-ton-per-hour crusher does not exceed $1200 to $1500. The life of the crusher proper is unknown. All of the hammer coal crushers built 20 years ago are still in service and bid fair to continue in service indefinitely. Crushers should be properly taken care of, however, just the same as any other piece of machinery.

A Common Mistake

One great mistake made by those designing tipples is that they do not figure on the installation of a crusher in the future; consequently most crushers installed in the ordinary tipple must be set at such point as can be found for them, which in a large percentage of installations is a space not adapted to a crusher if maximum results are to be obtained. This is especially true of poor drives, inadequate head room for proper feed and insufficient fall or discharge of the coal from the crusher. I therefore suggest to all those building or designing tipples to arrange at some convenient point a suitable space for a crusher, with ample head room, proper motor or belt drive and proper discharge, for it is only a matter of time when from 40 to 60 per cent. of the bituminous mines throughout the country, especially those furnishing coal to industrial plants, will be equipped with crushers.

The crushing of coal at the mines is not a new proposition, especially at those developments controlled by large industrial corporations that cannot secure enough screenings or fine chain-grate coal to supply their boiler plants. For instance, the mines furnishing coal for the Carnegie steel plants have crushed at three or four mines almost all the coal to a 3/4-in. to 1 1/4-in. product for over 10 years and have these crushers located over both the rail and river end of each tipple. This is only one of many instances where coal is crushed at the mines.

Those industrial plants which now employ crushers at their power plants have been forced to do so principally for the reason that at times they could not secure sufficient screenings, and as an added measure of precaution have crushed lump or run-of-mine to screenings size and stored it at a time when a coal strike threatened or when there existed a scarcity of cars due to bad weather. The ordinary industrial plant will never employ these precautions, and in my opinion it is up to the coal operator to prepare his mine to deliver that product which is desired by his customer the year round, bearing in mind of course a profit on such business. There are many of us of course who would take care of our trade regardless of the cost when our customers were temporarily "up against" some unforeseen shortage. This does not apply to the coal trade alone, but to any business venture the owners of which desire to succeed and prosper. The crushing of coal may be made profitable, however, and in my opinion is a necessity at many mines.

Coal Preparation in the Rocky Mountain Field

By Benedict Shubart*

SYNOPSIS—A district where the production of lump coal is the chief requirement. Box-car loaders are employed. Details of rescreening and washing methods.

In no section of the United States is the preparation of coal more elaborate than in the Rocky Mountain district. An Eastern operator entering this territory will almost always commence with a criticism of the seemingly ridiculous care that is taken both in the handling and the screening of the mine product, but a brief study of the market conditions will show why all this care is necessary and profitable.

With the exception of three or four months in the fall, there is practically no demand for steam coal. During the months of September, October, November and December, the sugar factories absorb a considerable amount of slack coal, the amount used by each factory being substantially the slack resultant from a production of 400 tons of coal per day. Thus one mine can serve practically two factories or even more.

This forms the largest single market for slack coal. Aside from this, there is a comparatively slight demand. The Rocky Mountain country is not yet a manufacturing district; and besides, the water-power resources have been developed to a high degree, and many small factories are driven by electricity derived from water power.

It is clear that there must be an overproduction of slack coal which must be disposed of at an expense additional to the cost of mining; furthermore, the sale of this slack tends to lower the price of the fine coal which ordinarily has a market.

Mine of the Big Horn Collieries Co. at Crosby, Wyo.

Demand Is for Large Coal

The Rocky Mountain West is a country of long distances. California is quite a way from Colorado, Utah and New Mexico, whence it gets its coal. The long grind to market in railroad cars causes a considerable breakage in the coal. With a freight rate varying from $4 to $6 per ton over the long hauls, and substantially no market for the fine coal which must be screened out before the large coal can be sold, the reason for the demand for a perfectly prepared large coal is plain.

The domestic market refuses to take any but the largest coal. Lumps of coal weighing from 150 to 300 lb. are frequently shipped, and the cry from the consumer is always for larger coal.

Starting in the mines, the question of the economy of shooting off the solid has been settled by the slack question. Small coal cannot be sold, and furthermore costs money to dispose of, so the coal must be undercut or sheared to increase the percentage of lump and nut coal. This unquestionably makes for safety in the mines by decreasing the amount of powder used, minimizing the windy shots and preventing to a large extent the shattering of the roof.

Of course in the coking-coal districts around Trinidad, Raton and Dawson, the slack can be made into coke, and furthermore makes a very good steam coal, so that in this district the slack question is not so important. The preparation of the other coal, however, is the same as in the rest of the Rocky Mountain district.

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*Engineer, Denver, Colo.

Robinson Tipple of Colorado Fuel & Iron Co. at Walsenburg, Colo.

No. 4 Tipple of the Kemmerer Coal Co. at Kemmerer, Wyo.

Plant of Carney Coal Co., Carneyville, Wyo

Every care is taken on the tipple to prevent breakage. Most of the modern tipples are now installing the power-driven type of rotary dump, not only because this permits the use of a solid-end car, which is safer and more economical than the old-style cars, but because it provides a method of dumping with the least possible amount of breakage. Gravity screens are used only in the smallest of wagon mines. Practically every modern tipple is equipped with shaking screens of some variety, and there are one or two installations of Marcus screens. Some of these installations are equipped for making quickly and easily the widest variety of sizes.

In the Utah field substantially 12 different grades are required, as follows: Run-of-mine coal, lump coal over 1½-in. perforations, lump coal over 3-in., lump coal over 5 in., lump coal over 8-in., slack coal through 1½-in., pea coal through 1½-in. and over ½-in., dust through ½-in., nut coal through 3-in. and over 1½-in., egg coal through 5-in. and over 3-in., stove coal through 5-in. and over 1½-in., California lump coal through 8-in. and over 3-in. These are roughly the sizes of coal demanded by the trade, the size of the perforations varying at different mines.

Rescreening Plants

Of course all these sizes are not made on the shaking screens. Each plant is supplemented by a rescreening plant, with its elevators, screens, and bins for storage. In some instances only the slack coal is raised for rescreening, in others the nut and slack coal, and in some instances even the egg, nut and slack coal. For this work in the larger mines the very rugged continuous-bucket elevator mounted on double strands of steel rolling chain is used, the type being shown by the accompanying illustration.

For the greater part, rotary screens are used, and they do very good work excepting in the case of damp coal,

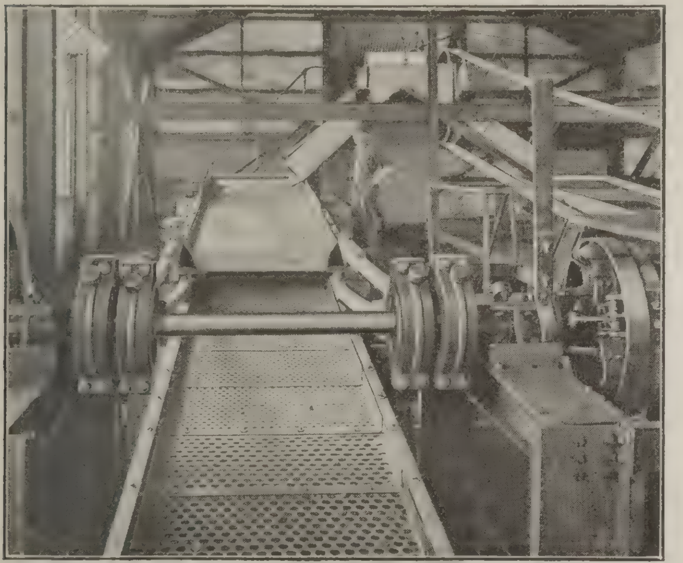
Tipple of Oakdale Coal Co., Oakview, Colo.

Tipple of Roundup (Mont.) Coal Mining Co.

where it is exceedingly difficult to keep the small perforations clear. These screens vary in size from 4 ft. in diameter by 12 ft. long to 5 ft. in diameter by 20 ft. long, and in some mines as many as four of the latter are installed to secure efficient screening.

Some recent installations use the Parrish screen. This is a shaker screen of peculiar design, the frame consisting of hickory or ash rigidly attached to elastic hangers or supports. The eccentric rods are also rigidly attached to the screen, the resulting motion being a sort of a whipping action, which tends to break up the masses of coal and to keep the screens clear.

A further complication in the preparation of coal in this district is the necessity for loading box-cars. Lump coal is invariably loaded into box-cars over the greater part of the territory. The same applies to nut coal, and it is even necessary in some cases to load coal as small as pea coal into box-cars. The reason for this is twofold—firstly the inability of the railroad company to supply sufficient coal cars and secondly the long hauls. The trains are obliged to stop at a good many division points before reaching their destination, and each division point takes its toll in the way of stolen coal, the total shrinkage being considerable.



A Shaking Screen Installation in the Rocky Mountain Field

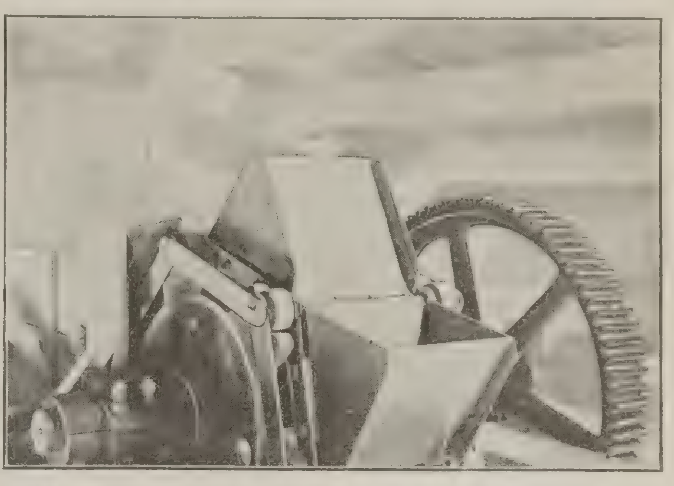
For easing the coal gently into the cars some very elaborate chutes are used. At the end of the shaking screen is usually a swinging shaking chute, which may be raised or lowered to adjust it to the height of the different cars, or else a picking-table type of conveyor is installed, pivoted at one end so that it can be adjusted for height.

Box-Car Loaders Are Used

Of course, box-car loaders are a necessity where the mine tonnage is of any moment. The Victor, Christy and Ottumwa loaders are all in use in the West, and the Manierre loader, which promises to handle the coal much more gently than any previous loader, is rapidly coming into use. Loaders are frequently installed in the larger mines for loading nut coal.

Few tipples are built with less than four loading tracks, and most of the tipples have five. This makes a very long tipple structure and necessitates carrying the coal a considerable distance before the final product is discharged into the farthest car.

Picking coal is not extensively practiced in the West. There are a few picking tables installed, but the picking is not nearly so thorough as in the Eastern mines. The infrequency of picking may be partly accounted for by the fact that there is so much thick and clean Western coal easily at hand that the dirtier seams have not yet been opened up.



Head of Elevator at Plant of Panther Coal Co., Panther, Utah

Many of the Western operators feel, too, that picking is only a makeshift, and where it is essential that rock be cleaned from the coal, the installation of a small washer has proven much more satisfactory and more economical in operation than the maintenance of picking tables.

Steel construction for tipples has not yet taken hold in the West very firmly. Several steel tipples have been constructed, and several more are in the process of construction. The trend of the mining law is to prevent the installation of inflammable structures near the mine mouth, and legislation in some of the Rocky Mountain States, together with threatened legislation in others, is proving a great factor in the design of tipples.

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Mining Companies Purchase New Equipment

A great many people recently have contended that business of all kinds is very bad. There are those, however, who take a different view and who state that conditions in their particular line are fairly prosperous. We have all heard that the coke business is improving rapidly, and it is interesting to know, also, that bituminous operators in many states have taken an optimistic stand and are preparing for an active trade this coming fall.

The Roberts & Schaefer Co., of Chicago, has received orders during the past six weeks for more than $300,000 worth of tipple and mine construction work. The prospective purchasers of this equipment are: Harty Coal Co., Mullens, W. Va.; Cottonwood Coal Co., Stockett, Mont.; Oregon-Washington R.R. & Navigation Co., Seattle, Wash.; Ayrshire Coal Co., Oakland City, Ind.; Oliphant-Wasson Coal Co., Vincennes, Ind.; Lorain Coal & Dock Co., Columbus, Ohio; Louisville & Nashville R.R. Co., Louisville, Ky.; Carter Coal Co., Coalwood, W. Va.; Elkins Coal & Coke Co., Morgantown, W. Va.

Eastern Ohio Mining Scale

SYNOPSIS—The agreement between the Association of Pittsburgh Vein Operators of Ohio and the United Mine Workers of America with reference to the operation of their mines in Belmont, Harrison and Jefferson Counties, Ohio. This agreement went into effect May 11, 1915, and will expire Mar. 31, 1916.

Following are the rules and regulations of the eastern Ohio scale somewhat condensed:

Rule 1. It is agreed that all local rules, regulations and customs heretofore established in conflict with this agreement are hereby abolished.

Rule 2. The management of the mine, the direction of the working force and the right to hire and discharge are vested exclusively in the operator, and the U. M. W. of A. shall not abridge these rights. It is not the intention of this provision to discourage the discharge of employees, or the refusal of employment to applicants because of personal prejudices or activity in matters affecting the U. M. W. of A. If any employee shall be suspended or discharged by the operator, and it is claimed that an injustice has been done, an investigation shall be made promptly by the mine committee and the mine superintendent, and if they fail to agree, the dispute shall be referred to the operator affected and the officers of District No. 6 or their representatives.

If the finding is that the said employee was wrongfully discharged or suspended the company then shall reinstate him and pay full compensation for the time lost through such suspension, based on the earnings of the said employee prior to his being discharged or suspended.

[The provisions of this rule contradict one another and may be the cause of much trouble later.—Editor.]

HOURS OF LABOR

Rule 3. The 8-hr. day of 48 hr. per week as provided in the Columbus day-wage scale of 1898 is hereby reaffirmed. The following holidays are recognized: Sundays, New Year's, Washington's Birthday, Apr. 1, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas.

(a) An 8-hr. day means 8-hr. work in the mines at usual working-places and includes all classes of labor. This shall be exclusive of the time necessarily expended in reaching such working-places in the morning and in departing from the same in the evening. The drivers shall take their mules from the stable to the passway where they receive the car from the motor and return the same in like manner to the stable. Motormen and tripriders shall be at the passway where they receive empty cars at starting time, and the time necessarily expended in taking mules and motors to the passway in the morning and returning the same at night shall not include any part of the day's labor, the working day of these men beginning when they reach the change or parting at which they receive empty cars, and in no case shall their time be docked when waiting for cars at the point named.

(b) All employees must be at their working-places at starting time on all days that the mines operate and shall remain there full 8 hr. or during such part of the 8 hr. as they have work to perform.

(c) Work shall begin at 7 a.m. and continue till 11 a.m. Not more than 30 min. shall be taken for dinner, and work will recommence at 11:30 a.m. and be concluded at 3:30 p.m. Central standard time. (This rule may be modified by mutual consent.

(d) When any places on any territory are not cut and the machine runners have not worked as many hours as the mine has been operated, by reason of breakdowns, sickness or absence of runners, the machine runners shall work on idle days or overtime until they have made up the time lost.

DISCIPLINE

Rule 4. No strike shall occur at any mine, except for failure to pay on the regular payday, without explanation.

(a) Should any officer or officers of the U. M. W. of A. or any member or members thereof, employed at any time, cause the mine or part of the mine to be shut down in violation of this rule, each member of the United Mine Workers of America employed at said mine who does not continue at work shall have deducted from his earnings $1 per day for each day or part of a day he remains idle.

(b) Should any operator or his representative lock the men out for the purpose of forcing a settlement of any grievance or cause the mine or a part of the mine to shut down in violation of this rule, he shall be fined $1 per employee for each day or part of a day during which the mine is thus thrown idle.

(c) All moneys assessed against employees under this rule shall be collected from the pay for the half-month in which the violation of the rule occurs or from the first money due thereafter. All moneys assessed against the operator for violation of this rule shall be turned over to subdistrict No. 5 of the U. M. W. of A., and all moneys assessed against the miners shall be turned over to the Association of Pittsburgh Vein Operators of Ohio.

(d) In any local grievance arising at any mine the aggrieved party or parties and mine foreman shall first make an earnest effort to adjust the dispute. Should they fail to agree, the question in dispute shall be referred to the mine foreman or superintendent and the mine committee. If these then fail to agree, it shall be referred to the general manager of the company involved, or his representative, and the president of the subdistrict organization, or his representative.

Should they also fail to arrive at a settlement, the matter shall then be referred to the president of District No. 6, United Mine Workers of America, or his representative, and the representative of the A. of P. V. O. of O. If they fail to agree, the matter shall be referred to the executive board of District No. 6 and the A. of P. V. O. of O. Should they fail to settle the controversy, the matter shall then be submitted to arbitration for final disposition. The miners' representative on this board of arbitration shall be the president of subdistrict No. 5. The operators' representative shall be the commissioner of the A. of P. V. O. of O. The third member shall be selected at once by the executive board to which reference is made above. Should they fail to make a selection within one day, then the third member of the board shall be appointed by the Industrial Commission of the State of Ohio, and if for any reason it is unable to make such selection, the federal judge of the northern district of Ohio shall then appoint such third member of the arbitration board.

The matter in controversy shall be immediately taken up by this board, and a decision of a majority shall be final and binding on both parties to the controversy. The expense of the arbitration shall be borne by the party against which the decision is rendered.

Rule 5. When any employee absents himself from duty two days or more, except on account of sickness, without giving advance notice, when possible, to the mine boss or mine superintendent, he forfeits his position.

Rule 6. When a machine runner or any employee upon whose work other employees of the mine are dependent absents himself from duty without giving advance notice, when possible, to the mine boss, he forfeits his position.

Rule 7. The pit committee shall consist of not more than three members, one or more of whom must be able to speak the English language. They, like all other employees, shall remain at their working-places unless a miner and a mine boss fail to agree on prices to be paid for extra work, when they may be called in to confer with the mine boss or superintendent in deciding the dispute.

Rule 8. No meeting shall be held during working hours except by mutual agreement between miners and superintendent.

PREPARATION OF COAL

Rule 9. Both miners and operators realize that in order to insure the sale of coal it is important that it should be clean. Consequently, it is mutually agreed that the miners will produce their coal in such a manner as will not increase, either by carelessness or reckless shooting, the percentage of fine coal, and will load the coal free from impurities.

In order to insure the above results, it is agreed as follows:

(a) Before shooting, all coal must be snubbed by the miner, if the operator so requires, and the fine coal and cuttings thoroughly cleaned from under the cut. The snubbing shall be 10 in. above the cut and 3 ft. under the coal.

(b) The miner or loader shall not drill his hole on the solid nor deeper than the undercut.

(c) Unless otherwise required by the operator, the fine coal and cuttings must not be loaded out separately, but must be loaded and distributed throughout the balance of the coal, in order to keep the product of the mine uniform.

(d) Any miner or loader who is found breaking up and loading the band or other impurities with his coal shall be fined $1 for each offense or be discharged, the penalty being at the option of the operator.

(e) The operator may designate one man at each mine who shall be recognized as inspector and whose duty it shall be to inspect and clean the coal. In case slate, bone, bands, copper stone or other impurities are sent out by the miner, the inspector selected shall estimate or weigh the quantity of the impurities, and the weight thereof shall be deducted from the total weight of the contents of the car and the miner or loader sending out the impurities shall be notified.

For the second offense within any pay, he shall be fined 50c. in addition to docking. For the third and each subsequent offense within any pay the miner shall be fined $1 in addition to docking, or he may be suspended or discharged at the option of the operator. A record of all cases and a daily report thereof shall be made to the operator and local union, giving the names of the parties loading impurities, with their check numbers.

Any employee of any mine abusing or seeking to embarrass the inspector for performing his duty shall be fined $3 or discharged at the option of the superintendent. Any local union where the miners so desire may select and employ one of its members who shall act jointly with the coal inspector appointed by the operator. This clause shall be so applied that no loaders or miners shall be unjustly or unreasonably penalized thereunder.

All fines imposed under the clean-coal rule shall be collected by the operator and turned over to the president of subdistrict No. 5 and the operators' commissioner, and shall be deposited in some bank to the joint credit of both. Such deposits are to serve from time to time as a burial fund or for other like charitable purposes as may be agreed upon.

DEAD-WORK PRICES

Rule 10. Operators shall pay 25c. per yard extra for driving wet entries when the miner and the mine boss agree that the place is entitled to that classification. The mine committee and the mine superintendent shall decide the matter if the former cannot agree.

(a) Operators shall take the water out of rooms and entries and have them dry at starting time, or pay 5c. per barrel if the miner has to bail the water. Barrels shall be placed in rooms and entries, and in those entries where they cannot be placed, the water-box shall be forwarded for the entrymen to bail water in.

Rule 11. Any rolls or horsebacks coming up in the bottom or down in the top shall be paid for as follows, per yard, running with the roll:

	Cutter	Loader
From 6 to 10 in. thick	$0.00	$0.31
Between 10 and 17 in.	.10	.52
Between 17 and 23 in.	.23	.85
Between 23 and 29 in.	.36	1.08

Any rolls of greater thickness shall be paid for in the same proportion for each 6 in. Miners shall take up and remove rolls where they cross the roadway.

When the roll is so hard as to require drilling and blasting, the operator shall furnish one-half and the miner one-half the labor for drilling and blasting. No part of the compensation shall go to the cutter for rolls coming down from the top.

Rule 12. When entries and entry breakthroughs in pick and machine mines are driven double shift, 25c. extra per yard shall be paid.

Rule 13. In order to prevent falls, miners shall exercise proper care in posting soapstone in rooms. When coal is taken out by the person employed in a room and less than 750 lb. of soapstone falls, it shall be removed by the miner without compensation. When the fall of soapstone exceeds 750 lb., the miner shall be paid for removing it unless it is removed by the company. The miner shall be entitled to compensation only in case the room has been properly posted.

(a) The prices to be paid for slate or soapstone unavoidably coming down over the coal shall be agreed upon by the mine boss and the miner. If they fail to agree, the dispute shall be referred to the superintendent, mine boss and mine committee.

(b) Clay veins and spars shall be paid for, the amount being determined by the miner affected and the mine boss. If the latter fail to agree, the company reserves the right to remove the vein or spar and give the miner another place.

Rule 14. Machinemen in both wide and narrow work are required to cut the coal level and close to the bottom, and in no case shall the thickness of bottom coal left exceed 4 in. If a machine cutter leaves a sprag or bottom coal over 4 in. thick he shall be notified to remove it, and should he fail or refuse, he shall be charged 50c. for each sprag or 25c. for each run or both, the penalty being paid to the loader.

Bottom coal in all narrow work must be taken up and loaded by the loader if the operator so requires. Bottom coal must be left down if the operator so orders.

Bottom coal in wide rooms which does not exceed 4 in. in thickness and is not "sticky" shall be lifted by the miner without extra compensation.

Whether the coal is or is not "sticky" shall be determined by the mine boss and loader in the following manner: The bottom is to be sheared along the rib to the face, and is to be open on the end. Two wedges are to be driven through the bottom coal, these wedges being 18 and 36 in. from the shearing and to reach 18 in. from the front of the bottom coal. If the coal still clings and adheres to the floor, it shall be termed "sticky bottom," and the loader shall not be required to lift it without compensation based on the maximum inside day-wage scale.

This, however, shall not prevent the mine boss and loader from making a mutual agreement to lift the bottom, or in case of their failure, to agree to have it lifted by anyone by paying the maximum inside day-wage scale. Nor shall it prevent the mine committee and superintendent from making investigations in case of disagreement under the above rule.

Rule 15. No extra compensation shall be paid because a working-place is driven on the butts or faces or at any angle thereto.

Rule 16. The operators pledge themselves to provide two rooms for each two machine loaders at the earliest possible moment, but in the event of territory becoming scarce through a squeeze or striking a horseback or any unavoidable obstacle, this rule shall not be construed so as to diminish the output of the mine.

(a) With 18-ft. rooms and a track along the rib, the above rule shall be modified by the operators and miners affected, if under its application the loaders will not be as steadily employed as they are at present under this rule. It shall be provided, however, that no two men be forced to work in one room.

Rule 17. All men driving working-places 15 ft. wide or over shall receive the tonnage price only, except in such rooms as hereinafter provided.

Rule 18. All rooms shall be 18 ft. wide or over. The operator shall designate the width of the room. When it is ordered that the place be driven less than 18 ft. wide, entry price shall be paid.

Rule 19. When required by the operator, rooms may be turned by machine, thus eliminating pickwork. In case the operator requires that pick cuts be taken out, the prices provided for herein shall be paid.

Rule 20. When the day men go into the mine in the morning, they shall be entitled to two hours' pay whether or not the mine works the full two hours. But after the first two hours the day men shall be paid for every hour thereafter by the hour for each hour's work or fractional part thereof. If for any reason the regular routine work cannot be furnished to the inside labor for a portion of the first two hours, the operators may furnish other than the regular labor for the unexpired time.

Rule 21. Any man called from the inside of the mine to perform outside day labor temporarily shall receive inside day wages. Any man called from the face of the coal or who receives $2.84 per day shall be paid that same sum.

Any miner who is without coal and who accepts employment on the outside for that day or any fractional part thereof shall receive the outside day wages for the class of work he performs.

Rule 22. A uniform rate of 1 per cent. on the dollar shall be charged in pick mines where the company hires the blacksmith, and it is further agreed that no cutters and loaders in machine mines shall be charged for blacksmithing.

MISCELLANEOUS RULES

Rule 23. There shall be no free turns allowed for either rooms or entries. The entries shall be driven as fast as the operators desire or conditions permit; but in no case shall entry miners be allowed more cars for coal than room miners, and at least once each pay the turn shall be made uniform throughout the mine for the time previously worked. If, however, the regular turn will not allow cars enough to drive the entries as fast as desired, the operators shall increase the number of miners in each entry, so that by giving to each the regular turn the entries shall be driven as fast as two miners could drive them with an unlimited supply of cars.

If, however, the room men decline to take their place in the entries when requested by the operator, then the entrymen shall have free turns until the entries are driven their required length.

Rule 24. A checkweighman may be placed on the tipple at the expense of the miners. He must not be a member of the pit committee and must at the time of his selection be an employee at the mine where he is to serve. His duties shall be those prescribed by the laws of the State of Ohio. All weigh scales may be tested by the miners at any reasonable time.

Rule 25. Any rule, either local or general, governing the scale or conditions of employment in the Pittsburgh vein of subdistrict No. 5 shall be mutually agreed to by the operators and miners interested, and said rules, before being enforced, shall receive the indorsement of the officials both of the operators and of District No. 6, U. M. W. of A.

Rule 26. The miners may cease working only on the day on which a fatal accident to an employee occurs in the mine. Under no circumstances shall the mine be made idle for any funeral.

In consideration of the mine continuing to work on the day a funeral is held, the operators agree to contribute to the bereaved family, on the death of any of their employees, one-third of the amount paid by the miners, said amount not to exceed $25. This rule does not prevent friends from attending a funeral. The operators shall not be required to pay the amount herein specified in case the deceased was covered by the Workmen's Compensation Act.

Rule 27. In case of local or general suspension of mining, either at the expiration of this contract or otherwise, the engineers, firemen, pumpers and other men necessary to keep the mines in shape shall not suspend work, but shall, when work is suspended, fully protect and keep in repair all the company's property under their care, and operate the fans and pumps, and lower and hoist such men or supplies as may be required to keep up steam at the company's coal plant; but it is understood and agreed that the operators will not ask them to hoist for sale on the market any coal produced by nonunion labor. The rates to be paid for such work to be those in effect at the time of suspension and also subject to any subsequent settlement.

Rule 28. The conditions, employment, duties, hours of labor and membership of the U. M. W. of A. of the engineers, firemen, electricians and machinists existing prior to Sept. 1, 1903, continue and remain in force during the life of this contract.

It is further agreed that if any member of the U. M. W. of A., even if on a mine committee or serving as a local officer, shall interfere with the engineers, firemen, electricians or machinists on duty he shall be subject to suspension or dismissal by the operator, it being understood that the engineers, firemen, electricians or machinists who are now members shall remain members of the U. M. W. of A. and those who are not members shall not be compelled to join.

Rule 29. Pay days shall be on the 10th and 25th of each month.

Rule 30. The check-off system is adopted as a part of the agreement in this district. This rule pertains to regular dues and assessments of the U. M. W. of A. In order to be honored the check-off must be furnished to the company not later than 5 p.m. on the 2d and 17th day of each month.

Rule 31. Where railroad cars are promised and are on the way between the yards and the mines at starting time in the morning, the men shall wait 30 min. and no more; provided, however, that where satisfactory local arrangements exist regulating the waiting for cars, the same shall remain in force.

Rule 32. The prices herein stipulated for cutting and loading a ton of coal carry with them compensation for taking care of the working-places. When the conditions of the working-places are such that it becomes necessary to reset posts, it shall be done by the cutter on one of the two following bases:

(1) The cutter shall reset two posts in rooms of any width without extra compensation and he shall receive 3c. per post for each additional post reset, or (2) the cutter shall reset three posts in a 24-ft. working-place or two posts in an 18-ft. working-place, without any extra compensation, and for each additional post reset in excess thereof he shall receive 5c. per post. Posts in either case shall be counted but once.

The operator shall have the right to elect which basis of settlement is to govern work of this character, if any, at each individual mine, but having made his decision he is not permitted to change the basis during the life of this contract. If posts need resetting the machine runner shall, if possible, notify the mine boss in advance that such work is necessary.

Rule 33. It is understood and agreed that should any dispute arise in regard to the interpretation of the rules and provisions of this scale the interpretation shall be left entirely to the committee of operators and miners who formulated and signed this agreement.

Rule 34. All draw-slate over 12 in. thick shall be considered "thick slate" and shall be paid for on the following basis per yard, running with the working-places:

The rate for each inch of draw-slate over 12-in. shall be $0.063 for a room 24 ft. wide, $0.053 for a room 18 ft. wide, $0.048 for a room 15 ft. wide, $0.042 for an entry 12 ft. wide and $0.0315 for an entry 8 ft. wide.

PICK-MINING SCALE

Mining, run-of-mine coal, per ton	$0.676
Mining, bank measure, per foot, room 24 ft. wide, coal 5 ft. thick	3.22
Mining, bank measure, entries not to exceed 6 ft. wide, per yard	4.06
Mining, bank measure, entries not to exceed 7 ft. wide per yard	4.74
Mining, bank measure, entries not to exceed 8 ft. wide, per yard	5.41

For every 3 in. above or below the regular height of 5 ft. of coal on a bank-measure system, in both entries and rooms, a proportionate advance or decline in the mining rate shall be paid.

INSIDE DAY-WAGE SCALE

Tracklayers, bottom cagers, drivers, motormen, trip-riders, machine-haulers, water-haulers and timbermen, where the latter are employed, per day	$2.84
Pipemen for compressed-air plants, per day	2.78
Tracklayer's helpers, and all other inside day labor, per day	2.62
Trappers, per day	1.25

OUTSIDE DAY-WAGE SCALE

The following shall be the scale for outside day labor, as enumerated below:

Checkers, per day	$2.51
Dumpers, per day	2.34
Trimmers, per day	2.19
First blacksmith, per day	3.12
Second blacksmith, per day	2.81
Blacksmith's helpers, per day	2.62
Mine carpenters, per day	2.62
Couplers and greasers, per day (boys)	1.37

All present outside day labor not satisfied with the wages to be paid according to this scale shall be given an average place in the mine.

The above schedule of day wages applies only to men employed in the performance of their labor and does not apply to boys, unless they can do and are employed to do a man's work.

MACHINE-MINING SCALE

Chain Machines

Cutting in rooms, per ton	$0.08
Cutting in entries, breakthroughs between entries, breakthroughs between rooms, and turning rooms 8 ft. wide, per ton	.08
And extra per yard	.20
Cutting in entries, breakthroughs between entries, breakthroughs between rooms and turning rooms, 12 ft. wide, per ton	.08
And extra per yard	.15
Loading with hand drilling in rooms, per ton	.39
Loading with hand drilling in entries, breakthroughs between entries, breakthroughs between rooms and turning rooms, 8 ft. wide, per ton	.39
And extra per yard	.50
Loading with hand drilling in entries, breakthroughs between entries, breakthroughs between rooms and turning rooms, 12 ft. wide, per ton	.39
And extra per yard	.40

Pick Cutting

Pick cutting, 8 ft. wide, per ton	$0.39
And extra per yard	2.90
Pick cutting, 12 ft. wide, per ton	.39
And extra per yard	3.62

Drilling—After both chain and punching machines, where drilling is done by machine operated by other than the loader, 1.85c. per ton mine-run coal will be paid to the driller and 2.27c. deducted from the price for loading as above.

Classifying Technical Literature

Delegates from about twenty national technical and scientific societies met in the United Engineering Societies Building, 29 West 39th St., New York City, on May 21, 1915, to perfect a permanent organization, the purpose being to prepare a classification of the literature of applied science which might be generally accepted and adopted by these and other organizations.

The name adopted for this organization is Joint Committee on Classification of Technical Literature, and the temporary address of the secretary, W. P. Cutter, is 29 West 39th St., New York City. Fred R. Low, the editor of *Power*, is chairman of the committee.

Tipple Equipment for a Modest Tonnage

By E. C. De Wolfe*

SYNOPSIS—The coal is lowered down the mountain side by an inclined plane to the tipple, where careful preparation is secured. The entire equipment was designed to handle a normal output of 200 tons per hour.

In the comparatively new fields of Harlan County, Kentucky, the Golden Ash Coal Co. has recently opened a mine to win a high-grade fuel from a high-level seam in the mountains. The plant is modest in character, as befitting the limited extent of the property. The tipple is placed at railroad elevation, while an incline leads up the mountainside to the level of the mine proper.

The tipple, Fig. 2, is a frame structure, equipped with a complete outfit of machinery, made by the Webster Manufacturing Co., Tiffin, Ohio, from the mine-car weigh scales to the railroad-car loading chutes. The equipment is designed throughout to handle an output of 200 tons per hour. While small and simple, it is complete and of the highest quality.

Mine cars in trips of four are let down the incline behind "dolly" cars. Uncoupled on the level approach to the tipple the cars are run singly over the scales and thence to the crossover dump, where the coal is discharged into the hopper the bottom of which is seen in Fig. 3.

A reciprocating feeder beneath the hopper delivers the coal evenly to the pair of balanced, inclined shaker screens, Fig. 4. On the day of the photographer's visit the output was being loaded as mine run, so the screens were veiled, as shown by Fig. 5, and cars were passed beneath the tipple on one track only, Fig. 2.

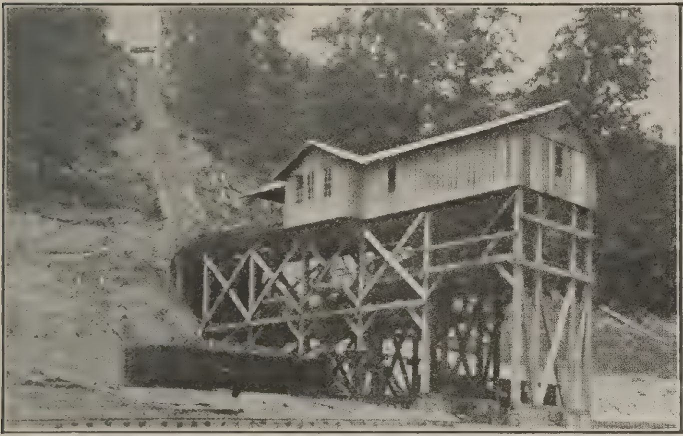

Fig. 1. Tipple and Gravity Plane of the Golden Ash Coal Co.

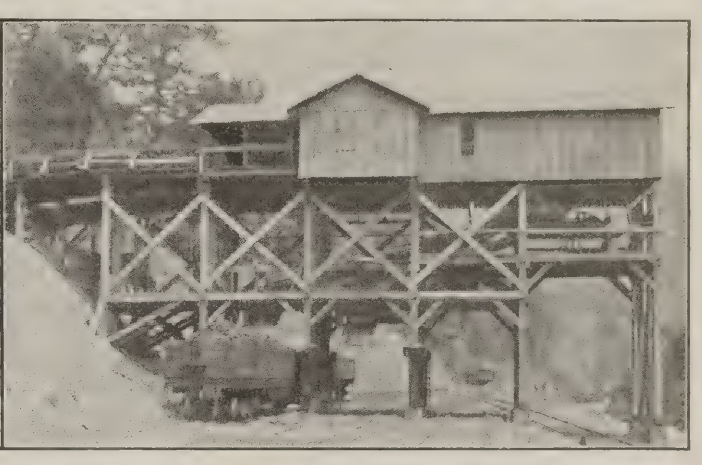

Fig. 2. The Tipple Spanning Four Loading Tracks

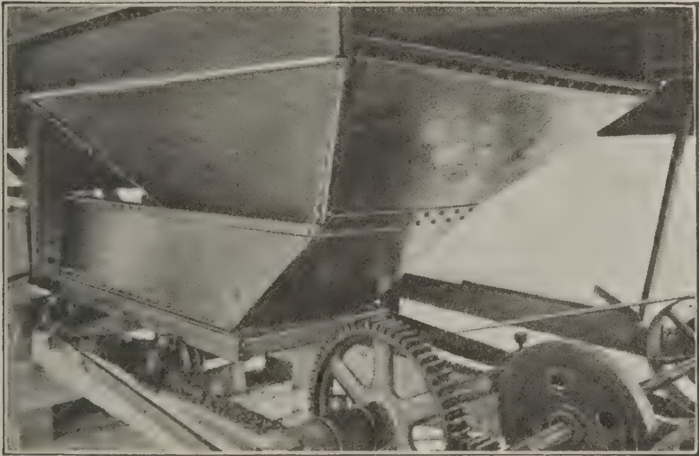

Fig. 3. Receiving Hopper and Reciprocating Feeder to Screens

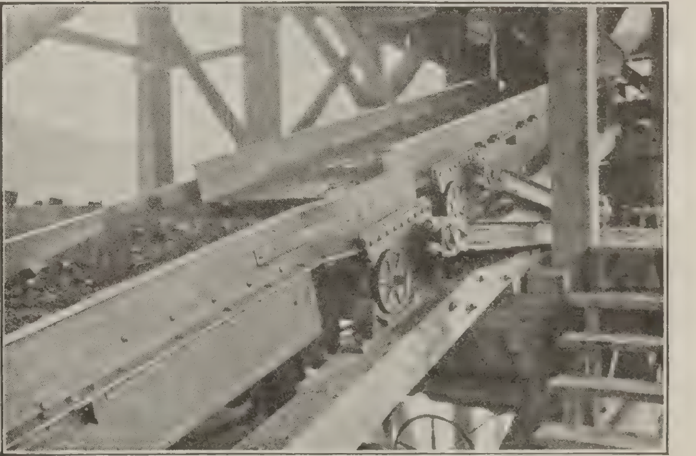

Fig. 4. Shaker Screens and Operating Connections

The two shakers are operated in balance by oppositely working eccentrics, the screens being mounted on wheels supported for a short horizontal movement.

For each grade of coal prepared there is a steel loading chute set permanently at proper inclination and adjustable to the desired loading position by movement endwise. This arrangement maintains a constant pitch to the chute and is therefore preferable to the common method of hing-

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*Secretary-treasurer, Russell-De Wolfe Co., 537 South Dearborn St., Chicago, Ill.

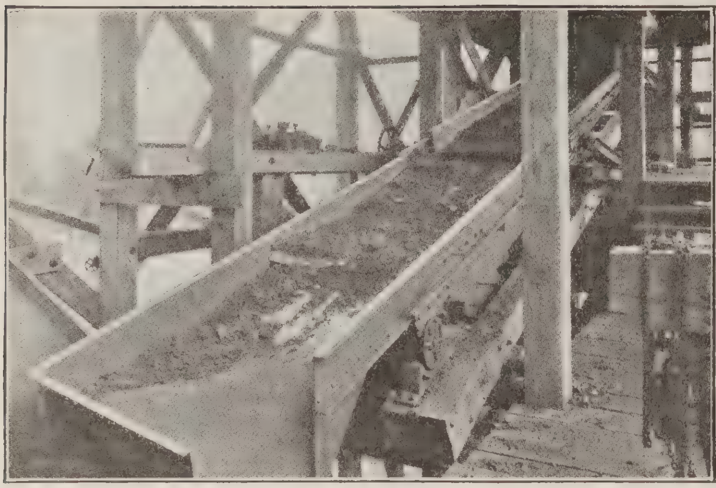

Fig. 5. Screens Veiled for Loading Run-of-Mine Direct to Railroad Cars

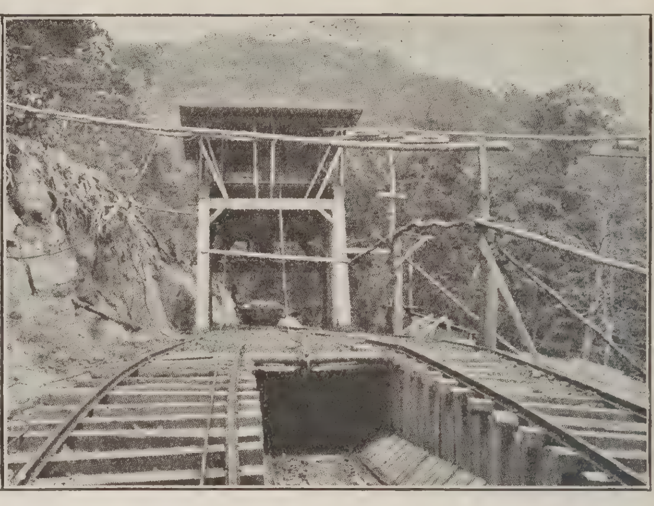

Fig. 6. Load Tracks over the Knuckle, and Empty Return Between

ing at the upper end and making loading adjustments by raising and lowering the delivery end.

The endwise adjustment is effected simply by arranging the chutes to slide in suitable guides, under control of a wire rope carried to a hand winch placed for convenient operation by the man on the loading runway beneath the tipple. At the left in Fig. 5 may be seen a portion of the lump or mine-run chute, and beyond it the wire rope passing over a sheave giving a fair lead to the winch below.

Operation of the Gravity Plane

At the head of the incline in a heavily timbered frame, Figs. 6, 7 and 8, is the rope drum by which the operation of the gravity plane is controlled. On the double tracks down the mountain the loaded cars going down haul the empties up. The drum has therefore only controlling work to do, and its principal feature is a positive and safe brake of ample power for all emergencies.

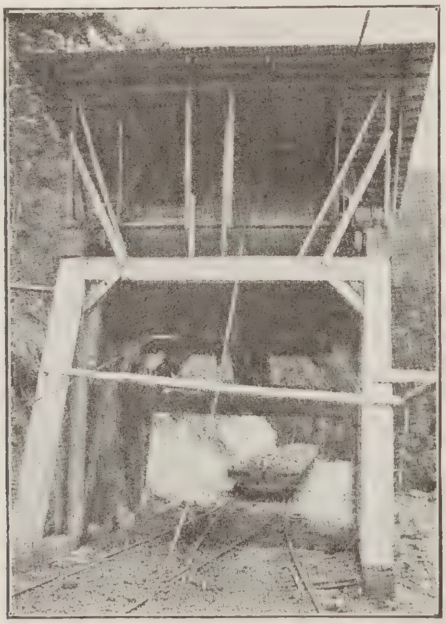

Fig. 7. Drum and Supporting Structure

The drum at Golden Ash has two heavy band brakes, one at each end. Either is ample for stopping and holding the drum at any speed it might attain, with any load which might be going down and with no load going up on the other rope. The drum is 8 ft. in diameter and 9 ft. long. It is of wood, on cast-iron spiders, fitted to a large shaft, supported in heavy rigid pillow blocks.

As shown in Fig. 7, the loaded cars may be sent through beneath the drum on either of two tracks leading to the "knuckle" at the head of the incline. Sets of four cars coupled together are alternately sent over these two tracks for lowering to the tipple. On whichever track the empties come up, they are switched automatically to a central track, on which they pass through the tunnel and run out to the right onto a side track, where they are made up into trips for return to the mine.

Sloping sides beside the rails in the tunnel and its approach force the cars back onto the track in case they should for any cause be derailed in coming up the incline. This is a wise and simple provision for safety and surety of operation where light empties are handled under conditions tending naturally to danger of derailment.

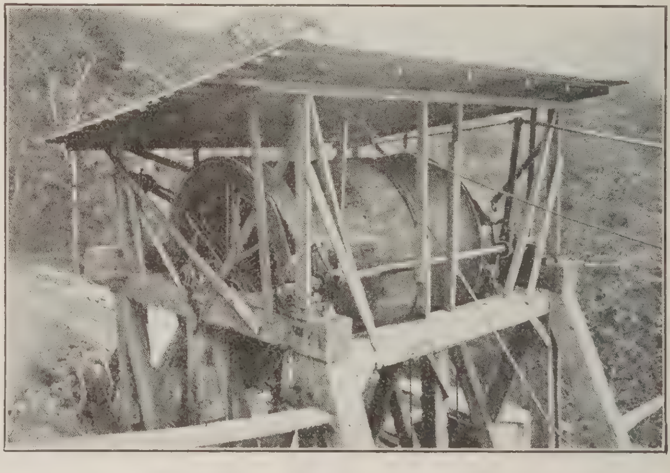

Fig. 8. The Drum and Its Powerful Double Brakes

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Tennessee Wage Law Invalid—The law enacted by the Tennessee Legislature in 1913 making it an offense for a corporation which operates a commissary to refuse to make semimonthly payment of wages to its employees in cash, after deducting amounts due for advancements, is invalid as indirectly authorizing imprisonment for debt, in violation of the constitution of that state. (Tennessee Supreme Court, State vs. Prudential Coal Co., 170 Southwestern Reporter 56.)

Utilizing Anthracite Dust

By J. C. Law*

SYNOPSIS—About one million tons of anthracite coal too fine to be marketable is produced yearly. Thus far attempts at briquetting this material have not been pronounced commercial successes. Coal-tar pitch has been heretofore used as a binder, but experiments would indicate that sulphite pitch with a few other ingredients added is a much better material for this purpose.

As a preface to this contribution bearing on the conservation of anthracite coal, I am reminded of a paragraph pertinent to the subject appearing in an editorial in Coal Age of Apr. 17, reading as follows:

"The American coal operator of today is a thorough economist. . . . In our present stage of development along economic lines no one would venture the assertion that the utmost attainable has been reached."

The writer is in full accord with this view, but will confine discussion to the anthracite branch of the industry. It would seem that wherein anthracite coal mining and conservation in extraction are concerned the operators have, under modern methods, attained the utmost. Yet in this branch of the industry there is a final stage in the employment of a present unmerchantable anthracite product that has not been reached, and so far has practically failed as an economic proposition, but which can be profitably utilized.

The matter referred to is the commercially successful utilization of the present huge cumulative tonnage of coal dust or anthracite fines below No. 3 buckwheat. Down to that size the coal is both salable and usable, alone in some instances, but more generally in combination with No. 1 or No. 2 buckwheat. The great tonnage below these sizes, which is now screened off and conserved, is practically pure coal chippings, but its profitable disposal is a grave problem at the majority of operations.

This finer product, aside from that already in banks unmixed with culm and other refuse, amounts to fully 1 per cent. of the total production of about 90,000,000 tons annually. On the face of it this appears to be an insignificant amount, yet in cold figures it aggregates 900,000 tons, of a nominal market value of 30c. to 35c. per ton f.o.b. It is possible that this tonnage is underestimated. Lackawanna County alone is officially reported to have produced over 320,000 tons of what is termed No. 4 buckwheat and under in the last 6 months of 1914. Actual tonnages of No. 4 buckwheat and below are difficult to obtain, for the reason that most collieries make no differential in reporting their tonnages below No. 3 buckwheat. It would be safe to assume, however, that 1,000,000 tons of these practically unsalable fines is produced annually.

A Solution Formulated

What, then, is the solution of this problem? Is there no way this product can be profitably capitalized? Eighteen months' special investigation of the subject convinces the writer that it *can* be, and the following is presented as a logical solution:

Primarily, let it be said that for many years private capital in the main has endeavored to briquette this material for domestic use. The briquetting plants have been operated within and without the coal field, using mainly coal-tar pitch as a binder. It is now an established fact that anthracite and coal-tar binder will not produce a satisfactory and smokeless briquette for domestic use, and this only should be the aim of any anthracite briquetting company—not alone to make a smokeless briquette, but one that is odorless and waterproof. The latter feature is not absolutely essential, but it is preferable, and adds but a few cents per ton additional to the cost of the process.

The demand for briquettes of anthracite is like that for the majority tonnage of fresh-mined hard coal and is confined to a comparatively limited market. That market is Pennsylvania, New York, New Jersey, Delaware and the New England States, which consume 82 per cent. of the entire anthracite production. In these states the consumer is accustomed to the use of anthracite coal for domestic purposes in stove, furnace and fireplace, and nothing short of a smokeless, odorless fuel will be tolerated if the cost of domestic sizes of hard coal to the consumer is not materially advanced in future years.

The heating value of coal-tar briquettes is not disputed, and, moreover, I am frank to say that I know of no briquetting plant using coal-tar binder with anthracite fines that has failed, provided the fuel could be burned, as it now is being burned quite satisfactorily on locomotives for instance. My contention, however, lies in the opinion, shared also by certain prominent coal operators and briquette machinery makers, that anthracite briquettes are essentially a domestic, not a power fuel, and that if the present briquetting plants had employed a binder such as will be referred to they would long ago have been enabled to make a smokeless, odorless and waterproof briquette in every way comparable, except in appearance, to fresh-mined chestnut and stove coal. It may also be asserted that by employing such a binder the finished product would have found a ready market at a much higher price than could possibly be expected for a coal-tar briquette—this too at only a slightly increased expense for manufacture.

The basic binder referred to is sulphite pitch—a byproduct of all sulphite paper-pulp mills. The pitch as recovered contains from 25 to 35 per cent. fixed carbon, but this is reduced to 18 to 22 per cent. in the process of briquette manufacture. A certain heat value is thus added to the fuel. This binder does not soften under heat and can be subjected to a high temperature.

To make smokeless briquettes they must be baked to a high temperature. No binder has heretofore been produced that would stand the baking process to as high a temperature as sulphite pitch and gain the desired result within a reasonable cost. Wheat shorts, molasses, starch and other grain and vegetable binders fail to withstand the temperature required to make a uniform and fully smokeless briquette, as beyond a certain temperature, they tend to carbonize like overbaked bread in the oven.

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*Sales engineer, Cross Engineering Co., Carbondale, Penn.

To further make such a briquette odorless and waterproof three common ingredients are added to the basic binder, completing the formula. For a 2000-lb. ton of briquettes it requires approximately 6 per cent. total binder, or 120 lb., which is reduced in the baking to about 75 lb. The total cost of binder per ton varies from 70c. to 80c. according to the location of the briquetting plant. This cost is low in comparison to the results obtained and the quality of the finished product.

Samples of these briquettes made in an experimental press and subjected to a burning test in a common range, as against fresh-mined chestnut coal, gave the results shown herewith. The briquettes weighed about 1¾ ounces each, a size between chestnut and stove coal, the same weights of fuel being used in each test:

FIRST TRIAL

Drafts On Full

Coal test; ignition period, 12 min.:

Total time until fire died out	3 hr. 50 min
Total unburned coal	2¾ lb.
Total ashes and waste	4½ lb.

Briquette test; ignition period, 14 min.:

Total time until fire burned out	3 hr. 35 min.
Total unburned briquettes	3 lb. (scant)
Total ashes, clear, no clinker	3 lb.

SECOND TRIAL

Drafts On and Off at Regular Intervals

Coal test; 15 lb. used; ignition period, 12 min.:

Coal burned until out	6 hr. 20 min
Unburned coal left	2½ lb.
Ashes and clinker	4½ lb.

Briquette test; 15 lb. used; ignition period, 14 min.:

Briquettes burned until out	7 hr. 10 min.
Unburned briquettes left	2½ lb.
Ashes, clear, no clinker	5½ lb. (scant)

Remarks—The briquettes were entirely smokeless except for a vapor (due to waterproofing ingredient) for about 3 min., noted when fresh fuel was added after perfect ignition had been secured. Briquettes were odorless, no fumes being given off by the stove. Briquettes held their shape in fire until consumed or burned out. The heat developed was, if anything, greater than that from the coal. A test as to the thoroughness of the waterproofing of these briquettes was made by soaking in water for 12 days, the water being then evaporated and the briquettes thrown in the fire, where they burned readily until entirely consumed.

* * *

Preparation of Coal for Market

By G. M. Lantz

SYNOPSIS—To secure clean coal for shipment there must be coöperation between the miner at the face and the slate pickers at the tipple. An understanding of the needs of preparation may be fostered by the posting at the mine's entrance of correspondence relative to the condition of coal delivered to the customer.

Coal-preparation might be divided, roughly, under four heads: Extracting, handling, sizing and cleaning.

Most mining men are familiar with the efforts made in mining coal to secure a maximum of marketable product with the equipment on the market for handling the coal to eliminate breakage. They are also familiar with the various sizes produced.

In the Hocking Valley district of Ohio, the mine-run system has served to produce a larger variety of sizes, since most of the smaller companies installed 2-in., 3-in. or 4-in. screens and produce egg, or a grade of large nut. Some of the larger companies had already been loading these grades, under the screened-coal system. In spite of efforts made in some quarters to return to the 1¼-in. lump basis, it is probable that grades of lump from ¾-in. to 6-in. will continue to be produced in Ohio.

A Plan to Secure Better Results

It is not my object to comment on the three first heads under which I have divided coal preparation, but with the last; namely, cleaning coal, or the removal of impurities. This is usually effected, sometimes only partially, by docking and by supervision of loading. I wish to suggest a plan that I believe would be of value as supplementing the two methods in general use. I refer to posting letters from customers at the bank-mouth, for the information of miners.

Obviously it is impossible for the trimmers to remove *all* the impurities from the coal. Part of this work, at least, must be done by the miners. It is also impossible for the mine-foreman to see all the coal loaded. His duties do not permit a thorough supervision of the loading.

Many miners are conscientious and endeavor to load clean coal at all times. Others there are who are inclined to "slip one over" occasionally, in the matter of broken-up bone-coal, fine slate, etc., in the bed of the car, with nice black, shiny lumps for "cribbers." Such a one justifies himself on the ground that the operator would sell the coal if he could, and would be inclined to "slip one over" on the purchaser if it were possible. For there are operators who are conscientious and others who are willing to sell impurities with their coal.

However, the trade demands clean coal, so that the operator, whether he wishes it or not, is compelled to meet the demands of the trade and send clean coal to the market.

Operator's Position Must Be Appreciated by the Miner

In order to produce clean coal, I believe it is necessary for the miner to appreciate the position of the operator—he should realize that production of clean coal is as necessary to him as to his employer. Without orders for coal the miner cannot make wages nor the operator profits.

The following letter, received by an operator from a customer, would be as valuable for the guidance of the miner as the operator:

"We have received several complaints during the last few weeks from our customers on account of excess bone in the coal purchased from you. On investigation, we find the complaints justified. Will you kindly ask your men at the mines who have charge of preparation to be more careful in the removal of bone?"

This letter posted at the bank-mouth, together with a few orders from the customer from whom it was received, would be an impressive object-lesson for the miners. Orders from this customer often run from 10 to 25 cars weekly.

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*New Straitsville, Ohio.

Or the following letter, posted beside the orders from the sender, would show the miners the necessity for cleaning the coal more effectually than a personal warning from the foreman:

A Warning Letter

"We have noticed in the last few cars of coal shipped from your mine a larger amount of slate than is justified. As you know, we have been featuring your coal, but unless the matter to which we refer is remedied, we shall be compelled in the interest of our customers to buy elsewhere."

And a letter like the following would show the miners the result of thoroughly cleaning the coal:

"Please ship at once, two cars of 4-in. lump coal. The last car was a dandy."

This signifies more than a means of securing clean coal. It means a closer coöperation between the miner at the face and the operator in the particular matter of cleaning coal, and opens the way to a further coöperation in other matters. It is a method of showing that the interests of miner and operator do not conflict. It is a means of taking the miner into the confidence of the operator. Frankness, after all, is a safe policy to follow. It would promote the kind of loyalty Michael Bernard has in mind when he writes:

Although with such importance fraught
And everywhere so widely sought,
It's something that cannot be bought
By gold or hope of gain;
Instead, it wields its power where
Employers' dealings all are square,
Where every rule is just and fair
And every act is plain.

Sizing and Cleaning Anthracite

By F. H. Blatch*

The preparation of coal in the anthracite field increases in difficulty each year. This is due principally to the mining of lower grades, or seams of coal containing bony and slaty material. The big veins of good coal have been the source of output of the mines, and the percentage of these veins grows less each year, while the beds containing more refuse matter are now forming the bulk of the tonnage.

Naturally these conditions have caused great improvements in the preparation of coal. Modern preparation for anthracite coal is based on good sizing and cleaning which can adapt itself readily to the changes and restrictions of market demands. One of the methods of modern anthracite preparation is as follows:

The run-of-mine coal, after it is delivered into the breaker, is divided into three classes of material—large lump coal, bony or intermediate material and mud-screen material. The large coal runs over oscillating bars and on traveling platforms, where bone and rock are removed, while pure lump coal goes through crusher rolls and over separate sizing screens to mix with the mechanically cleaned coal on the way to storage bins.

The large bony material, hand picked from traveling platforms, goes through a separate set of rolls which crush it to commercial sizes, after which it is sized over shaking screens and delivered to spiral separators, which separate the refuse from the coal by the dry method.

The mud-screen material (from 6 in. down to dirt) goes through the oscillating bars to shaker screens and is thoroughly washed and sized before being prepared over the spiral separators used for wet separation.

Showing Spiral Separators in an Anthracite Breaker

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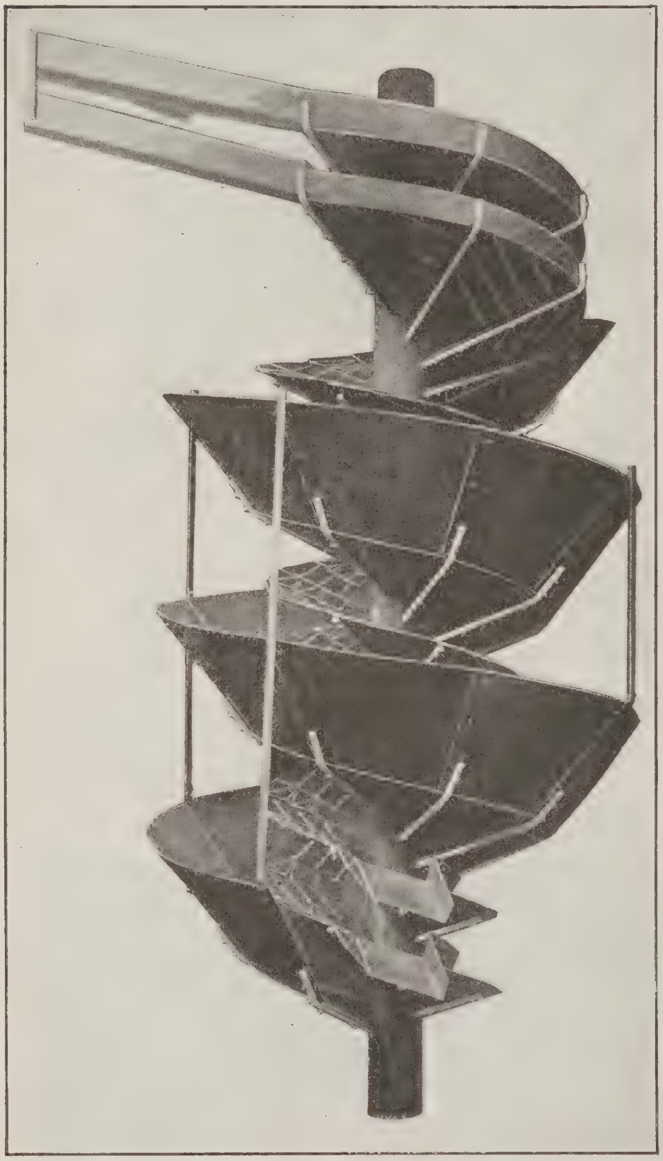
*Hazleton, Penn.

These spiral separators are used to give three separations—good coal for the market, cleaner refuse for the rock bank, and a delivery of bony material into a separate course, to be ground to smaller sizes, where it will not affect the prepared coal. With the three-part separation, the appearance of the prepared sizes for the market can be made to satisfy a very exacting inspector without losing the undesirable appearing coal and bony material, which otherwise would be wasted with the refuse if not ground down to steam sizes where the appearance does not affect the burning qualities.



Spiral Separator Used in the Anthracite Field

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Production of Coal Briquettes Increased

A substantial increase in the quantity of coal briquettes manufactured and sold in 1914 is announced by the U. S. Geological Survey. A tendency to operate in large units is illustrated in the statistics of this collateral branch of coal mining, notwithstanding the fact that it may well be considered in the early stages of development, the smaller and experimental plants going out of existence and the new enterprises being of greater capacity.

The production of briquetted fuel in 1914 amounted to 244,635 short tons, valued at $1,123,178, an increase compared with 1913 of 62,776 short tons in quantity and $115,851 in value. This shows the greatest activity in coal briquetting in the history of the industry.

For convenience the Survey has grouped the output by Eastern, Central, and Pacific Coast states. In each of these groups the production in 1914 was greater than in the preceding year. In the Eastern states it increased from 62,244 short tons, valued at $240,643, to 101,782 tons, valued at $273,046; in the Central states from 73,287 tons, valued at $360,408, to 88,325 tons, valued at $424,569, and in the Pacific Coast states from 46,328 short tons, valued at $406,276, to 54,528 tons, valued at $425,563.

Of the 15 plants in operation during 1914, five used anthracite culm as a raw material; two, semi-anthracite; one, bituminous slack; two, a mixture of anthracite culm and bituminous slack; two, petroleum residuum; two, semibituminous slack, and one, a mixture of anthracite culm, bituminous slack, coke, and lignite. Eight plants used coal-tar pitch for a binder, four used secret binders, and one used petrolastic cement. No binder is required in the briquetting of carbon residues from oil-gas works.

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New York School Contracts

By Patrick Jones*

A preliminary analysis of the bids on the coal supply for the New York City Board of Education shows that we will effect a saving of at least $25,000 as compared with the previous contract. We have been the pioneers in the question of economy in the use of fuel, and the following figures will show what has been accomplished in the interests of the taxpayers.

COAL PURCHASES OF NEW YORK CITY SCHOOLS SINCE 1903

Year	Budget	Compared with 1904	
		Decrease	Increase
1904	$584,544.70		
1905	453,387.00	$131,157.70	
1906	451,864.00	132,680.70	
1907	451,094.00	133,450.70	
1908	501,800.53	82,744.17	
1909	501,800.42	82,744.28	
1910	526,880.10	57,664.60	
1911	522,130.95	61,413.75	
1912	561,939.07	22,605.63	
1913	648,687.36		$64,142.66
1914	612,132.74		27,588.04
1915	606,712.15		22,167.45
Total		$704,461.53	$113,898.15

It will be noted that the total reduction in the budgets as compared with 1904 is $704,461.53 and that the total increase in the budgets as compared with 1904 is $113,898.15, making the reduction $590,563.38. The new schools that were not in existence in 1904, but became a liability against the fuel fund subsequently thereto, burned about $1,350,000 worth of coal up to May, 1915. And we met this enormous demand, not with any increase as compared with 1904, but with a total decrease of $590,563.38.

We are still progressing in other directions and hope to effect further economies. One thing is certain—that I will ask for less money for fuel for the schools for 1916 than the amount allowed for 1915; and I am aiming to make my budget for 1916 lower than the budget for 1904.

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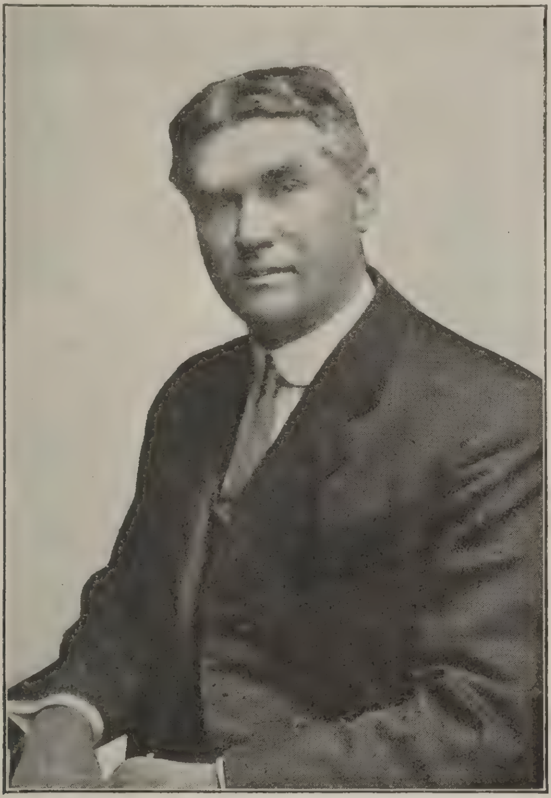
*Superintendent of School Supplies, Park Ave. and 59th St., New York City.

Who's Who in Coal Mining

James Scott Thompson

One of the most successful of the younger men that are now making their mark in the coal-mining business of the Far West is J. S. Thompson, general superintendent of the Utah Fuel Co. Few men are more popular or have a wider acquaintanceship in the coal fields of the Rocky Mountain region than Mr. Thompson.

He was born in Chicago in 1875, but received his early education in the public schools of Denver, Colo, later securing his mining degree in the Colorado School of Mines, where he graduated in 1899. In college Mr. Thompson took a prominent part in athletics, being recognized as one of the greatest foot-ball stars the School of Mines ever turned out. The qualities that made him so popular with his college mates have also served him well in his business associations. His most valuable personal asset is his ability to secure and retain the good-will and confidence of those with whom he deals.



J. S. THOMPSON, OF UTAH FUEL CO.

Soon after leaving college Mr. Thompson entered the employ of the Colorado Fuel & Iron Co. as assistant engineer. In 1901 he was appointed division engineer for the same company and a year later was advanced to the position of superintendent of the Sopris mine. This position he held until 1907, when he left the Colorado Fuel & Iron Co. to become assistant superintendent for the Federal Lead Co., Flat River, Mo.

In 1908 Mr. Thompson accepted the position of general superintendent of the Stone Cañon Consolidated Coal Co., Stone Cañon, Calif. In 1909 he again entered the service of the Colorado Fuel & Iron Co. as division engineer, which position he held until 1910, when he became superintendent of the first division of the company, holding this post until 1913.

After introducing a short course in coal mining at the Colorado School of Mines for candidates to state examinations during April and May, 1914, Mr. Thompson assisted in the mine examinations conducted by the Utah Fuel Co., being appointed general superintendent of the company on Dec. 1, 1914, which position he now holds.

Mr. Thompson is a member of the American Mining Congress, the American Mine Safety Association and the Rocky Mountain Coal Mining Institute.

To Burn Coal Like Oil

Crude oil as a competitor of coal may have a solar plexus blow dealt it soon if the invention contemplated by an official of the Oregon-Washington Railroad & Navigation Co. does what it is expected to do. Many railroads in the country have installed oil burners in their locomotives, but notwithstanding that oil has its virtues, it also has its drawbacks. Railroads that have a supply of coal of their own do not of course relish the idea of buying oil, and as coal is as good for making steam as its competitor is remains to find a cheaper and cleaner means of handling it.

The new scheme is to powder the coal and burn it in locomotives on exactly the same principle as crude oil is burned. Under the prospective process there will be little waste and no smoke, ash or cinders. Should this novel method prove practicable it will mean a great saving in the inland districts, where it is difficult to secure crude oil. It is planned to force the powdered coal into the firebox under steam or air pressure. Thus the fuel will not touch the grates, but will burn precisely the same as gas.

COMING MEETINGS

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

Mine Inspectors' Institute of the U. S. A. will hold its annual meeting June 8, 9, 10 and 11, 1915, at St. Louis, Mo. Secretary, J. W. Paul, Pittsburgh, Penn.

West Virginia Coal Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel Du Pont.

M. O. I. Coal Association annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland, Ohio.

American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

American Mine Safety Association will hold the following meets: July 2-3, Big Stone Gap, Va.; July 23-24, Billings, Mont. Secretary, H. M. Wilson, 40th and Butler St., Pittsburgh, Penn.

The Order Kokoal will hold its annual pow-wow at Chicago, Ill., July 13 and 14, 1915.

The American Mining Congress will hold its 18th annual session at the Exposition Memorial Auditorium, San Francisco, Calif., Sept. 20-22, 1915. J. F. Callbreath, secretary, Majestic Bldg., Denver, Colo.

Sociological Department

Picker Boys' First-Aid Team Makes Good

When Joe Columbo, an Italian laborer, had his leg squeezed below the knee in the Truesdale breaker of the Delaware, Lackawanna & Western R.R. Co. coal mining department recently, the picker boys' first-aid team was right on the job.

The team has always done well in competitions, but this was a real injury with all its attendant excitement. When Joe Columbo arrived at the Nanticoke State Hospital, Dr. Acyer examined the dressing, and before he knew who made it stated that it was the best first-aid dressing he had ever seen.

Dr. Walter Lathrop, of the Hazleton Hospital, states that since the men have been trained in first aid and learned how to bandage properly and how to use the tourniquet, almost 90 per cent. of the amputations formerly necessary have been eliminated, except where the muscles are torn and the artery crushed or severed. The destruction of the softer fleshy parts of a limb is now a more serious matter than the fracture of a bone, as the Hazleton Hospital is now doing some marvelous bone grafting.

The value of the first-aid work in preserving limbs lies in the fact that the patients no longer arrive at the hospital exhausted from the loss of blood. Dr. Lathrop, however, adds a word of caution advising the loosening of the tourniquet once in awhile so as to partially restore the circulation of the blood if much time is necessary to get the patient to the hospital. Dr. Lathrop was the pioneer of first-aid training for the Lehigh Valley Coal Co. and still acts as a judge at their annual first-aid meets, so that he is familiar with both its theory and practice.

A Plea for the Miner's Wife

By Mrs. Edmund Ewing*

There is something of the aesthetic in every human being, no matter what his occupation or profession. A wee baby is attracted by bright colors; the attraction grows as the child develops, until all nature, clothed in various garbs, becomes a part of his personality and is always an inspiration to him. Have you never thought that the miner, living so much in the dark, must unconsciously miss the glories of the day, and have you never felt that his home, above all others, should be attractive?

When I knew my home was to be in a mining camp, I was elated; for there, one being relieved of obligations, social and otherwise, the "home beautiful" and hence the "camp beautiful" is the chief concern; in other words, one can make one's own environments. Much to my disappointment, I found that in this particular camp there were few homes that had even a vine on the porch. Naturally, the first impulse was to censure severely the wife who had not the pride and energy to try to make a home for her husband. Several inquiries were made as to the cause of the seeming negligence, with always the one answer, "Try and you'll find out."

This is what was found out by one person who tried. Fertilizer was to be had for the asking; so a goodly amount was distributed on both yard and garden, the yard was sodded, seeds were planted in both front and rear, and chickens were bought and comfortably housed. All this required work; for not only did we have a virgin soil to deal with, but the lot was on a hillside and the ground was hard, yielding only reluctantly to pick and spade.

All went well until the hot summer days ended all our prospects. Hose was purchased, but there was no water in the pipes. The ground had been mined underneath.

In the meantime, we had been making notes about those wives we had censured, and because of the observations we made I am making this plea for the betterment of their conditions. Besides the regular cooking, housecleaning, mending, sewing, caring for the children, there was the laundering, especially heavy in a miner's family, and the supplying of water for the men's baths for the housewife to take care of. In many cases this water had to be carried some distance. I remember that in one house there were nine men; one young girl and the other help about that house actually carried water a length of about two city blocks. It is needless to say that the bloom early fades and the wrinkles appear in such instances.

Welfare of the Miner's Wife Is Entitled to Consideration

I have often thought that it was just as necessary to protect the lives of the wives outside the mines as those of the men who have to work inside them, for the women are being killed surely though slowly.

It does seem that with just a few modern conveniences their work might have been lightened one-half, and they could have expended that extra energy, not only in making their surroundings more attractive, but in planting their own vegetable gardens with a small amount of help from the husband, thereby supplying their tables with fresh, nutritious vegetables at little cost. The chickens, too, could have supplied a goodly portion of the food with an even less expenditure.

With other conveniences the husband could have stayed in the house at night and read his evening paper comfortably, instead of sitting on the porch trying to read by a smoking lamp, as they have often been seen to do.

It does seem that the well-kept home, the fresh food, the lowered cost of living would have proved an incentive and the men would have given the company better service, and what a source of pleasure it would have been to the wife, who was naturally blamed because it took one hard day's earnings to furnish food for the next.

It was my good fortune to visit several times a nearby camp that not only had these modern conveniences, but one where gardening was encouraged, prizes were offered for the prettiest yards, clean-up days were observed, splendid teachers were employed in a beautiful, modernly equipped school, and there was a decided difference in conditions.

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*Wylam, Ala.

Some have said that this was due to the fact that the financial heads are located in this camp. Well suppose we take a look at some of the Tennessee Coal, Iron & R.R. Co.'s camps, the most beautiful in the South. Yet most of the financial heads of that corporation really knew very little about them. Don't you suppose that the men in charge realize that the best dividend-paying company is the one that gets the most efficient work, and this kind of labor is to be obtained only when attractions are such that they not only draw the best class of miners, but get the greatest amount of work from the least suitable men?

Have you ever thought that it is the wife who profits most by the conveniences furnished and she is the greatest incentive to the man's work? My great desire is that all companies will realize the necessity of taking care of the miner's wife, and in turn the business of the corporation will be taken care of. The plan has been tried and has never failed.

THE LABOR SITUATION

SYNOPSIS—Even the Federal Industrial Relations Commission has ceased to trouble the waters. There remains nothing but the apprehension of what will happen in 1916. The union hoped to make the greatest struggle on record at that time, but for it the miners have only the leanest of purses.

The Federal Industrial Relations Commission has ended its sessions. Francis Patrick Walsh, much to his regret, is no longer a headliner in the news. Appointed by the President on June 26, 1913, he has been virtually repudiated by him, for when Walsh sought to obtain a letter written by Governor Ammons to the President, the secretary to the President refused to comply with his request.

His colleagues became more and more restive under his leadership as the weeks wore on; notably Harris Weinstock and Mrs. J. Borden Harriman. The first objected to his asking questions of John D. Rockefeller, Jr., which had not previously been submitted to that witness, others under examination having been informed as to the questions to be asked. All the members objected apparently to his rudeness in examination and signed, it is said, a "round robin" of protest. Whether such a paper was prepared is open to question as the public was not permitted to see it.

But we should not be too severe on Mr. Walsh as his wildness has undone him and helped the cause of those he would injure. On May 31 he made a statement summarizing what he pretended to believe he had proved against the John D. Rockefellers, father and son. One paper felicitously termed the notice, "Walsh Again in Eruption." It would not serve any useful purpose to publish his baseless diatribes.

W. L. Mackenzie King when being examined found much fault with F. P. Walsh's manner of questioning, declaring it injudicial. Harris Weinstock, Walsh's colleague in the commission, then tried to find what was the object in his line of questioning, and Walsh curtly replied that he, Walsh, was not on the stand and would not consent to be questioned.

Gallagher Amendment Is Signed

On May 27, Governor Willis signed the Gallagher amendment to the Green antiscreen bill, that being the last day on which action could be taken. The labor leaders brought much pressure to bear on the Governor, hoping that he would veto the bill, but he took the position that everyone should be permitted freedom of contract. It is said that at an earlier stage he was urgent in advocating the passage of the amendment. In his message he declares that he might have let the instrument pass by default, but he was opposed to evading his responsibilities. He ascribed much of the idleness in Ohio coal mines to the unfortunate Green antiscreen law.

The miners talk of endeavoring to have the bill recalled, and it must lay over for 90 days to give time for such action. A meeting of the executive committee has been called to discuss this referendum petition, but there seems no marked desire for it as practically all the mines are on a run-of-mine basis and will be till Mar. 31 of next year.

Despite the Long Contract and Wearisome Experience Strikes Continue

About 200 miners employed at the Majestic mine of the A. G. Blair Coal Co., at Blairmont, in Jefferson County, struck last week because it was claimed that all their wages were withheld to pay the deferred rent on houses occupied by them. The men say that during the conference over the wage scale at Cleveland the operators promised they would be lenient in the collection of such debits.

Another cause of dispute at Blairmont arose out of the ad interim arrangement which is to continue in force till equipment for weighing run-of-mine coal can be installed. The company declares that the miners were promised 24 per cent. additional pay for the unweighed slack. C. J. Albasin says that 32 per cent. was promised. As the agreement was verbal the correct figure will be hard to determine. The operators are given 60 days to remodel their tipples so that they can weigh the coal as it comes out of the mine.

The miners' organization is still demanding that the miner stockholders of the small West Wheeling mine, near Bellaire, join the union. The mining company is a sort of coöperative concern, and when the stockholders appeared to work in the mine about 17 union workers laid down their tools. It is claimed by the stockholders that they cannot join the union because they are members of the Pittsburgh Vein Operators Association and cannot be members of contending organizations.

At one time the stockholders were all members of the union, but left to avoid voting against their own interest. The labor leaders tried to force them into the union, but after paying their money the stockholders of the company found they would not be allowed to vote in the labor organization, and after making a protest the union returned their checks.

In 1906 after a general strike the company was not allowed to resume work, and for the first time employed nonunion men, continuing this practice for about 16 months. Before and since that time they have never employed nonunion men according to T. H. Johnson, the treasurer of the company.

Anthracite Labor Problems

The employees of the Henry shaft of the Lehigh Valley Coal Co., at Plains, presented their grievance before Judge Gray, the umpire for the Anthracite Conciliation Board, on Nov. 28. The men claimed that at one time they were paid 55c. per lineal foot for rock removed from the roof. Some time ago the company decided that the cars should be more heavily "topped," and consequently it was necessary to take down more roof in the "five-foot vein" so as to permit of the change. The yardage rate was then increased to $1.10 per lineal foot.

Later on the company opened another section of the same vein, and the men were paid the first or lower rate. It was shown that there was little or no difference in the earnings of the men in the two sections of the mine, and consequently the arbitrator was satisfied that the old rate was reasonable for the work to be done and gave his judgment accordingly.

The coming "spring drive" of the union on the operators in 1916 is naturally a matter of much speculation. It is to be hoped that the large program demanded will be considerably modified. The 8-hr. day for day hands will probably be a leading item, and it should be conceded. It has often been found that mining regions persisting in long working days manage to put out less coal than those which work a shorter time.: Illinois is an example of what can be done in a short working day.

An anthracite strike is almost sure to fail because of the lack of funds. Nothing can make it win except unreasonableness on the part of the operators. Seeing that the present heads of the companies are advocates of everything that is fair to their workingmen, they can rightly anticipate speedy success in arriving at a satisfactory settlement.

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Injury to Miner Through Fall of Slate—A coal operator who directs a youthful and inexperienced miner to work under slate which is apt to fall is liable for consequent injury to the employee, who is entitled to assume that he will not be directed to work in an unsafe place. (Kentucky Court of Appeals, Garrard vs. Interstate Coal Co., 173 Southwestern Reporter 767.)

Editorials

The Mining Institute and Statecraft

The New York section of the American Institute of Mining Engineers approved the action of the three representatives appointed by the parent body in signing recommendations for amendments to the state constitution. It further authorized these three committeemen to coöperate with various other bodies of engineers and to act in the name of the New York section. It is a somewhat peculiar condition which is responsible for this action.

The members of the New York section of the Institute are little interested as engineers in the constitution of the state, and while more competent than the average man to decide on the necessities of statecraft, they have little vital interest in the problems of the state in which they live. In fact they would not have considered them seriously as a body, or perhaps as citizens, had they not been urged to take that interest by engineers of other types, such as members of the American Society of Civil Engineers, whose knowledge of the necessities of good government from an engineering point of view has been quickened by almost daily contact with the problems involved.

Despite the sterling character and qualifications of the men who will act on behalf of the section—W. L. Saunders, Benjamin B. Lawrence and J. Parke Channing—it is to be expected that the leaders in the deliberations will be men in societies having to do with civil engineering in its various branches. The coöperation, however, is suggestive of what the other sections of the institute may do where their vital interests are involved. It may well be that the American Institute of Mining Engineers as a body will take action of a statesmanlike character which will clarify the public mind on questions of national polity.

The Institute as a whole may well hesitate to discuss plans to regulate or dispossess the State Engineer and Surveyor, or to provide for the creation of a Department of Engineering and Public Works or of Public Utilities or of a Court of Public Claims, for these are matters of which it does not have the intimate knowledge and personal touch needed for decision.

But the Institute does have the information necessary to aid in preparing codes, constitutional and legislative, on matters such as the staking of claims, the setting of land values, the compensation of workingmen, the preservation of the lives, health and safety of miners, the regulation of competition, the assessment for taxes and the advancement of conservation.

And it is interesting to note that there is a disposition to treat these matters on the broadest basis, the members regarding themselves as citizens, not defending their personal interests, but those of the public. They act as engineers solely where their engineering knowledge gives them a peculiar ability to discuss certain problems.

It is to be hoped that this attitude will continue and the aim be, whole and entire, the interest of the republic and not an undignified desire to advance the interest of the engineering profession and the business concerns with which it is related as against that of any other body of citizens.

It is well known that there is a body—the American Mining Congress—the aim of which is solely to correct abuses of the police power as exercised over the mining business, and it is therefore argued that other societies should be solely technical and avoid discussions of "politics." But the purposes of the Congress are so clearly to advance propaganda of this sort that it cannot work so effectively on the public mind as an organization the purpose of which has primarily no relation with the issues involved, the members of which moreover are not likely to be directly enriched or impoverished by any political action however drastic.

There are instances where the engineers are pecuniarily interested in legislation. But in those particular cases the Mining Congress is not likely to help them. The engineers believe that engineers should be in charge of engineering work or at least adequately represented. We do not know of any body of business-men or lawyers who are agitating this principle for which the engineers are contending. Every indication is that they desire to occupy these positions of trust themselves and would relegate the engineers to the place of "hewers of wood and drawers of water."

In fact it has been increasingly evident that any man who desires to qualify to be placed in charge of works of national and state importance should study Blackstone rather than graphic statics and hydraulics. Though mining engineers have been sufferers—in the appointment of receivers, for instance—they have not been the leading victims of this unfair preference for lawyers. They do well, however, to add their protest to that of their professional brethren.

Too Many Societies

We all hear a great deal about there being too many institutes, and doubtless there are too many uncoördinated overlapping institutions. But most of the objection is really to societies generally, and the remark is as reasonable as one which we used to hear—"too much education."

We cannot have too much collaboration in human effort. We cannot have too much research. Too much publicity is difficult to conceive. The world will never go ahead unless we make the knowledge of one the property of all. "Too much endeavor," "too much fraternalism," "too much coöperation"—such statements are absurd on their face; and those who condemn societies perpetrate this folly, though possibly they do not know it.

The societies need vitalizing, it is true. Some of the papers presented at their sessions are clearly written to order, like those essays we wrote in earlier days with sundry bitings of the heads of our pencils. Too many are accepted because they are contributed by men with a good position rather than an active brain or a telling message. Big men with nothing to say should give place to little men who have a compelling thought and time to formulate it for the benefit of the public.

Our societies are feeble because we do not take them seriously. It should be a recognized offense, and one not to be condoned by platitudinous compliments, to deliver an address and say nothing. Have not a hundred or so members who have traveled as many miles a right to reproach bitterly a speaker who wastes their time by saying nothing or insults their intelligence with an address that he has been too lazy to prepare with care? He should be compelled to make the hundred 100-mile trips himself as a penace for his effrontery and folly.

But these are days when we regard criminality with leniency, as a weakness, symptomatic of a disease, and not as an offense. So we must bridle our resentment and admit that it is impossible to visit on the offender all the burden of his grevious offending. We must be content to let him continue to owe a debt to his more conscientious fellow-citizens. Perhaps the author of a poor article believes he is doing the public a service, for what is a light to a bat is darkness to a man.

If our societies were all they should be, why should we begrudge them our money, for indeed it is only a few dollars we are asked to give to progress and to inspiration? For what else do we live except to move forward and to dream? Surely it is not a vegetating life without hope or progress that we seek.

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Middle Western Crops and the Coal Markets

The outlook for wheat in Indiana and Illinois is encouraging, and the farmers are getting a good start with corn. The smaller crops are also looking better than usual, so that unless conditions later are adverse there should be an abundance of money in the Middle West this fall. This will undoubtedly have a tendency to stimulate industrial and business conditions generally and be of material assistance to the coal operators

A promising sign is further noticed in the tendency of shippers to withhold free coal from the Western markets; most operators have gaged their output exactly to meet the current demand, and this has been one of the main factors in causing high prices for screenings.

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Pennsylvania's Anthracite Tax

The Pennsylvania Legislature has just concluded its sessions, and the coal companies as usual have watched its deliberations with much interest. Probably the most important piece of legislation enacted was a new anthracite tax law, which retains the old figure of 2½ per cent. on the market value at the mines, but is essentially different from the original act in that it makes a new division of the proceeds from the tax levy. Under the new law 50 per cent. will revert directly to the state for road development throughout the commonwealth and the remainder will go to the county which produced the coal. A bill was introduced to repeal the old act, but it was not heard from.

The passing of this new act shows that the legislators must feel secure as to the constitutionality of the new law. As will be recalled, the validity of the old act is now being contested, and it was expected that the Supreme Court would fix a time during the past week for hearing an appeal from the decision of the Dauphin County court, which sustained it. But the Supreme Court adjourned without fixing a date, and it now seems that a decision is far in the future.

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Nullification

A sister state, Pennsylvania, scorning all the sentiment of the times for a just distribution of the burdens of government, has put a tax on anthracite with the express purpose of making New York State pay the major part of it. It is not laid for the benefit of those subject to the peculiar drawbacks and dangers of the industry, or why should the whole state receive a part of it?

It is purely a steal, and the offense is not mitigated by any desire of self-protection, which is the alleged cause of most tariff. It is for revenue only, the purpose being to make the people of New York State, rich and poor, pay tax in the State of Pennsylvania.

As an attempt to enable one state to pay its bills by taxing the consumption in another state, it is practically nullification. The courts may not so rule, and from a legal point of view they may be right. But there is a larger sense in which the anthracite tax is an offense against the Union.

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Anthracite Production Slow

The production of anthracite in May reflected the industrial depression in many lines of business and was not equal to that of May a year ago. Shipments of anthracite in May, 1914, amounted to 6,281,553 tons, but it is probable that they fell below 6,000,000 tons last month.

According to the record of the Bureau of Anthracite Statistics shipments for the first four months of 1915 were 52,809 tons less than shipments for the first four months of 1914. When May is included the shipments for the five months of 1915 will probably be from 350,000 to 400,000 tons less than for the corresponding period in 1914.

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Fishponds and Temperance

The Donohoe Coke Co. has a large reservoir, which it stocked with fish three years ago. The fishing rights in this pond were recently sold to the Greenwald Temperance Society for the exclusive use of members. No one can join the society without signing the pledge. But those who won't sign it say, What is fishing without a bottle?

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Bathhouses in Kansas

The legislature in Kansas has passed House Bill 1033, providing that all mines must be equipped with bathhouses, which must contain several shower baths, also a locker for each miner. Kansas is progressive as usual.

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The July 3 issue of Coal Age will be devoted entirely to coke and its byproducts. All of our readers are invited to contribute articles dealing with some phase of coke manufacture. Manuscripts should be in our hands by June 24, or sooner.

Discussion By Readers

Mining Laws and Legislation

Letter No. 4—I was much interested and somewhat amused at the letter of I. C. Parfitt, COAL AGE, Apr. 10, p. 651, in which he seems to have had some difficulty in interpreting the meaning of that section of the bituminous law of Pennsylvania relating to the legal responsibility of the assistant mine foreman.

Apparently Mr. Parfitt thinks that because the assistant foreman works under the instructions of the mine foreman he is not personally responsible for the results of his action. When the present bituminous mine law was framed it was well known that the majority of the mines were so extensive that it was impossible for the mine foreman to visit all the men in their working-places every day. For this reason the clause was inserted in the law giving the foreman "the right to employ a sufficient number of competent persons to act as his assistants," stating further that they "shall act under his instructions in carrying out the provisions of this act."

It will be readily agreed that an assistant must always work under the instructions of his superior in office. In my opinion, however, this does not relieve the assistant of his personal responsibility in carrying out his orders. As I understand the law, both the mine foreman and his assistants are personally responsible—the mine foreman for the orders given to his assistants, and the assistants for the faithful performance of the same. Certainly the mine foreman cannot be held responsible for any carelessness or personal neglect on the part of one of his assistants, He can be held responsible only for the orders he issues and for the employment of those he believes to be competent men to act as his assistants.

I do not think for a moment that any mine foreman would attempt to hide behind his assistants or throw a responsibility that was his own on the other man's shoulders. When a mine foreman employs an assistant, he does so believing that he is capable of assuming the responsibility for the district placed in his charge. One might gather from Mr. Parfitt's remarks that he regarded the mine foreman as a mere figurehead who is authorized by law to employ a sufficient number of assistants to perform the work that was properly his own. Anyone familiar with the situation, however, knows that the mine foreman of a large mine has a hundred and one things to look after besides personally visiting the men in their working-places.

I believe the mine foreman should visit and carefully inspect certain portions of the mine every day himself, but his attention should be given mostly to those portions of the mine and to those matters requiring his personal oversight. There are no "figureheads" under ground and no place for them. The company pays the mine foreman a good price for knowing what has to be done and what men are best adapted to perform different classes of work. Each assistant and each workman employed in the mine is paid in proportion to his responsibility and the class of work he performs.

I might sum up by saying that in my opinion an assistant foreman is held legally responsible for anything that goes wrong in his district owing to his own neglect or carelessness in the performance of his duties of inspection. No judge or jury would convict a mine foreman for an accident arising from the carelessness or neglect of an assistant foreman, who must be responsible, as I said before, for the faithful performance of the duties laid upon him.

THOMAS HOGARTH.

Burgettstown, Penn.

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Longwall in Pittsburgh Seam

Letter No. 9—I have followed with a great deal of interest the discussion of the question of whether the No. 8 or Pittsburgh seam can be worked successfully by the longwall method of mining. Inasmuch as I have had experience in working this seam and have studied its character and that of the overlying strata, I want to say that my conclusion is that the No. 8 seam cannot be worked profitably on the longwall advancing system.

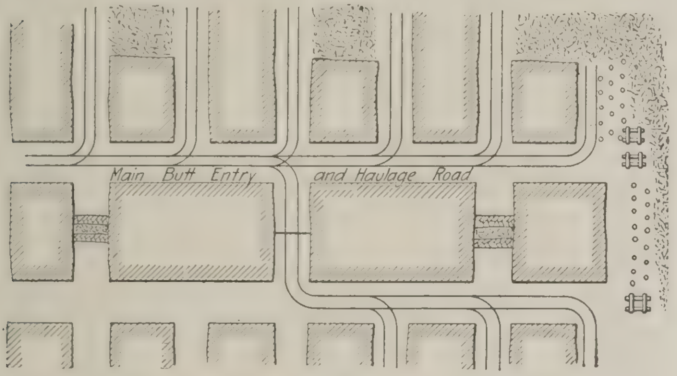
For many years I was in charge of longwall work in our mines and visited a number of other mines that were being worked on the same plan. Some of the mines visited had a very tender roof, but were worked with profit to the operator. Where the roof was tender, the longwall face was always carried forward in steps (see Fig. 3, Letter No. 8, May 29, p. 940), so as to prevent the formation of a continuous break that would destroy the action of the roof, which is so necessary in the longwall system. In our mines each working place was kept 15 ft. in advance of that next following. The roof being tender, a break only extends as far as the steps, which arrest its progress. By this means, a general subsidence of the roof along the entire longwall face is prevented. In these mines the tender roof extended a good many yards above the seam itself, which is not the case in the No. 8 seam, where the tender roof extends only to the limestone—a distance that varies in different parts of the Ohio field, not exceeding 5 ft. in some places.

In considering the question of longwall, it is important to remember that the strata overlying the No. 8 seam is not at all suitable for packing material, because it crumbles quickly, especially if it is damp, which is the usual condition. For this reason the packwalls would not stand the pressure necessary to break the limestone, and as a result the roads leading to the face would be entirely lost and the working places would soon cave, when it would be found practically impossible to keep the work open.

Referring to the longwall retreating method proposed by John Oldroyd in Letter No. 7, May 15, p. 859, for working this seam, I would say that practically all the coal could be extracted by this system, but few operators would care to adopt the retreating method owing to the length of time required to extend the entries to the property line. The retreating method of longwall not only possesses the disadvantage of late returns on the investment, but the operator in most cases is not in a position to buy all the coal he desires at the commencement of operations and must wait until his returns enable him to make a further investment, which is not possible in the longwall-retreating system. The working of future acquisitions would require the sinking of new shafts and the providing of another surface plant and equipment.

At the present time there is not more than 60 per cent. of the coal extracted in a majority of the mines working the No. 8 seam in the Ohio field. No one will deny that it is shameful to admit that more than one-third of the coal must be left in the mine in working this seam, and it goes without saying that some other method than that in present use must be adopted whereby more coal can be recovered.

I would suggest, briefly, that the plan might be tried of driving double rooms, say 32 ft. wide, as shown in the accompanying figure, the room necks being driven 8 ft. wide, a distance of 7 yd., leaving a 16-ft. entry stump between the openings. A track is laid along the straight rib on each side of the room, and a 32-ft. breast is driven up a distance depending on the conditions in any case. When the room has reached its limit, the 16-ft. pillar between the room and the one next adjoining is cut across at the face and the room pillar drawn back by taking a 5-ft. skip along the rib, using for this purpose a shortwall machine. When driving up the rooms all the waste is thrown into the center between the two tracks, which leaves the ribs clear and enables them to be drawn back readily.



Proposed Plan of Working No. 8 Seam

I have outlined in the figure the general plan of this work. The butt-entries are driven 10 ft. wide with a pillar 8 yd. wide between them. When all the rooms of a pair of butt-entries are driven up, and the room pillars drawn back as far as the entry stumps, the work of drawing back the entry pillars and entry stumps is commenced. As shown in the figure, this work of drawing the entry pillars is started from the inby end or head of the entry on the retreating plan.

I believe that this method or a similar one will enable 95 per cent. of the coal to be extracted. The driving of wide rooms will produce a much larger percentage of lump coal. It will generally be found that two shots will be all that is required to break down the coal in a 32-ft. breast.

In drawing back the entry pillars and stumps, cribs should be used and switches laid at the face, as shown in the sketch. The cribs can be removed and used again repeatedly as the work progresses; likewise also the posts, which are set in two or three rows along the face of the pillars. It is important that these cribs and posts should not be drawn too rapidly, in order to prevent the roof from breaking over the pillars. A Sylat post puller should be used for drawing the timber. This machine allows the man to stand in a safe place a number of feet away from the post he is drawing. The cribs should be made of hardwood, each stick measuring 2 ft. in length and 8x8 in. in section. When building a crib, the first stick must be laid on a few shovelfuls of fine dirt, so as to provide for its ready removal when desired.

Harry Marson.

Wolf Run, Ohio.

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The Mine Car Question

Letter No. 2—Manufacturers and mining men generally have doubtless read with interest the article by R. Z. Virgin, Coal Age, May 1, p. 752, relating to mine cars and the changes that have taken place in their construction during the past few years. I notice that Samuel Dean has drawn attention to the same subject and has suggested a discussion of the question to bring out more clearly the conditions that must be met and the requirements of mine cars for good service. This inquiry of Samuel Dean appeared in Coal Age, May 22, p. 904, and in the same issue, p. 900, was an interesting letter by P. F. Lynch, superintendent of Cross Mountain Coal Co., Briceville, Tenn. Discussions of this sort should prove very profitable both to the makers of mining equipment and to coal operators and mine superintendents.

Mr. Virgin's remarks are undoubtedly, for the most part, well founded. In the past few years there has been a tendency toward an extreme "battleship" type of mine-car construction at a great many mines. There has naturally followed a train of evils such as mentioned by Mr. Virgin; namely, the increased difficulty of handling the cars in the mine at the working face, the necessity for heavier locomotives to haul the cars and the requirements for heavier rails, and finally an increased cost of maintaining the roads in good condition. We have recently noticed, however, a tendency on the part of the more progressive mining men to get back to a lighter form of car for mine use—one that is especially adapted to the most economical handling of the coal under the particular conditions existing in their mines. As a consequence, the capacity of the cars, their length, width and height, size of wheels and track-gage are specified to conform to the conditions existing in the seam from which the coal is mined.

In considering this question, it is important not to overlook the changes in conditions with respect to underground haulage that have taken place during the past few years. In most mines mule haulage has been supplanted by some form of rope or locomotive haulage, electric or compressed-air locomotives being largely used on main-haulage roads. These changes demand a corresponding change in the character of the mine car and its equipment in order to obtain the greatest benefit and operate the system with the most economy.

While a mule can haul a certain tonnage per hour under given mining conditions and a light mine car built with a simple truck will stand up under the strain imposed by such a method of transportation, it must be remembered that under the increased tonnage hauled per hour where mechanical haulage is employed the same car will not prove adequate, and as a consequence the cost of maintenance is greatly increased, repairs being more frequent and the life of the car being greatly diminished.

Practical mining men know that when a powerful locomotive is employed larger trips are hauled, and the consequent strain and jerks to which the cars are subjected soon send them to the repair shops and it is not long before they are relegated to the scrap heap. Again, the increased speed of hauling the cars is wasteful of the oil, which is thrown from the journals unless an improved form of car-wheel is adopted. The old-fashioned wheels are cut out, as a rule, in a few trips and become unserviceable.

To meet these arduous conditions requires an increased size and strength of the drawbars and other irons with which the car is equipped, and in many cases channel bars must be employed to give greater strength and rigidity to the cars. The manufacturers of car-wheels have sought to develop a type of wheel that will stand the increased severity of the service and carry the heavier loads at the greater speed without cutting out the wheels and with the greatest possible saving of power.

The roller-bearing wheel, in its present state of development, is the result of these efforts of car-wheel manufacturers. It is true that a set of four wheels of this type, for a 42-in. track-gage, the wheels being 16 in. in diameter and set on 2-in. axles, will weigh with boxes and bearings complete 125 lb. more per set than the simple type of truck formerly used, which is approximately an increase of 25 per cent. in the weight of the truck. But for this increased weight in the truck there is gained the decided advantage that the drawbar pull is reduced from 30 or 40 lb. per ton to as low as 11 lb. per ton of load hauled. This alone shows a total saving in power of from 60 to 70 per cent. The wheels will also run from 6 to 18 months without regreasing and will not cut out in the hub at any speed or length of haul.

The improved equipment of roller-bearing wheels, permitting the easy starting of the car, makes the proposition of handling the cars by hand in the rooms and working places a very simple one and is an important factor in increasing the daily output from each working place. It may be stated with certainty that the results obtained by the adoption of this improved equipment in mine cars fully justify the additional weight of the trucks and the increase in first cost of the equipment.

W. F. Daniels,
Enterprise Foundry & Machine Works.
Bristol, Tenn.

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Stopping Payroll Leaks

Letter No. 4—It is commonly recognized in all mining communities today that producers of coal must look carefully to the cost of operating their mines. It is well known that the daily tonnage of a mine has a direct and powerful influence on the cost-sheet. Keen competition, however, has developed the fact that tonnage is not the only factor to be considered in relation to the cost of coal production.

Competition in the coal industry has necessitated a most careful preparation of the coal shipped to market. This is especially true in respect to the larger sizes of coal shipments. Again, the quality of the coal or its *heat value* is another determining factor in its selling price. Coal is now largely purchased by contract based on the heat units of the coal per ton as determined by analysis.

These conditions affect the coal miner and laborer equally with the operator. It is therefore a matter of great importance to all concerned to consider carefully what can be done to reduce the cost of operation and increase the value of the product. In this connection, I was glad to see the reference made by F. M., in Letter No. 3, Coal Age, May 22, p. 901, where he draws attention to a few of the "small items" that are so generally lost sight of in the operation of a mine.

I desire to refer briefly to one or two points of mismanagement that are of frequent occurrence in the mining of coal. I want to say first of all that the selling price of coal on the market does not dominate the conditions in a mine as much as the system of mining employed in the extraction of the coal. It is well known that market conditions vary. At times the demand for coal so far exceeds the supply that all mines are operated at their full capacity and every effort is made to produce a large output. At such times the demand for coal almost completely absorbs every other interest and things that should receive attention underground are neglected.

A little sober reflection will convince any practical mining man that this condition is wrong, as far as the cost-sheet is concerned. It is when the times are good that provision should be made for the carrying out of plans that will insure a more regular output in the future working of the mine. The necessary work of prospecting should then be performed and the required amount of narrow work pushed forward with great energy.

As a rule when the times are good and the demand for coal is urgent work is abandoned on the low coal and frequently pillar work is neglected, while the most attention is given to the thick coal. Would it not be better to give the same attention, as far as practicable, to all sections of the mine, with a view to its future development and keeping the workings generally well cleaned up? The extra expense attending many of these operations can be better borne when times are good than when the demand for coal is slack.

It seems only natural to consider that when times are poor the cost-sheet could be much reduced by giving more attention to the working of wide rooms and thicker coal where the best quality of lump coal can be produced at a small expense of labor. If necessary, at such times, stop all narrow work and all unnecessary day work. Due consideration should be given to the fact that when times are poor it is often possible to secure both labor and material at a reduced cost, and for this reason necessary development work can often be projected to advantage. I have often observed that the general tendency of operators in a dull season is to retrench and refuse to do such work until the approach of better times, when it is frequently difficult to secure the needed labor and material promptly as required.

I recall one instance when the mine where I was working only ran about eight or ten days in the month throughout the winter. Prospects improved on the approach of spring, and with a new contract in sight word was sent into the mine requiring a certain number of cars of screen coal. This was wanted at once for sample coal. It was found, however, that it was impossible to supply more than half of the number of cars required of this kind of coal. An investigation was started to ascertain the reason for this and developed the fact shortly that the fault lay in the underground planning and development.

At first miners were blamed for not drilling the holes in the proper location for blasting, using too much powder, not undercutting or shearing their coal so as to give a shot the opportunity to perform its work and finally for the practice of shooting coal from the face before cleaning up the coal of a previous shot. All of these causes, it is clear, help to produce much fine coal and slack.

I believe, however, that the mine officials were more to blame for the overproduction of slack and fine coal than the miners themselves. Investigation showed that, in one fireboss section, out of 43 working places there were 25 employed on narrow work or entry driving, while five of the *rooms* also had to be driven narrow owing to bad roof and could not be cut with the machines, but must be worked by pick miners. This left only 13 wide rooms in this section containing 43 working places. Beside all this there were, in the same section, 18 cut-throughs being driven, which greatly increased the amount of fine coal and slack. No argument is required to show that this was a case of mismanagement and little foresight in planning and carrying on the work underground. It was found that at least 50 wide rooms could have been turned and put in condition for a good output of coal when needed.

Frequently the mistake is made of abandoning certain sections of a mine for work in other sections because of certain market requirements. In some instances rails, ties, posts, wire, pipe lines and other equipment are withdrawn for use in another section of the mine, only to be replaced later when work is resumed in the section from which they were taken.

While it is readily agreed that such a proceeding may be necessary to some extent under certain conditions, it is clear to all that every effort should be made to avoid such an exigency. The abandonment of a section of the mine before it is completely finished most always means an increased expense to clean up the rooms and roadways and equip the section again for work. Experience teaches that coal can always be mined more easily, and with less expense and greater safety, when the work is continued until the extraction is complete. I have worked at mines where certain sections have been abandoned once or twice before the pillars were finally drawn. In my opinion such practice is careless, expensive and dangerous in coal mining.

H. R. K.

Curtisville, Penn.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Molecular Theory of Matter—Chemical investigations have led to the accepted conclusion that all matter is composed of minute particles called **molecules**, the molecule being considered the smallest division of which the matter is capable without destroying its identity.

Theory further assumes that the molecule is composed of two or more **atoms**, like or unlike, but bound together by a force of attraction for each other known as **affinity.** Each of these combined atoms represents an **element** or a particular kind of matter and their combination as molecules diversifies matter and creates substances of various nature and kind.

Atomic Weight—Atomic weight is simply relative. The atom of each element has a weight peculiar to that element, referred to the weight of the hydrogen atom as **unity.**

Molecular Weight—The molecular weight of a substance is equal to the sum of the atomic weights of the elements of which it is composed. These elements combine in **fixed proportions**, which are determined by the number of atoms that saturate each other or the **"valences"** of the elements.

Valence or Valency—The valence of an element is a term used to express its **combining power** in relation to the number of atoms of hydrogen (the assumed **unit**) or its equivalent required to satisfy the affinity. For example, two atoms of hydrogen are required to saturate a single atom of oxygen, and the valence of hydrogen being one, the valence of oxygen is two. The reaction is expressed by the chemical equation

$$2\ H_2 + O_2 = 2\ H_2O.$$

There are many elements, however, that do not unite with hydrogen and to determine their valency it is necessary to compare them with other elements that combine with them and whose valence is known. For this purpose the elements **oxygen and chlorine** are most convenient. The valence of oxygen, as shown above is **two.** The valence of chlorine is **one,** since one atom of hydrogen completely saturates one atom of chlorine.

$$H_2 + Cl_2 = 2\ HCl.$$

The element calcium combines both with oxygen and with chlorine but not with hydrogen alone. Its valence is two as shown by the following equations:

$$Ca_2 + O_2 = 2\ CaO$$
$$Ca_2 + 2\ Cl_2 = 2\ CaCl_2.$$

The **valence** of most elements is **not absolute** but changes, often by two and frequently by successive units. For example, calcium has a valence of two and four; gold, one and three; copper, one and two; iron, two, three, four and six; while nitrogen forms the following series of oxides:

$$N_2O,\ N_2O_2,\ N_2O_3,\ N_2O_4,\ N_2O_5.$$

Classification of Elements by Valence—Owing to the change in valency exhibited by many elements it is not possible to make an unvarying classification in this respect. For the sake of convenience, however, many of the elements are designated as **univalent, bivalent, trivalent, quadrivalent,** etc.; or as **monads, dyads, triads, tetrads, pentads, hexads,** etc., according as they exhibit valencies of one, two, three, four, five, six, etc., in combining with other elements.

The Coal Age Pocket Book

A Chemical Compound—A chemical compound is a substance composed of molecules formed by the chemical union of two or more unlike atoms. In a chemical compound the elements are always combined in **fixed proportions** and the substance has fixed properties that are always the same.

A Mechanical Mixture—A mechanical mixture is composed of unlike substances mixed together in any proportion and not chemically combined. The properties of such a mixture vary with the kind and proportion of the substances of which it is formed.

The **atmosphere** is a mechanical mixture of oxygen and nitrogen. Although the proportion of these gases is practically always the same in pure air, the gases are only mixed and do not combine with each other.

Acids, Bases and Salts—Chemistry considers three general classes or conditions of matter, which make the substance either an acid, a base, or a salt.

Briefly and plainly stated, an **acid** is a substance that dissociates in aqueous solution yielding hydrogen ions.

A **base** is a compound capable of reacting with an acid to produce a salt. It is an alkaline metallic oxide.

A **salt** is a generally neutral compound formed by the union of an acid and a base.

In general the **nature of an acid** is the direct opposite to that of a base. In combination they neutralize each other, forming a neutral salt and water. The **distinguishing characteristics** of all acids are: 1. The sour taste. 2. The turning of blue litmus red. 3. The evolution of hydrogen by contact with a metal.

A number of acids are formed by the direct union of hydrogen with another element; as hydrochloric acid (HCl); hydrogen sulphide (H_2S). Other acids are formed by the union of two radicals—the hydrogen radical or hydroxyl (HO) and an acid radical; or they may be considered as the result of the addition of water (H_2O) to an anhydrous acid (anhydride).

In the first instance, the formation is as follows:

Hydrogen radical (hydroxyl)	$2(HO)$
Acid radical	SO_2
Sulphuric acid	H_2SO_4

Or, again, the formation may be regarded thus:

Water	H_2O
Sulphuric anhydride	SO_3
Sulphuric acid	H_2SO_4

Oxides—Nearly all the elements unite with oxygen to form oxides, but the affinity for oxygen is stronger in some cases than in others. When the affinity of the elements for each other is strong the compound formed is more stable than when the affinity is weak.

A **monoxide** is formed when the molecule contains but one atom of oxygen; as for example, carbon monoxide (CO).

A **dioxide** is formed when the molecule contains two atoms of oxygen, as carbon dioxide (CO_2).

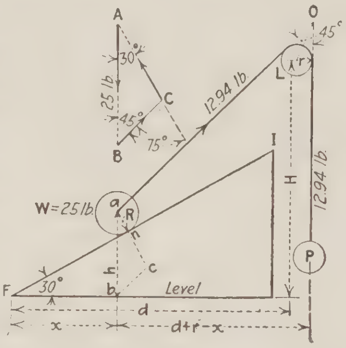
A **trioxide** contains three atoms of oxygen.

Inquiries of General Interest

A Question in Mechanics

There is an interesting problem in regard to balancing a given weight on a plane having a given inclination, which has excited considerable interest and I would like to see the same answered in Coal Age. The question is as follows:

Referring to the accompanying figure, find what weight or downward pull P will support a weight $W = 25$ lb. on an incline making an angle of 30 deg. with the horizontal when the pulley L is at such a height H above the foot of the incline that the rope supporting the weight W and running over the pulley L is not parallel to the incline. It will be observed that the ratio between the weight W and the balancing pull P is not constant, since the angle that the rope makes with the incline constantly changes, according to the position of the weight on the incline.



J. R. L.

Seattle, Wash.

As correspondent states, the angle that the rope makes with the incline is constantly changing. For this reason it is impossible to get any simple expression for the ratio of the weight moving on the incline to the balancing pull.

Referring to the accompanying figure, let FI be the incline on which the weight W (25 lb.) is supported by the rope that passes over the pulley L, the balancing weight being shown at P. Assume the radii of the weight, ball or wheel W and the pulley L to be R and r, respectively. Call the horizontal distance from the foot of the incline to the center of the pulley d, and the horizontal distance from the foot of the incline to the center of the weight x. Then the horizontal distance from the center of W to P is $d + r - x$.

Now, it is possible to find the distance x, which determines the position of the weight W, for any assumed angle that the rope makes with the vertical or the angle of contact on the pulley. For example, taking the angle of contact on the pulley as 45 deg., as indicated in the figure, the horizontal distance from the foot of the incline to the center of the weight or the distance x is found by applying the principles of geometry; thus,

$$x = (d + r) - \left[H - h + \frac{r}{tan\ \frac{1}{2}\ (45°)}\right] tan\ 45°$$

But, since the tangent of 45° = 1 and tan ½ (45°) = tan 22° 30′ = 0.414, and assuming the following values, which are known or can be found: $H = 64$ ft., $d = 75$ ft., $R = 5$ ft., $r = 4$ ft., we have, by substituting these values in the above equation,

$$x = (75 + 4) - \left(64 - h + \frac{4}{0.414}\right) = 5.34 + h$$

But by the principles of geometry

$$h = \left(x + \frac{R}{sin\ 30°}\right) tan\ 30°$$

$$h = \left(x + \frac{5}{0.5}\right) 0.577 = 0.577\,x + 5.77$$

Then, substituting this value of h in the previous equation, we find for the value of x

$$x = 5.34 + 0.577x + 5.77$$

$$x(1 - 0.577) = 5.34 + 5.77$$

$$0.423x = 11.11$$

$$x = \frac{11.11}{0.423} = 26.26 \text{ ft.}$$

Finally, to find the distance Fn (see figure) measured on the incline from its foot to the weight W, we have

$$Fn = \frac{x + R \times sin\ 30°}{cos\ 30°} = \frac{26.26 + 5 \times 0.5}{0.866} = 33.2\ ft.$$

The weight required to balance 25 lb. in this position on the incline is now found from the triangle of forces ABC, shown in the figure, and which corresponds to the triangle abc indicated just below it on the incline. In the triangle of forces ABC, $AB = 25$ lb., and the angles are $A = 30°$, $B = 45°$, while the external angle C is equal to the sum of the other two interior angles A and B, or 30 + 45 = 75 deg. The side BC, drawn parallel to the rope supporting W, represents the pull required to balance that weight in this position on the incline. Hence,

$$BC = AB\frac{sin\ 30°}{sin\ 75°};\ \text{or}\ P = W\frac{sin\ 30°}{sin\ 75°}$$

$$P = 25\,\frac{0.5}{0.966} = 12.94\ lb.$$

This problem although interesting is of value only as a mathematical drill.

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An Electrical Question

Assuming that a man is in contact with a live wire and it is necessary to short-circuit the current in order to rescue the man, should this be done between the man and the power station or just beyond the man; or will it make any difference?

A. P. Caudell.

Hannastown, Penn.

The current may be short-circuited with practically the same result on either side of the man, but as close to him as practicable. The small resistance represented by the short length of trolley wire between these two points is so slight comparatively that it is negligible. It is more important to make the short-circuit as quickly as possible at the most convenient point close to the man.

Connellsville—The Connellsville coke trade shows a production and output decidedly increased from previous figures. The production and shipments recently reached 305,000 tons, being a record for the present year. One thousand four hundred idle ovens were recently fired, most of which were non-productive until the present.

Uniontown—The H. C. Frick Coke Co. has fired 1090 ovens since May 20. This firm has been operating on a 63 per cent. basis, but for the last two weeks has been working its men six days each week. It is understood that a stock of coke is being accumulated.

Quemahoning—M. L. Reiman and Luther T. Gardner, of Johnstown, have secured options from 25 farmers of Quemahoning Township, Somerset County, for something like 3000 acres of coal lands, which they expect to dispose of to Raymond Havemeyer, of the American Sugar Co., who recently inspected the tract. The tract extends from Quemahoning Dam site to Stoyestown and Hooversville and adjoins the property owned by the Federal Coal Co., the Quemahoning Coal Co. and the Randolph Coal Co. It is possible that the deal will be consumated within the next week or so when a corps of engineers will be put to work on the tract. It is said that Mr. Havemeyer has an option on some 500 acres of coal located near the Quemahoning Dam that adjoins the property about to be taken over.

Scottdale—Arrangements have been made for reopening the Strickler Works, in Mt. Pleasant Township, Westmoreland County, after a complete shutdown of many months. The plant is owned by J. A. Strickler, banker and coal operator of Wilkinsburg, Penn.

Bentleyville—The Pittsburgh Westmoreland Coal & Coke Co. at this place is constructing a new and uptodate lamp house on the foundation of the one recently destroyed by fire and explosion. The new structure will be of brick and concrete and will be thoroughly fireproof. New equipment will be installed.

WEST VIRGINIA

Huntington—May was one of the greatest coal loading months in the history of the Chesapeake & Ohio R.R. Up to the 28th of the month 1,797,590 tons had been loaded, and it is believed that when figures are all in they will show that over 2,000,000 tons were shipped. During the first half of May 16.3 per cent. more coal was taken out of the field than during a corresponding period of last year, and this with a reduction of 6.2 per cent. in the railroad pay roll.

Wheeling—Andrew Ferari, of Wheeling, recently appeared by counsel before Judge Robert M. Addleman and asked for a receiver for the Parisian Coal Co. in which he is a partner. The judge postponed action until the opening of the June term of court, and suggested that in the meantime the partners get together and compose their difficulties.

Bluefield—The entry of Italy into the European war is already having its effect in the coal operations throughout the Norfolk & Western territory, and it is feared that the departure of many of these men will seriously cripple operations which have been retarded for several weeks on account of a scarcity of labor. It is believed that one-fourth of the coal miners employed in this field are Italians, 45 per cent. of which are of the reservist class.

TENNESSEE

Knoxville—The Tennessee Legislature has just passed an act that provides for removing 500 of the 800 convicts from the state mine and coke ovens during the summer months and working them on the roads. This will tend to make better roads and less competition in the coal market when there is practically no demand for large quantities of coal. The 300 convicts kept at the mine during the summer are considered to be what is sufficient only to keep the plant in proper working condition and keep up with what contracts have to be filled in the summer months. This operation is what is commonly known as the Brushy Mountain mine and is located near Petros, on the Harriman & Northeastern R.R., which is operated by the Queen & Crescent. A few of the convicts have already been put to work on the roads near Petros, and the balance of the 500 will be taken from the mine as fast as the necessary equipment can be provided for working and caring for them on the roads throughout the state and contracts made with the various counties to use them.

OHIO

Bellaire—Four hundred more coal miners will go to work when the Pultney mine of the George M. Jones Co., south of the city limits, starts operation after an idleness of 14 months. Machine men are now in the mine preparing for the resumption of work. This mine is one of the largest in this section of the country.

Flushing—Seventy-five miners employed in the Tunnell mine were imprisoned recently when the timbers at the pit mouth gave way, allowing the entry to fall in. The men escaped through an air shaft a mile distant. The timber supporting the pit mouth had decayed badly during the 14 months' strike, and finally gave way.

Columbus—New mining safety problems confront State Mine Commissioner John M. Roan as the result of the prospective opening of eastern Ohio mines, which have not been worked for more than a year, the longest period of idleness in the state's history. Commissioner Roan is making a thorough survey of the every mine before permission to resume operations is granted. Most mines will not start for a week or more it is said.

INDIANA

Indianapolis—The Supreme Court of Indiana, in a case in which the Jacksonville Coal & Coke Co. was interested recently decided that a mining company must leave sufficient support in a mine for the soil above although it is not required that the support be sufficient to carry heavy buildings placed on it by the owner of the surface. The suit was for damages because the land settled owing, it was alleged, to the negligent manner in which the coal was mined underneath.

ILLINOIS

Lincoln—A receiver has been appointed for the Latham Mining Co. of Lincoln, following a foreclosure suit filed by the Sangamon Loan & Trust Co. The mining company has failed to redeem a large part of $60,000 bonded indebtedness.

Dunfermline—The operation of the Dunfermline mine of the Big Creek Coal Co. was assured for several years by the closing of leases on 550 acres of land. These leases were recently consummated and the shortest of them runs for 15 years.

FOREIGN NEWS

Nanaimo, B. C.—Volunteer rescuers on May 28 entered the lower workings of the Reserve mine of the Western Fuel Co. in search of the bodies of 19 miners who were entombed on the night of May 27, by an explosion of gas. The bodies of three miners were recovered as well as a fourth man who was so badly injured that he is not expected to live. Scant hope was entertained that any of the entombed men could be rescued alive, and the mine officials turned their attention to restoring the system of ventilation.

PERSONALS

C. C. Scott has been named to succeed E. E. Russell as mine foreman at Flat Top mine, the appointment having been made by Governor Henderson recently.

George M. Isaacs, who was formerly with the W. J. Hamilton Coal Co. and its successor the Maple Hill Coal Co. for 11 years, has taken a position as Indiana salesman for the Pocahontas Coal Sales Co. of Detroit.

W. D. Roberts, of Huntington, W. Va., has written a book entitled "Logan County Coal." The reason for this production is to further a campaign of education among the large users of coal to the economic necessities that the producer should be paid a better price.

Richard Krapf, outside foreman at the Phoenix Park Colliery of the Philadelphia & Reading Coal & Iron Co., has resigned his position to become coal inspector of the sales department of the Maderia-Hill Co. He will be connected with the Pottsville offices and will make his residence there.

W. H. Clingerman, president of the H. C. Frick Coke Co., recently received a painful injury in one eye, while returning to Scottdale from one of the mines, in an automobile. A branch of an overhanging tree whipped against Mr. Clingerman's face with great force, and one eye was seriously cut. His physicians have ordered complete rest for both eyes during several days.

R. A. Shiflett, better known in the mining regions of East Tennessee as Bob Shiflett, recently received from the Governor his commission as chief mine inspector, succeeding George Sylvestor, appointed four years ago. Mr. Shiflett served in the capacity of mine inspector for a four-year term under McMillim. Again a similar term during the Frazier administration, and still again under ex-Governor Patterson.

Merton A. Pocock has been appointed district sales manager for the territory included in the States of Minnesota, North Dakota and South Dakota by the Terry Steam Turbine Co. His office is 400 Endicott Building, St. Paul. This arrangement supersedes the previous selling agreement with Robinson, Cary & Sands Co. of St. Paul.

The above company has also appointed the Hawkins-Hamilton Co., People's National Bank Building, Lynchburg, Va., its representatives for the State of Virginia.

OBITUARY

Frank Hopkins, of Sebastopol, an assistant mine foreman for the Pennsylvania Coal Co., died recently at Pocono Pines, where he had gone some weeks ago for the benefit of his health. The body was returned to Sebastopol for interment.

J. C. Hayden, of Jeansville, Penn., died May 27 of apoplexy, at the age of 81 years. He had been ill for the past year from heart and kidney trouble. Mr. Hayden was a pioneer anthracite coal operator, but sold his mining property to the Lehigh Valley Coal Co. years ago. He was the founder of the Jeansville Iron Works, which is now controlled by the International Steam Pump Co.

Reese Tasker, general inside superintendent of the Philadelphia & Reading Coal & Iron Co., died at his home on George St., Pottsville, on the afternoon of May 31, from the effects of a stroke of paralysis. He was prominent in mining circles for nearly a half century, his knowledge of the inside workings of the 55 collieries of the Reading company making him a highly valued man, whose loss, the officials say, will be difficult to replace.

Andrew Jackson Reilly recently died in the office of Dr. U. J. W. Peters in the Empire Bldg., at Birmingham, Ala. Mr. Reilly came to Birmingham about 30 years ago from Philadelphia to take the position of chief engineer with the old Ramsey & McCormack Coal & Iron Co. He remained with the concern for about 15 years, and then opened an office in Birmingham as consulting mining engineer. He later bought the Fairchilds Coal Co. of Inland and until the time of his death was actively engaged in the management of this concern of which he was the owner.

RECENT COAL AND COKE PATENTS

Dump Car. J. J. Irvin, Bellwood, Penn., 1,134,859, Apr. 6, 1915. Filed June 17, 1913. Serial No. 774,168.

Miner's Lamp. S. J. Yellen, Great Neck, N. Y., 1,136,303, Apr. 20, 1915. Filed Oct. 1, 1914. Serial No. 864,461.

Smoke Consumer. O. Olson, Minneapolis, Minn., 1,134,553, Apr. 6, 1915. Filed Dec. 13, 1912. Serial No. 736,606.

Coal and Rock Drill. P. Jopling, Rock Island, Ill., 1,135,530, Apr. 13, 1915. Filed Jan. 5, 1911. Serial No. 600,889.

Baffle for Water Tube Boilers. G. Kuehne, Chicago, Ill., 1,135,535, Apr. 13, 1915. Filed Apr. 9, 1914. Serial No. 830,599.

Fire Box for Boilers. F. M. Jacobs, Atchison, Kan., 1,135,114, Apr. 13, 1915. Filed May 20, 1914. Serial No. 839,698.

Fuel Feeding Mechanism for Furnaces. C. I. Filson, Burnham, Penn., 1,134,600, Apr. 6, 1915. Filed Apr. 11, 1914. Serial No. 869,403.

Feeding Device for Furnace Grates. G. H. Thatcher, Jr., Albany, N. Y., 1,134,167, Apr. 6, 1915. Filed Oct. 22, 1912. Serial No. 727,147.

Mining Machine. A. H. Gibson, assignor to Ingersoll-Rand Co., New York, 1,134,734, Apr. 6, 1915. Filed Dec. 3, 1910. Serial No. 595,473.

Smoke Consuming Apparatus for Boiler Furnaces. F. Gareau, Montreal, Canada, 1,135,275, Apr. 13, 1915. Filed Mar. 5, 1914. Serial No. 822,657.

Extension Frame for Mining Drills. G. W. Morgan and L. Evans, Commerce, Okla., 1,133,442, Mar. 30, 1915. Filed Oct. 15, 1914. Serial No. 866,804.

Hopper Car. F. L. Barber and E. W. Webb, assignor to Standard Car Truck Co., Chicago, Ill. 1,134,251, Apr. 6, 1915. Filed Oct. 30, 1914. Serial No. 869,403.

Coal Breaking and Screening Machine. J. L. Hiller, assignor to Pennsylvania Crusher Co., New York, 1,135,796, Apr. 13, 1915. Filed May 1, 1911. Serial No. 624,291.

Smoke Consuming Furnace. H. L. Price and G. J. Cartwright, Sydney, New South Wales, Australia, 1,135,842, Apr. 13, 1915. Filed Dec. 11, 1913. Serial No. 805,959.

PUBLICATIONS RECEIVED

"Tenth Biennial Report of the State Mine Inspector of the State of Utah, 1913-14"; 149 pp., 6x9 in., illustrated.

Department of the Interior, Bureau of Mines. Bulletin 87. "Houses for Mining Towns," by Joseph H. White. Sixty-one pages, 6x9 in., illustrated with halftones and drawings.

Department of the Interior, Bureau of Mines. "Monthly Statement of Coal Mine Fatalities in the United States, February, 1915." Compiled by Albert H. Fay; 12 pp., 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines. "Coal Mine Fatalities in the United States, 1914; with detailed figures for December." Compiled by Albert H. Fay; 31 pp., 6x9 in., unillustrated.

Department of the Interior, U. S. Geological Survey, Water Supply Paper 375-A. "Ground Water for Irrigation in the Sacramento Valley, Calif." by Kirk Bryan. Forty-nine pages, 6x9 in., illustrated.

Department of the Interior. U. S. Geological Survey. Water Supply Paper 343. "Geology and Water Resources of the Tularosa Basin, New Mexico," by O. E. Meinzer and R. F. Hare; 317 pp., 6x9 in., illustrated.

The Kanawha Mine Car Co., Charlestown, W. Va. "Coal Mine Equipment." Two hundred and four pages, 8½x5 in., illustrating and describing mine cars, monitors, tipple equipment, car couplings, and various other supplies used about coal mines.

Department of the Interior, Bureau of Mines. Technical paper 89. "Coal Tar Products, and the Possibility of Increasing their Manufacture in the United States," by Horace C. Porter, with a chapter on "Coal Tar Products Used in Explosives," by C. G. Storm. Twenty-one pages, 6x9 in., illustrated.

Department of the Interior, Bureau of Mines, Technical Paper 90. "Metallurgical Treatment of the Low Grade and Complex Ores of Utah." A preliminary report by D. A. Lyon, R. H. Bradford, S. S. Arentz, O. C. Ralston, and C. L. Larson, issued jointly by the Bureau of Mines, and the Department of Metallurgical Research of the Engineering Station of the University of Utah. Forty pages, 6x9 in., unillustrated.

INDUSTRIAL NEWS

Bicknell, Ind.—The American Coal Mining Co. has just given the Link Belt Co. an order for additional equipment for its mine at Bicknell, Indiana.

Uniontown, Penn.—Decisions in the petitions for leave to file suits against J. V. Thompson and others now in the hands of receivers will not be handed down by Judge J. Q. Van Swearingen before June 15.

Lexington, Ky.—The Kentucky River Coal Corporation, a leasing company recently formed by the consolidation of the Haley Coal Co., the Slemp Coal Co., and others, has established headquarters at the Fayette National Bank Building, Lexington.

Columbus, Ohio—The Ralston Steel Car Co., of Columbus has secured a contract from the Pennsylvania R.R. Co. to build 1000 all-steel hopper cars for coal traffic. The Ralston company is just completing a 200-car order from the Baltimore & Ohio R.R. Co.

Roundup, Mont.—The Roundup Coal Co. has placed an order with the Link-Belt Co. for a complete tipple and screening equipment. This company is the designer, engineer and manufacturer of the entire equipment, the cost of which will be approximately $25,000.

Uniontown, Penn.—The injunction hearing of the Rainey company against D. J. Johnson and C. W. Johnson to restrain them from drilling through the Rainey workings at Percy which was to have been heard before the court May 18 was continued until June 22 by agreement of counsel.

Washington, D. C.—Rates on bituminous coal from the Crooksville, Ohio, coal district to Chicago and points in Illinois, Indiana and Michigan, were recently pronounced unjustly discriminatory by the Interstate Commerce Commission as against rates from mines in the middle district of Ohio.

Charlestown, W. Va.—William L. Connell, president of the Paint Creek Colliery Co., was recently named as its receiver on a petition of a Scranton, Penn., banking house. Liabilities are given as $100,000. This company operates one of the most important coal developments in the Kanawha field.

Kansas City, Kan.—The new automatic coal and ash handler which was recently installed in the municipal plant at Kansas City, Kan., was set in motion May 19. The change from handling coal through the old carrying, hauling and shoveling methods it is estimated will save the city $5000 a year in operating expense.

Youngstown, Ohio—The Republic Iron & Steel Co. has awarded a contract for the construction of storage bins at its new byproduct coke plant to the McClintic-Marshall Construction Co., of Pittsburgh. The job will call for 600 tons of structural steel. The bins will be used for the storage of the coal required in the operation of the plant.

Chattanooga, Tenn.—The byproduct coke plant at Alton Park is almost completed, and fires have been lighted under a battery of the coke ovens. The production of coke in large quantities will begin during the present month. Gas is now being used from the Chattanooga mains, but as soon as the ovens are brought to the proper temperature, gas will be supplied to the city.

Seattle, Wash.—After a controversy lasting nine years, the government has finally issued a patent to Morris A. Arnold, president of the First National Bank of Seattle, for a claim in the Bering River coal field of Alaska. The claim is one of three located in 1906. Over $150,000 was spent in developing the property, and then all work was stopped by an order from the government.

Carrolltown, Penn.—The Jacob C. Steinman Estate has reecntly closed a deal for the purchase of coal under 145 acres of the Henry Shaffer farm in Conemaugh Township. This tract adjoins the present coal holdings of the Steinman Estate. It will be mined from the Southport operation, and will not necessitate a new opening. The consideration was approximately $28,000.

Juneau, Alaska—After five years, the government has decided to drop the indictments against Cornelius Christopher and George Simmons, who were charged with having attempted to obtain possession of Alaskan coal claims by fraudulent methods. Many others who have been indicted under similar circumstances have been dismissed on the grounds that there was no evidence of fraud.

Greensburg, Penn.—Jos. Owens, W. H. Owens and J. & C. Owens, residents of Westmoreland County, have sold to Thomas Bowman, of Manchester, England, three tracts of coal land in Allegheny township for a consideration of $11,000. The deed dated Apr. 28 gives the purchaser only the right to mine the vein termed the Upper Freeport and reserves all lower measures to the parties of the first part.

Columbus, Ohio—The Chesapeake & Ohio directors have approved the trackage agreement with the Norfolk & Western by which the Chesapeake & Ohio will use 62 miles of track between Waverly and Columbus in connection with the Chesapeake & Ohio's recently announced plan to build a line to connect with the Hocking Valley. Work has been started on a 28-mile section of track to run from Sciotoville to Waverly.

Johnstown, Penn.—For the first time since the early part of November, 1913, the Cambria Steel Co. will be operating eight blast furnaces in the immediate future. Two additional openhearth furnaces are being heated up at the Franklin plant, making a total of 27 openhearth furnaces to be placed in use. Many additional men are being given work but the labor situation is not expected to regain its normal conditions for some time to come.

Red Lodge, Mont.—The case of the Bear Creek Coal Co. and the Montana Coal & Iron Co. against the Montana, Wyoming & Southern R.R., which was heard before the state railroad commission last December has been settled in favor of the defendant. The coal companies were attempting to secure a combination of rates that would permit them to compete with the mines of the Roundup Coal Co. along the right-of-way of the Chicago, Milwaukee & St. Paul R.R.

Baltimore, Md.—On May 25, nine vessels were in line at the coal piers of the Baltimore & Ohio R.R. at Curtis Bay, and at those of the Western Maryland Ry. at Port Covington either being loaded or waiting their turn to get under the chutes to take cargo. This is as large a number as has gathered here in one day for some time. It shows that the work of exporting coal is fast growing and bears out the prediction that there would be an active foreign demand for American fuel.

Uniontown, Penn.—Deeds conveying the coal underlying 36 lots in Mount Pleasant, Westmoreland County, have been recorded at Greensburg. James A. Braddock, of Mt. Pleasant, bought this coal and transferred it to the Frick interests, receiving in return an equal amount from the Frick field adjoining his Franklin plant in Fayette County. While the majority of sellers are private property owners the transfer also includes the coal under the Mt. Pleasant Seminary and the Baptist church.

Connellsville, Penn.—It has been announced that the experiments of the H. C. Frick Coke Co. looking toward the profitable extraction of sulphuric acid and iron oxide from the mine water at Davidson will be discontinued because of the cost of operation, this being greater than the value of the product secured. The experiments demonstrated that these products might be extracted from the mine water, but the cost of operation was such as to render the scheme commercially impracticable.

Washington, D. C.—The Supreme Court on June 1 affirmed the Interstate Commerce Commission's order reducing coal rates to Nashville, Tenn., and giving switching privileges to the Louisville & Nashville R.R.'s competitors. The commission ordered the Louisville & Nashville and the Nashville, Chattanooga & St. Louis railroads' coal rates reduced to 20c. per ton from western Kentucky, eastern Tennessee and Alabama. It held these rates were unreasonable as compared with those given Cincinnati and other cities.

Pittsburgh, Penn.—J. A. Paisley, of Cleveland, recently entered a suit against the Rail & River Coal Co. asking $339,000 commission fee from the defendant company and its officers. He alleges that he was retained to sell properties of the Rail & River Coal Co. and to receive therefor a commission of 10 per cent. That the properties were sold to the Grand Trunk Development Co., of Toronto, Canada, for $3,390,000 and the sale was made through Charles M. Hayes, of Toronto, Canada. This case was tried once before, but the jury disagreed.

Uniontown, Penn.—Announcement was made May 28 by George Whyel, president of the Consolidated Connellsville Coke Co. that a shipment of 4500 tons of Fayette County coke would be made to Argentina for experimental purposes in an effort to find a substitute for the German byproduct coke that has been used exclusively in South America. Should the test shipment of coke prove satisfactory, it is certain that the Fayette County coke region will feel the effects of a more steady and permanent demand for its staple product. The shipment will be made from Baltimore.

Spokane, Wash.—The public service commission has accepted a compromise in coal rates in Washington. In connection with Roslyn coal rate to Spokane being reduced to $2.25 a ton, a movement is on foot to have still maintained the 35c. differential rate from the Crows Nest Pass coal field which includes the Crows Nest, Corbin and Bellview mines. The present rate of these Canadian coals is $2.15 and the former rate on Roslyn coal was $2.50, thus if a 35c. differential rate is maintained by the Canadian mines, the rate will be $1.90 a ton to Spokane. The matter has been taken up with the railroad companies.

Brookville, Penn.—The Dilltown Smokeless Coal Mining Co. has filed complaint with the Interstate Commerce Commission against the Pennsylvania R.R. and the Buffalo, Rochester & Pittsburgh R.R. Co., charging discrimination against the Dilltown company in favor of its competitors. It is alleged that the Buffalo, Rochester & Pittsburgh road furnishes other coal companies with plenty of empty cars while it refuses to give to the Dilltown company enough for its purpose. It is charged that the Pennsylvania exacts a rate of $1.25 a ton from the Dilltown company on shipments to Buffalo, N. Y., and carries the coal of its competitors for $1.10. These discriminations the commission is asked to stop.

Toronto, Canada—The application of the railway companies to the Canadian Railway Commission for permission to increase the freight charges on coal 10 cents per ton is now being considered by the Commission. A hearing was given at Ottawa recently to the representatives of the Toronto coal dealers and the Consumer's Gas Co., who presented arguments against the proposed increase. Figures were presented showing that at present it costs much more for freight and customs duty on a ton of bituminous coal f.o.b., Toronto, than the actual cost at the mines. It was stated that bituminous coal can be bought at the Pennsylvania mines a $1.30 per ton. The freight rates from the mines to the International Bridge at Niagara Falls is $1.25 and from that point to Toronto 60 cents per ton. The ordinary customs duty is 53 cents and the war tax 10 cents making the total cost at Toronto $3.78. It was contended on behalf of the railways that latterly their expenses had increased enormously but that their revenue was not increasing proportionately. The case is still pending.

Coal Trade Reviews

General Review

Anthracite continues to slow down and price cutting becoming more general. Bituminous agencies are still optimistic though concern is felt over the prevailing low prices.

The current season has witnessed a large falling off in the number of anthracite consumers stocking up at the minimum circular of the year. The difficulty in making satisfactory collections, because of the uncertainty in financial circles is largely responsible for this, the retailers hesitating to push for business on which payments are liable to be long delayed. The market is also badly unsettled because of the low prices, there still being persistent rumors that the large companies are participating in the price cutting, some having openly quoted pea coal at 50c. off the circular. A compensating feature of the situation is the undoubted fact that there must be a tremendous rush in the fall business in order to overcome the deficiency now being developed. While shipments up the Lakes have been maintained in a normal volume so far, the movement out from the Upper Lake ports has slowed down and coal is beginning to back up into the shipping ports at Buffalo.

Aside from the heavy movement in the export trade, the bituminous market has seldom ever been so devoid of interest. The large off-shore business has stimulated some slight interest among local buyers and shippers are confident of a firmer market before very long, while there are some large orders coming up for consideration during the current month. On the other hand there is some concern being expressed over the trend of the market, due to the low prices being quoted on some large city contracts, which have been closed at the minimum figures for a number of years.

An occasional temporary spurt creates renewed hope among Pittsburgh shippers, and the situation averages up as monotonously dull as ever, although the fact that the trade has held its own since the resumption of mining in Ohio is an encouraging feature. The possibility of a labor shortage, due to the extremely light immigration since the inception of the European war, combined with an abnormal exodus of miners leaving to participate in the trouble, is being used to boost the market, but well-informed observers see little hopes for any relief in this direction, so long as the demand is so restricted. Regular circulars are generally maintained, but as is always the case in a dull market, there is more price cutting than normally. No important movement in the Lake trade is anticipated before July. The exceedingly low prices prevailing in the open market are still interfering with negotiations on new contracts in Ohio, and with one of the most important companies announcing it will not start Lake shipping before July 1, the outlook is still discouraging.

One of the most encouraging features in the Middle Western situation is the fact that shippers are effectively curtailing production so that the market is free of demurrage coal. Agencies continue optimistic regarding the future, but the current movement is light, while the situation is further aggravated by poor collections. The recent cool weather has increased the demand slightly and helped mine operations.

BUSINESS OPINIONS

Boston News Bureau—Every day seems to increase confidence in the financial and commercial position of the United States. This is the result of the European war. It looks now as if we should have a foreign trade balance something like $1,000,000,000 June 30, the close of the fiscal year. Against this, including interest on American securities, tourist expenses, freight charges and all other possible offsets, there will remain a net trade balance of fully $500,000,000. The brightest minds see in our remarkable position a situation calculated to arouse the greatest amount of courage and enthusiasm. It must stimulate the initiative. The fact is that this country is making such enormous strides that even our troubles with Germany and Mexico cannot absolutely check the benefit.

Bradstreets—Cool, wet weather over a wide area has reduced retail trade in seasonable goods; pending international political matters, though not given much prominence, make for caution in financial circles, and winter wheat and corn crop reports are not so glowing as heretofore. On the other hand, the larger distributers of staple articles seem to be doing quite well; mail-order trade is large; manufacturing certainly is more active; complaints of a scarcity of skilled mechanics are numerous; business in war materials is rushing; ship-building yards are filled with orders; railway traffic is heavier.

Iron and Steel—The record prices obtained for spelter have made startling changes in the prices of finished galvanized products. An increase of $10 per ton has been made in galvanized pipe and an increase of $5 in galvanized sheets follows one of $7 a ton less than a month ago. Foreign business continues large but there is getting to be more and more difficulty in securing freight room. At the meeting of the Iron and Steel Institute held in New York last week the leaders of the industry spoke enthusiastically about the prospects for business. Rail orders have been larger but the 135,000-ton order of the Pennsylvania has not yet been placed. Sales of steel making iron have been made in Pittsburgh at slightly higher prices. The steel industry as a whole is operated at 75% of the maximum capacity.

Dun's — Steadily expanding industrial operations — due mainly, but not wholly, to the big war demands—have a stimulating effect generally, although the many uncertainties of the foreign situation make for caution everywhere. Hesitancy in new enterprise, however, does not imply any lack of confidence in the future, but rather a disposition to await further developments in regard to this country's diplomatic relations with Germany.

Marshall Field & Co.—Despite unseasonable weather for dry goods distribution, current wholesale shipments are about the same as a year ago. Sales by our traveling organization show an increase over those of the corresponding period last spring. The continued disposition of retailers to anticipate their future sales requirements is resulting in a good volume of fall business. The daily average of buyers in the market has been considerably larger than last year.

Engineering News—The ability of business to withstand the severe shocks which occurred during May, indicates clearly the firm foundation which underlies the general structure. Although the newspapers in the United States are calling attention to the dire possibilities that might result from international complications, there has been no postponement of business already under way—no engineering contracts, as far as can be learned, have been postponed for this reason—and while there was a temporary halt in the volume of new business, this has almost all disappeared and increased activity is making steady headway. As far as the general business situation is concerned, it was better on June 1 than on May 1. More men are at work, more projects are planned, and there is more confidence that business this year will show a steady gain. Contracts for certain commodities have been made for delivery well into 1916, and the business world is taking a long look ahead.

ATLANTIC SEABOARD

BOSTON

Buyers show more interest in market. Export demand tends to harden prices. Less "market coal" and better conditions on cars. Georges Creek in good position. Anthracite shippers have a supply of June orders.

Bituminous—All the agencies are still talking confidently of a firmer market and there is more interest on the part of buyers than for two months. There has not been any buying of consequence but there are likely to be some good-sized orders placed during the current month. Meanwhile, the export business is helping to keep down accumulations at the Hampton Roads and Baltimore piers. The latter port is having its full share of the off-shore business and when clearances are too slow for coastwise boats the shift is made to

Norfolk and Newport News. In this way, all interests are deriving some benefit from the foreign demand. Prices are not changed from last week but there is a little more life to the market, $2.75@2.80 is now about the lowest price at which standard Pocahontas and New River can be had.

"Market cargoes" are less in evidence here and the on-car price is somewhat firmer; $3.70@3.75 is now the ruling price on small lots for delivery inland. In some quarters there is beginning to be some concern over the possible trend of the market next winter. This is particularly true in the local city market where prices have lately been the lowest in years on account of certain local complications.

The output of Georges Creek is still being confined largely to Baltimore for foreign tonnage but small consignments are coming forward via Philadelphia and New York. There is practically none of this grade available for spot shipment and each cargo arriving here has a consignee awaiting it.

There is a slight improvement noticed in the demand for the better Pennsylvania grades, due in large part to the better situation on the Southern coals. No strengthening in prices is apparent as yet but as the market at Hampton Roads gets firmer there is naturally more interest in the Cambrias and Somersets that compete under such conditions.

Water Freights have so far shown no firmer tendency; it is easy to charter at 75c. Hampton Roads to Boston, on barges 1500 tons and upwards. On Long Island Sound the minimum rate of 40c. still prevails for New York loading.

Anthracite—The curtailment is showing results. Several of the companies have carried orders over into June. While barges are not all in use there is a fairly constant movement, especially from Philadelphia. Some of the smaller shippers are just now clearing cargoes on which there was some assurance of April loading. Dock screenings continue in short supply but steam sizes are everywhere available for spot shipment.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.75@2.85
Boston†	....	....	....	3.70@3.78
Providence†	....	....	....	3.60@3.73

* F.o.b. †On cars.

PHILADELPHIA

Anthracite very dull over the month end. Mining operations restricted and trade badly unsettled. Price cutting spreading to the leading companies.

Anthracite—The last week of May opened with little prospect of increased tonnage. However, a cool spell unprecedented in the annals of the weather bureau stimulated a few orders. Outside of this the trade shows a tendency to lag more than is usual even at this dull period of the year. Many of the collieries continue on short time and the indications are that the working schedules will soon be even more restricted.

Retail dealers complain of poor collections, which has resulted in their not pushing sales of domestic sizes for delivery at this time. The market continues badly unsettled by the low prices prevailing; it is even being suggested that some companies, long known for their rigid adherence to the regular circular, have deviated from their usual course in this respect.

Retail dealers are strongly averse to stocking up at the low prices and many of them openly state they have good reason to believe they will be able to buy two or three months from now at prices as low as the present and possibly lower.

Stove coal seems to be in the most active demand. Broken is well taken care of, as most of this size is sold on contract to large consumers such as gas companies, iron manufacturers, etc., and it is feared in some quarters that it will be very difficult for some operators to fill their contract orders on this size owing to restricted mining. The demand for egg is weak, while chestnut, along with pea and the other small sizes, are going begging. The large companies are asking $2 for pea although the circular price is $2.50, but the individuals are making sales at 15c. to 25c. under the $2 figure, and it is noted in at least one instance where pea has sold for as low as $1.60.

Considerable interest is centered this week on the bids for supplying coal to the public schools; bids are requested on about 37,000 tons of pea and 19,000 tons of prepared sizes. The price at which this coal is taken is always interesting and it is feared in some quarters that certain dealers who are becoming especially noted for low prices, anticipating a particularly dull summer, will take the business without profit, being content with a hauling charge to keep their equipment in action. There was also a rumor abroad that some of the large mining companies would bid on the business direct, as was their custom some years ago, but it is not likely that this will eventuate.

The prices for June have just been issued and there will be the customary advance of 10c. per ton on the prepared sizes, which makes the prices for delivery this month as follows:

	Line and City	Tide
Broken	$3.20	$4.45
Egg	3.45	4.70
Stove	3.70	4.70
Nut	3.85	4.95

NEW YORK

Some accumulation at New York Harbor and bituminous market maintained with difficulty. Anthracite dealers stocked up and mine operations much restricted. No improvement anticipated before fall.

Bituminous—Increased demands by contract holders has aided the soft coal situation materially and conditions are better than in some time. There has been a slight improvement over last week, much of which is attributed to the demands on American manufacturers from the countries engaged in the European struggle. A stronger market is looked for with better prices.

While operators are endeavoring to keep shipments within the consumption, the docks in New York harbor continue to be well stocked, but the surplus coal has not been sufficient to cause any serious trouble. The mines in the Central Pennsylvania and Pittsburgh districts are working a trifle better. Operators in the southern West Virginia and Kentucky regions are experiencing some labor trouble. Car shortages continue on some of the railroads but are not serious enough to cause any extended trouble. The bunkering business has improved some while shipments to New England points have increased.

Demurrage coal is scarce. The demand for spot coals has not been active. Some job lots of good Pennsylvania coals have gone at $2.40 to $2.45.

The export demand continues to be the feature of the market. With inquiries increasing shippers are having trouble in getting bottoms. Few boats are to be had and rates have stiffened. An inquiry has come from Spanish interests for 100,000 tons, and a crucible company in Italy is reported to be in the market for American coals, willing to take a few cargoes on trial. It is also stated that the Swedish railways have about closed negotiations for 300,000 tons at an f.o.b. rate.

Quotations on the various grades are as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.30@3.40	$3.30@3.40	$3.30@3.40	$1.75@1.85
Georges Creek Tyson	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.55@2.65	....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	....	....	1.35@1.50
Nanty Glo	2.75@2.80	....	....	1.20@1.25
Barnesboro	2.65@2.70	....	....	1.10@1.15
Somerset County:				
Quemahoning	....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe	2.45@2.55	....	....	0.90@1.00
Greensburg	2.75@2.80		....	1.10@1.15
Westmoreland	2.95@3.20		....	1.15@1.40
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	0.70@0.80
Steam		2.45@2.50	2.45@2.50	0.90@0.95
Western Maryland		2.35@2.45	2.35@2.45	0.80@0.90

Anthracite—The anthracite coal market shows no improvement. Demand has fallen off and no betterment is looked for until fall. Most dealers are stocked up and operations continue slow. Many of the mines are not working more than half time while others are endeavoring to do a trifle better. Advance estimates for May indicate a falling off of about a quarter of a million tons from the shipments of May, 1914.

Individual operators are curtailing their production and it is probable that they will endeavor to strengthen the market by keeping stocks down. Some of their coals were quoted at from 30 to 40c. below companies' circular, but even at those figures there was no rush of buyers. Some of the larger sizes are still quoted at less than April circular.

Nut coal is longest with some shippers and short with others. Stove is generally bringing the full circular. Line trade for these sizes is quiet. The weakness in the steam coals has not improved. Prices remain about the same as last week, with pea coal quoted in odd lots at about $2.75 f.o.b. Buckwheats are in heavy supply with No. 2 in better condition than the other sizes.

Quotations are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.75		$4.80	
Egg	5.00	$4.80	5.05	$4.85
Stove	5.00	4.80	5.05	4.85
Chestnut	5.25	5.00	5.30	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	2.00@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

OCEAN FREIGHTS

Freight conditions are practically the same as a week ago and although numerous steamers have been chartered during the interval for export coal, the freight rates paid were about those quoted in our last report. We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$2.00@2.25	Bermuda	$3.50@3.75
Cardenas or Sagua	3.00@3.25	Vera Cruz	**3.50**
Cienfuegos	2.75@3.00	Tampico	**3.50**
Port au Spain, Trinidad.	3.75@4.00	Rio	8.64@8.76
St. Lucia	3.50@3.75	Santos*	8.88@9.12
St. Thomas	**3.25**	Montevideo	**7.92**
Barbados	3.75@4.00	Buenos Aires or La Plata	8.04@8.16
Kingston	2.75@3.00	Rosario	8.40@8.64
Curacao	3.75@4.00	West Coast of Italy	**10.80**
Santiago	2.75@3.00	Spain**	9.60@10.20
Guantanamo	2.75@3.00	Valparaiso or Callao	**7.20**
Demerara	5.00@5.50	Marseilles	9.60@10.20

Note—Rates noted in **bold face** type are only approximate.
* Consignees paying dock dues. **Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

HAMPTON ROADS

Export movement lighter than anticipated. Prices well maintained. Monthly tonnage large.

Coal shipments foreign have not been so heavy as was anticipated, though the movement coastwise has been fair. The number of bunker steamers calling at Hampton Roads has been normal and in a majority of cases they have taken exceptionally large quantities. The accumulation of coal at Tidewater is still somewhat large but there is quite a large fleet of barges and schooners due which should considerably reduce the tonnage.

Prices on New River and Pocahontas are practically the same as they have been for some weeks although there may be a few cargoes which have been sold at a concession. The government has taken coal during the week some of which was loaded for the Naval Station at San Francisco. The indications are that the dumpings for Hampton Roads ports will not be so heavy as was anticipated during the first half of the month but in any case it is expected they will be close to 1,250,000 tons.

The following vessels have cleared from Hampton Roads during the past week:

Norfolk

Vessel	Destination	Tons
August[1]	Genoa	8079
Songa[2]	La Plata	3788
Mariongo Goulandris	Savona	5084
Mar Cor[1]	Genoa	4950
John B. Biemiller	Canary Islands	1542
Dinnamare[1]	Naples	4904
Woudrichem	Buenos Aires	3304
Thorsa[3]	Manzanillo	1447
Frey[1]	Las Palmas	2100
Den of Crombie	Leghorn	7280
Chiswick	Canal Zone	4800
Catherine V. Mills	Fayal	380
Strathalbyn	Dakar	6750

Norfolk

Vessel	Destination	Tons
Antares	Havana	2837
Geo. E. Walcott	Para	2850

Newport News

Vessel	Destination	Tons
Vesuvio	Genoa	7200
Harald	Barbados	4500
Adelaide Barbour	San Juan	1788
Exford	Marseilles	7500
Italiana	Genoa	3657

Note—Steamers are indicated by **bold face type**, all others being schonners.

[1] Pocahontas Fuel. [2] Northern Coal Co. [3] Castner, Curran & Bullitt.

Railroad Tonnages—Dumpings over the local piers for the past several weeks were as follows:

Railroad	Week Ending May 1	May 8	May 15	May 22	May 29
Norfolk & Western	......	208,179	151,113	162,921	146,462
Chesapeake & Ohio	60,967[1]	88,609[2]	80,045	84,286	83,678
Virginian	65,099	45,116	57,903	39,431	61,688
		341,904	289,061	286,638	291,828

[1] Week ending Friday. [2] Nine days.

BALTIMORE

Anthracite consumers fail to buy at the low-price period. Bituminous exports continue heavy, and May will break all records. Other business continues quiet.

There has been a large falling off in the number of consumers to take advantage of the low schedule of anthracite prices. Buying is confined almost entirely to immediate needs only. Scarcity of money seems to be the chief trouble, although collections have not been particularly bad.

Low grade Pennsylvania coals are offering at 95c. and $1, while the less desirable steam coals of Maryland and West Virginia bring around 80 and 85c. at the mines to the trade. Best coals are being held closer, as they are more fully covered by contracts. Medium grade fuels are offering at from $1.10 to $1.20, with best coals at $1.25 to $1.30.

The following charters were announced the past week:

Vessel	Nationality	To	Rate
Wondricken	Dutch	River Plate	$7.56
Gledhow	British	River Plate	8.76
Filomachi	Greek	West Coast of Italy	
Honiton	British	River Plate	
Julia Park	British	River Plate	8.16
Adriatic	British	West Coast of Italy	10.80
Ambon	Dutch	Alexandria, Egypt	
Dalton	British	River Plate	
Lalnishen	British	West Coast of Italy	
Nina	Italian	West Coast of Italy	
Good Hope	British	West Coast of South America	
Antoinette Acme	Italian	Genoa	
Fairport	British	Genoa	
New Sweden	Swedish	Gothenburg	

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
New Sweden	Swedish	Baltimore	Gothenburg	3287	
Thelma	Norwegian	Newport News	Cardenas	846	
Eleanor A. Percy		Philadelphia	Boston	3062	
Morazan	British	Baltimore	Valparaiso	2213	
Dunachton	British	Baltimore	Montevideo	3311	$8.28
Ontaneda	Spanish	Baltimore	Montevideo	2232	
Aldgate	British	Baltimore	Rio Janeiro	2294	8.88
Styliani Bebis	Greek	Baltimore[1]	Italy[2]	2216	10.80
Wardha	Italian	Baltimore[1]	Tarranto	2426	
Westlands	British	Baltimore	Alexandria	2001	
Moldegaard		Philadelphia	Havana	1788	
Perry Setzer		Baltimore	Mayport	1268	
Dalton	British	Baltimore	River Plate	2263	
Ambon	Dutch	Baltimore	Alexandria	2806	
Kariba	British	Virginia	Buenos Aires	2350	8.04
Warrior	British	Virginia	Buenos Aires	2394	
Honiton	British	Baltimore	River Plate	3011	
Filomachi	Greek	Baltimore	Italy[2]	2146	10.80
Good Hope	British	Baltimore	South America[2]	2308	
Edward H. Cole		Philadelphia	Rio Janeiro	1395	
Florance Creadick		Hampton Roads	Cardenas	657	2.75
Edward H. Blake		New York	Dartmouth, N.S.	484	1.65
Jessie Ashley	British	New York	St. Andrews	122	1.75
Genevieve	British	New York	Dorchester	124	1.75
Ponhook	British	Philadelphia	Liverpool, N.S.	198	
D. W. B.	British	Philadelphia	St. John, N.B.	96	1.50

Note—Steamers are indicated by **bold face type**, all others being schooners.
[1] Or Virginia. [2] West Coast.

LAKE MARKETS

PITTSBURGH

Conditions generally unchanged. Manufacturing demand slightly improved. Operations at 50 to 60% of capacity. No labor shortage feared.

Little, if any, improvement is to be noted in the general coal situation in the Pittsburgh district. Perhaps, however, the trade would be doing well enough to hold its own for the time being, since the general resumption of mining operations in Ohio after the long deadlock. Lake shipments are still far from heavy and not much increase is expected in the near future, though July may see a fairly heavy tonnage. The Lake movement as a whole is practically certain to prove a poor one.

There is no domestic demand to speak of. Railroad requirements have increased slightly, and there has been a barely perceptible increase in the requirements of manufacturing consumers, chiefly in the iron and steel industry. A further improvement in this direction is predicted. Mines continue to operate at an average between 50 and 60% of capacity. While immigration has been extremely light since the war started, and indeed was quite light for a couple of months preceding, there seems to be no possibility of any labor shortage in the coal mining industry in the Pittsburgh district. There is much talk of a prospective shortage in steel mill, blast furnace and coke-oven labor if the trade revives further as is expected.

Mine-run on contracts to Apr. 1 next is largely nominal at $1.15. Free coal is practically unchanged, prices generally being about as follows: Slack, 55@60c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Very little improvement in bituminous and none at all in anthracite. Every prospect of a light summer. Considerable coal here on track. No really good business till manufacturing starts up.

Bituminous—An occasional jobber will report a little better trade, but as a rule it does not hold. The general opinion now is that there will be no stir of any account till midsummer, if then. At the same time there is no real distress shown anywhere. As is always the case when the volume of business is not satisfactory there is more cutting of prices than there would otherwise be the case but quotations remain at $2.70 for Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack. Allegheny Valley sizes are about 25c. lower than Pittsburgh.

Anthracite—The unusual dullness is remarked by everybody. Reports from the Western trade indicate a great part of the coal shipped to that territory this summer will remain on the docks till winter. A liberal amount is moving by Lake, but this is due largely to the difficulties at one dock that has suspended operations once or twice this season by Government order and may be shut down again almost any time on the same account. It is not at all certain that the pace can be maintained, as these shipments are probably more than the Western market will need for the winter. The week's shipments were 96,000 tons.

The local anthracite market is as dull as ever, with no prospect of improvement right away. It appears that the increased amount of independent anthracite in this market has had much to do with the dullness.

COLUMBUS

Domestic and steam business continues quiet and Lake trade is still slow. Difficulty in renewing contracts is still evident.

Operators and jobbers believe that there will be a better demand in the latter part of the year but so far the demand has not come up to expectations.

The domestic trade is still slow but that is expected at this time of the year. Some demand is reported for the fancy grades such as Pocahontas and West Virginia splints. Anthracite is also selling well for this early in the season. Retail prices are generally well maintained at the levels which have prevailed for the past month. On the whole the domestic trade is at a standstill but preparations are being made for a rather active season in July and August. Some demand from the rural districts is expected in the near future.

The steam business is also quiet as manufacturing is still slow. Outside of munitions manufactures, there is only a small demand for steam fuel. Difficulty in renewing contracts is reported on all sides because of the extreme low prices offered in the open market. The railroad demand is not increasing as anticipated.

Lake trade is still slow but it is yet too early for much of a movement towards the Northwest. The Sunday Creek Coal Co. will not start shipments until after July 1. Chartering of boats is slow and charters do not extend for any great length of time. Reports from the Upper Lake ports show a large amount of coal still on the docks.

Some concern is felt over the labor situation in Ohio since the entrance of Italy into the world war. A large number of Italians are leaving for service in the army and it is believed this will have a marked effect on the mining situation in Ohio.

Mining operations are on about the following basis:

District	Week Ended		
	May 15 Per Cent.	May 22 Per Cent.	May 29 Per Cent.
Hocking Valley	25	25	30
Jackson	25	25	20
Pomeroy Bend	50	50	45
Crooksville	25	30	35
Cambridge	35	30	35
Massillon	40	35	35
Eastern Ohio	....	5	15

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	.70	.75	.65
Coarse slack	.60	.70	.55

TOLEDO

Favorable crop outlook and recent heavy war orders are the features of an otherwise dull market.

Domestic buying is light although aided some by the chilly weather which has prevailed here for the past couple of weeks. There is some demand for threshing coal which will of course increase as the season advances; crops are reported in the best possible condition throughout this section and more than the usual acreage was planted. There is no Pocahontas coal to be had on the local market, especially in the prepared sizes. There is a slight movement of lower grade smokeless coals of which there is a plentiful supply. Pittsburgh No. 8 is not yet much of a factor in the market.

War orders were recently placed in this city amounting to more than a million and a half of dollars, which have forced the enlargement of a couple of local factories and will have a beneficial effect on the market. Cambridge is selling fairly well. Prices are for the most part being well maintained as respects the list although they are at rock bottom. Contracts are still a little slow and the movement of Lake coal continues sluggish. Prospects for a good season later on are considered good and the trade seems content and is doing little worrying.

CLEVELAND

Spot prices rule low and buyers take coal at their own figure. Lake shippers plan to increase the movement this month.

Buyers continue to take advantage of the weak market that continues heavy in spite of the light receipts. Fine coal has sold as low as $1.55, but the market generally rules 5 to 10c. higher. The difference between what jobbers have to pay and the market for spot coal excludes buying for current shipments. Most of the coal coming in is on contract except some coarse coal, which is sent on consignment.

The Lake shippers plan to move a little more coal this month than last. The shipping season will not be normal for two months yet but the movement by that time will be up to last year. The buying for threshing will commence in the Northwest the latter part of this month. Ore shipments are expected to be larger after the middle of the month because freight rates from the ranges back of Duluth-Superior and Two Harbors were reduced 5c. a ton effective June 1. A number of buyers have postponed orders until June 1 for this reason. This will increase the demand for railroad and mining fuel.

Vessels were held over Saturday and Monday to get coal cargoes. Tonnage is exceedingly plentiful and will continue so the next 30 days.

Jobbers are paying the following prices for shipment:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	....	......	....	....
Lump, ¾ in.	.....	$2.20@2.25	$2.00	$1.80@1.85	$1.75@1.85
Egg	3.10	....	......	....	....
Mine run	2.65@2.70	2.10	1.85	1.85@1.90	1.75@1.85
Slack	......	1.65@1.70	1.60	1.65@1.70	....

CINCINNATI

Contracting in both steam and domestic coals continues slow and at low prices.

The tendency noticeable to delay buying as long as possible, and then to buy only in small quantities, is still the outstanding feature of the coal market. Instead of taking advantage of the situation to accumulate stocks on very attractive terms, consumers evidently prefer to fill current needs with the cheap spot coal offered, deferring contracting with an evident hope of still lower prices. The Lake movement is not developing as expected, although it is more brisk than at first.

LOUISVILLE

River shipments beginning to arrive but otherwise the trade is devoid of interest.

Nominally the coals for the domestic trade advanced 10c. on June 1, $1.40 for four-inch lump being the base price. Whether this advance will be maintained in actual transactions is generally doubted. Kentucky operators and dealers are looking to the opening of the Lake trade to relieve at least some of the competition from the sections which reach that market. The stocking operations among the retailers are as yet not proceeding in a satisfactory manner. Steam coals show virtually no change.

The first shipments of coal from Pittsburgh since the first of March are now reaching here, the vanguard of some 13 tows, with a total of 244 coal boats and barges laden with nearly a quarter of a million tons. It was estimated in reports from Pittsburgh that three million tons have accumulated in the local pools awaiting a stage of the river which would permit shipments south. The heavy rains of the last two weeks have given this stage, after three months of what was practically drought.

BIRMINGHAM, ALA.

Steam coal shows slight improvement but domestic grades continue very quiet.

The past week has brought no relief for the lump coal situation, the demand being about as near to nothing as it could be. In fact, there is less business being done on this grade than at any time during the past two years. Steam coal is in better shape, though the tonnage moving is not up to normal though it seems to be improving, both locally and on bunker business. Many of the mines which have been closed down for the past six months are now operating, though only about three days a week, while the average throughout the district is from three to four days a week. Coal is being moved down the Warrior River to Mobile and New Orleans since Lock 17 was officially opened on May 13.

COKE

CONNELLSVILLE

Foundry coke moderately active. Furnace coke very dull but with operators holding slightly firmer views. Production and shipments make new records for this movement.

There continues to be a fair volume of contracting for foundry coke, chiefly for the twelvemonth beginning July 1, though some operators are making an effort to limit contracts to six months, expecting better prices later, for delivery after Jan. 1. The regular contract price for standard high grade foundry coke is $2.40, and the leading operators seem to be adhering to this price. Less favorite brands may be had down to $2.20. There is moderate buying of foundry coke for prompt shipment, particularly by those who contemplate the possibility of changing brands with their new contracts. According to grade prompt foundry is bringing $2 to $2.40.

Furnace coke is dull and inactive as to both prompt and contract. It appears that few contracts are to run out June 30, and as yet few idle furnaces contemplate going into blast. The views of operators, however, are a shade stiffer. We quote furnace coke at $1.50@1.55 for spot shipment in small lots, $1.60 to July 1 and $1.75 for shipment to Jan. 1.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 22 at 306,691 tons, an increase of 9137 tons, and shipments at 305,047 tons, an increase of 9080 tons. These figures exceed the best previous records on this movement by 7198 tons in the case of production and by 1670 tons in the case of shipments.

Buffalo—The coke trade is as dull as ever, waiting as formerly on the movement of iron. It would seem that the demand for coke is even lighter than anything in iron and the amount of iron ore coming down the Lakes is not large, apparently nothing being done that anticipates a large fall trade in iron or even a guess that there will be a revival of demand next winter. The quotations remain on the basis of $4.15 for best 72-hr. Connellsville foundry, with $3.15 for stock coke.

Chicago—Country dealers show an inclination to stock up on domestic sizes, and some improvement is noted in furnace and foundry demand. Market prices are about the same as last week, being as follows: Byproduct, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

MIDDLE WESTERN

GENERAL REVIEW

Buying slow and prices do not advance. Screenings continue firm. Pocahontas and smokeless coals strong. Anthracite demand below normal.

Screenings have continued on about the same level as a week ago, prices averaging about 85c. to 90c., although toward the close of the week they showed a slight softening. No perceptible increase in the consumption of fine coal by manufacturing plants has been evidenced. The insignificant demand for coarser sizes results in a reduction in the output of all grades, which in turn contributes to the maintenance of high prices on screenings.

The volume of coal taken by the retail yards is still below normal. The consumer buys only for his immediate needs, and no orders are being placed for storage purposes. The dealers are still finding more or less trouble in making collections some of their unpaid accounts being as far back as last fall, and this has doubtless made them hesitate about placing orders with shippers. As a result of last year's experience country dealers in many cases are showing no disposition to make contracts preferring to take their chances in the open market this fall and winter and shippers are not pressing them to change from this attitude. It is anticipated that storage business will not open to any considerable extent before June 15 and in many cases later.

CHICAGO

Movement light in all directions but an improvement anticipated soon. Prepared grades of West Virginia in fair demand and Hocking coals also improving.

Southern Illinois producers report a slight increased buying from Western sources for domestic sizes for early delivery. Screenings from Franklin and Williamson Counties are scarce and bring high prices. Carterville washed sizes are strong, but raw screenings are weak, having been offered in the Chicago market recently at as low as 75c. per ton. The situation with respect to coarse coals from these districts is expected to improve slowly but surely from now on.

No change has occurred in the Springfield district. The minimum amount of railroad coal is moving, while there is a strong demand for screenings, shippers not being able to fill all the orders received.

Indiana coals are flat except screenings, for which the demand has been strong until the latter part of the week, when some softness was noted. Some contracts for screenings have been closed at the same figures as last season.

West Virginia smokeless in the prepared sizes is strong, but weak on mine-run, which has been quoted as low as $1 per ton in the Chicago market. Retailers are showing more eagerness to close contracts. Splint coals are dull and prices inclined to be weak. Some consignment coal has been moved at whatever prices it would bring. Pennsylvania smokeless grades are becoming stronger, and the retail trade is commencing to place more orders for these coals.

Eastern Kentucky fuels are inactive with prices most variable. It is not thought that an increased demand for these grades will be felt before late in the summer.

The movement of Hocking coal is light but it is held at fairly firm prices. Shipments are commencing to move in larger quantities via the Lakes, which is having a beneficial effect. It is reported a few contracts have been closed.

The end of May saw improved buying of anthracite. Prices are well maintained, and little free coal has moved into this district. Curtailment of anthracite production is evidently having a good effect on the Western situation.

The market is quotable as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Greene Co.
Lump......	$1.25@1.35	$1.25@1.35	....	....	....
4-in. lump..	....	....	$1.35@1.40	$1.30@1.40	....
Steam lump	1.15	1.10@1.25	1.25@1.30	1.10@1.25	....
2½-in. lump.	....	....	1.20@1.30	1.20@1.30	....
1¼-in. lump.	....	....	1.15@1.25	1.05@1.20	....
Mine-run...	1.10@1.25	1.00@1.10	.90@1.10	1.00@1.10	....
Egg........	1.15@1.35	1.15@1.25	1.10@1.25	1.00@1.15	....
No.1washed	1.20@1.35	....	1.50@1.60	....	....
No.2washed	1.25@1.35	....	1.60	....	....
6x3-in. egg.	1.20@1.35	....	....	....	....
Nut.......	1.10@1.25	1.05@1.25	.95@1.05	1.00@1.05	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.20@1.35	....	....	....	....
Screenings..	.90@1.00	.85@ .95	.75@ .80	.85@ .90	....

	Harrisburg Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.35	$1.25@1.40	$1.70	$1.35@1.65	$1.50@1.60
1¼-in. lump.	1.15@1.25	1.15@1.25	....	....	1.15@1.35
Mine-run...	1.10	.95@1.10	1.00@1.25	1.00@1.15	....
Egg........	....	1.00@1.10	1.70	1.35@1.65	1.25
Nut.......	..	....	1.40	1.35@1.45	1.15@1.25
Pea........		..	1.35	....	....
Screenings..	.90@1.00	..	....	....	....

Knox and Greene County, 5-in. lump, $1.15@1.25; 3-in. lump, $1.15; 5-in. egg, $1.15; 3-in. egg, $1.10@1.15; mine-run, $1@1.05; screenings, 75@85 cents.

INDIANAPOLIS

Business quiet but with a fair undertone.

The cool weather in May created a market for domestic grades that is unusual so late in the season, though it was not extensive. Most of the mines in operation are making good time though others are closed down entirely. Unless the unexpected happens industrially and commercially, the trade will remain at a steady level. The educational institutions will soon begin ordering their season's supplies, to be delivered in June, July or August, during the vacation period; July and August also bring a demand from the threshers. In August the retailers begin to give their first orders and manufacturing plants to accumulate their winter surpluses. The factory demand continues to show a slight improvement. There is good call for slack, at 85c. for Nos. 5 and 6 and 90c. for No. 4. Prices at the mines continue at the summer level.

ST. LOUIS

Retail trade good but the wholesale business is at a standstill. High river stage releases Pittsburgh coal and closes the Southern markets to St. Louis agencies.

The local market is practically at a stand-still. Some Carterville coal is beginning to move into the country, and screenings seem to be in demand. Standard grades are bringing 85 to 90c., and Carterville is strong at 95c. Carterville lump has been selling at $1.05 to $1.20 during the past week, and Franklin County is still held at $1.25. Standard 2-in. lump is quoted 77½c. at the mines, or rather that is the price made by the recently formed selling agency; the better grades of Standard coal are bringing $1 for 2-in. lump and $1.10 for 6-in. lump.

In a retail way conditions are about normal. What coal is moving in wagon-load lots is bringing a good price. During the past week the ice business dropped off considerably, and with just a small amount of coal being ordered, the retailers have found things rather slow.

There will be a dropping off in the tonnage of Illinois coal moving south to river points, which has been unusually heavy for the past two months or more. Low water in the Ohio River tied up Pittsburgh coal, but the recent rains released 13 tows of 244 barges laden with about 214,000 tons.

KANSAS CITY

The wholesale business has increased during the week and the shipments of coal are coming in faster every day. The retail trade has shown a slight change for the better, owing to the fact that the weather has been decidedly cool. Delays in shipments have occurred owing to the high water all through the river sections of Kansas and Missouri.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN

Destination of shipments over this road for April of this year, the four months of this year and last year were as follows, in short tons:

	April		Four Months	
Coal	1914	1915	1914	1915
Tidewater, foreign	188,513	365,874	617,185	753,317
Tidewater, coastwise	323,280	216,087	1,315,143	1,052,009
Domestic	1,605,493	1,618,590	5,929,365	5,807,936
Coke				
Tidewater, foreign	......	1,122	15	2,959
Domestic	86,918	76,450	404,587	284,537
Total	2,204,204	2,278,123	8,266,295	7,900,758

VIRGINIAN RAILWAY

Shipments over this road for March of the current year amounted to 309,427 short tons as compared with 344,139 during the preceding month.

RATE DECISIONS

I. C. C. No. 6001—Basin Supply Co. vs. Texarkana & Ft. Smith Ry. Co.

1. The carrying of coal for use as fuel and to be consumed by a vessel engaged in coastwise or foreign trade does not constitute a coastwise or export movement of the commodity.

2. Defendant's demurrage regulations relative to the free time allowance on bunker coal at Port Arthur, Tex., not found to be unreasonable or unjustly discriminatory. Complaint dismissed.

Investigation and Suspension Docket No. 475—Bituminous coal rates to Baltimore, Md., and other points.

1. Proposed increases in rates for the transportation of bituminous coal from mines in Pennsylvania, Maryland, and West Virginia to Philadelphia, Penn., Wilmington, Del., and Baltimore, Md., for transshipment to points inside the capes of the Delaware and Chesapeake bays not justified. Tariffs naming the increased rates required to be canceled.

2. If rail carriers be permitted to establish rates in connection with water carriers upon a basis which will equalize shippers at various points along the waterway, they will absorb the benefit which should accrue to the public of the lower cost of water transportation.

I. C. C. No. 6617—Application of the Spokane, Portland & Seattle Ry. Co., under the provision of section 5 of the act to regulate commerce, as amended by section 11 of the Panama Canal Act, in connection with the operation of the Dalles, Portland & Astoria Navigation Co.

On petition of the Spokane, Portland & Seattle Ry. Co. under section 5 of the act, as amended by the Panama Canal act, for a temporary extension of time during which petitioner may retain ownership of the Dalles, Portland & Astoria Navigation Co.; **Held—**

1. That the Dalles, Portland & Astoria Navigation Co. does and may compete with petitioner's rail line.

2. That the continued ownership by petitioner of the Dalles, Portland & Astoria Navigation Co. would not be in the interest of the public and of advantage to the convenience and commerce of the people, and that it would exclude, prevent, or reduce competition on the water route here considered.

3. Petition denied, effective June 1, 1915.

I. C. C. No. 6976—Daly Coal Co. Et al vs. Chicago & Alton R.R. Co., Et al.

Rates on bituminous coal from mines in Illinois and Indiana to St. Paul and Minneapolis, Minn., not found unreasonable. Complaint dismissed.

FOREIGN MARKETS

GREAT BRITAIN

Difficulty in obtaining privilege to export. Considerable business going to American operators.

Attention naturally still centers on the Government prohibition of unlicensed coal exports and the method of issuing licences. There is no doubt that the restriction of exports from this country is greatly stimulating the demand for American coal, particularly for shipment to Italy. So far as the North-East Coast is concerned, the refusal of licences puts a check on any expansion of trade with Scandinavian countries, on which many of the collieries are greatly dependent. Difficulty in securing licences has also been experienced in South Wales markets. We understand that the Norwegian State Railways have now contracted for their supplies of steam coal over the summer months. The original inquiry was for 40,000 tons, but the quantity contracted for is now stated to be 80,000 tons. Tenders for the Swedish State Railways are said to have been prepared on the basis of about $6 a ton f.o.b. for best Northumberland steams, subject to licence.—"The Iron & Coal Trades Review."

May 21—Business is on rather quiet lines and prices are lower. It is anticipated, however, that an improvement will shortly set in. Quotations are approximately as follow:

Best Welsh steam	Nominal	Best Monmouthshires	$7.92@8.04
Best seconds	Nominal	Seconds	7.44@7.68
Seconds	$7.44@7.92	Best Cardiff smalls	5.04@5.16
Best dry coals	8.40@8.88	Cargo smalls	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is quiet and rates have further weakened. They are approximately as follow:

Gibraltar	$4.80	Naples	$5.76	St. Vincent	$4.56
Marseilles	5.79	Alexandria	5.28	Rio de Janeiro	6.60
Algiers	5.79	Port Said	5.28	Monte Video	6.00
Genoa	5.76	Las Palmas	4.32	River Plate	6.24

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Italy—An American consular officer in Italy reports that a firm in his district desires to communicate with American exporters of bunker coal.

Canada—A report received from an American consular officer in Canada states that a business man in his district is undertaking to establish a rather extensive coal business. Prices on a good quality of anthracite coal, quoted f.o.b. shipping point, are desired. The man states that the initial orders will probably amount to 1000 to 1500 tons. (No. 16,959.)

Great Britain—The British coal freighters "Glenmoroen" and "Therese Heymann" have both been posted at Lloyd's as among the victims of the German raiders. The "Glenmoroen" of Leith sailed from Tyne for Leghorn on Dec. 26, and the "Therese Heymann" of London sailed from the same port for Savona, Dec. 25.

Spain—An American consular officer in Spain transmits the names and addresses of a number of leading coal importers and merchants in his district. Correspondence should be conducted in Spanish.

Italy—A firm in Italy informs an American consular officer that it desires to communicate with American manufacturers and exporters of coal. Correspondence may be in English. References are given.

Buenos Aires—The mayor of Buenos Aires has addressed a note to the Minister of the Interior asking to be informed whether the Comodoro Rivadavia Exploitation Committee could supply the municipality with 3500 tons of petroleum fuel annually. The various power installations of the municipality consume 5000 tons of Cardiff coal yearly, which at $12.75 per ton comes to $64,000 per annum. It is anticipated that the substitution of the Comodoro Rivadavia oil would result in an annual economy of $30,000. The modifications in the boiler installations that this change of fuel would necessitate are being studied.

Spain—Madrid newspapers feature offers made by American exporters of coal. The list of firms interested in coal, which was furnished by the consulate to the Ministry of Treasury, is published with the following statement from the ministry: The United Statess offers to sell or send to Spain as many shiploads of coal as may be necessary. The price of this coal c.i.f. Spanish port, according to information at hand, will be between 64 and 65 pesetas (about $13.12 and $13.32) per long ton.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let Section on Page 38.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page (all in Vol. 7) on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
508	Supt. of Supplies	Philadelphia	Penn.		955
679	Board of Education	Dayton	Ohio	6000	955
691	Watervliet Arsenal	Watervliet	N. Y.		877
728	Board of County Comrs.	Bryan	Ohio	125a	916
733	Bd. of Control and Supply	Providence	R. I.		917
735	Board of Education	Davenport	Iowa	2900b	917
755	Board of Education	Lakewood	Ohio	2000b	917
776	Board of Education	Ridgefield Park	N. J.	300a	956
778	Mich. Home and Training School	Lapeer	Mich.	7000b	956
778	Mich. Home and Training School	Lapeer	Mich.	100a	956
779	Electric Light Plant	Onawa	Iowa		956

a Indicates anthracite coal. b Indicates bituminous.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

✚No. 486—Boston, Mass.—Bids have been received on this contract (Vol. 7, pp. 665, 915), which provides for the Massachusetts hospitals, as follows:

Bidders	Boston State Hospital, 6500 tons	Boston Psychopathic Hospital, 1500 tons	Danvers State Hospital, 6500 tons	Foxboro State Hospital, 2000 tons	Gardner State Colony, 800 tons	Grafton State Hospital, 3000 tons	Medfield State Hospital, 6000 tons	Monson State Hospital, 3400 tons	Northampton State Hospital, 1500 tons	Taunton State Hospital, 2000 tons	Waverley School for Feeble-Minded, 3000 tons	Westboro State Hospital, 5000 tons	Worcester State Hospital, 5500 tons	Wrentham State School, 2000 tons
E. Russell Norton			....	$4.20	$4.32		$4.19	$4.01	$4.12	$3.56	$3.55	$4.38	....	$4.19
H. N. Hartwell	....		4.17	4.13 to 4.28	4.28	4.09	4.13	4.10	4.09	3.93	3.55	4.23 4.38	....	4.08 4.13
Staples Coal Co.	....		....	....	....	....	....	....	....	4.47	....	....	....	....
Geo. E. Warren Co.	..		4.25	4.30	4.39	4.15	4.25	3.99	4.17	4.15	....	4.40	....	4.29 4.48
Maryland Coal and Coke Co.	....			4.25 4.45	4.35	..	4.25		4.15	3.62	3.72	3.62+ 3.70+	....	4.25
Claflin & Summer	....		....	....	....	B 3.33 4.08	....	....	....	....	....	..	4.52	....
M. L. Cobb	....		....	4.35	4.30	....	4.35	....	4.15	....	....		....	4.35
S. P. Burton	....		....	4.34	....	4.15 ..	4.35½	....	....	....	....	..	....	4.3.
Spague, Breed & Brown	....		4.20	....	....		....	....	....	....	....	....	....	....
Spring Coal Co.	$4.70		3.88	4.48	4.35	B 3.04 4.20	4.48	4.04	4.20	3.73	3.67	3.73+	....	4.30
Quemahoning Coal Co.	4.86	..		4.36	....	....	4.36	....	4.26	4.26	....	3.73+	....	4.36
Skeele Coal Co.	....		....	4.35	4.45	....	....	....	4.25	....	....	....	....	4.35
J. F. Holbrook	....	....	....	....	....	....	....	3.99 4.25	....	....	....	....	....	....
N. E. Coal and Coke Co.	....	....	....	....	....	....	....	....	....	....	3.60	....	....	....
Bader Coal Co.	....	....	....	....	....	....	....	....	..	....	3.72	....	....	....
City Fuel Co.	4.75	....	....	....	....	....	....	....	....	....	....	....	....	....
Daniel Doherty Co.	4.66	....	....	....	....	....	....	....	....	....	....	....	....	....
Brookline Coal Co.	....	4.64	....	....	....	....	....	....	....	....	....	....	....	....
F. C. Warren Bradford Coal Co.	....	4.80	....	....	....	....	....	....	....	....	....	....	....	....

+ Plus 85 cts. ft. B, Birdseye.
Address E. R. Libby, Room 6, State House, Boston, Mass.

✚No. 541—Toronto, Can.—Bids on this contract (Vol. 7, p. 708), which provides for furnishing coal to various public buildings throughout Canada, will be received until June 17. Specifications and proposal forms can be had on application. Address Secretary, Department of Public Works, Toronto, Can.

✚No. 550—Norfolk, Va.—Only one bid has been received on this contract (Vol. 7, p. 709), which provides for furnishing the local War Department with 3000 tons of bituminous coal. The company bidding was Nottingham & Wrenn Co., and the price quoted was $2.50 per ton. Address Lieut.-Col. of Engrs. Pervey, U. S. Eng. Office, Norfolk, Va.

No. 764—Franklin, Ohio—This contract (Vol. 7, p. 956) should read 1000 tons per month instead of 1000 per year, as previously noted. Address Secy. Fred B. Zartman, Franklin Board & Paper Co., Franklin, Ohio.

✚No. 706—New York, N. Y.—The date of opening the re-advertised bids on this contract, which was originally set for June 10, has been changed to June 11. This contract (Vol. 7, pp. 877, 918, 955) covers the consolidated fuel and forage bids, issued by the Central Purchasing Committee, on which the first original bids have been rejected. The original bids will not appear in these columns, but a complete list may be obtained on application to the editorial department. Address regarding the contract Secy. F. R. Leach, Central Purchasing Committee, Room 1226, Municipal Bldg., New York City.

✚No. 719—Revere, Mass.—The bids on this contract (Vol. 7, p. 916), which provides for furnishing the coal requirements of the city buildings during the ensuing year were as follows: George F. Proctor & Co., stove, egg and nut, $6.55; stove and nut coal for Charity Dept., $7.25. Metropolitan Coal Co., bituminous mine-run (14,400 B.t.u.), $4.40; stove and egg, $6.35; nut, $6.60; nut coal for Charity Dept., $7.50. Chelsea Iron & Coal Co., egg and stove, $6.57; Lehigh egg and stove, $6.72. Revere Ice & Fuel Co., bituminous lump (14,800 B.t.u.), $4.75; stove and egg, $6.75; nut, $7.50. Staples Coal Co., stove and egg, $6.49; nut, $6.74. Address Mayor Arthur B. Curtis, Revere, Mass.

✚No. 726—New York—Bids on this contract (Vol. 7, pp. 916, 955) were opened last Tuesday morning (June 1), and were as follows:

	Item 1	Item 2	Item 3
Wm. Farrell & Son	$6.16	....	....
Burns Bros.	6.18	$5.84	$5.98
Bacon Coal Co.	....	....	5.79
Meyer, Denker-Sinram Co.	...	5.90	5.97
Jos. Gordon, Inc.	...	6.08	....
Commercial Coal Co.	....	5.90	....

Item 1—2700 gross tons egg or stove coal for fireboats berthed on the North River and New York Harbor. Item 2—1450 gross tons egg or stove coal for fireboats on East River. Item 3—1150 gross tons egg or stove coal for fireboats berthed on the Harlem River. Address Fire Commissioner Robert Adamson, Municipal Building, New York City.

✚No. 734—Brookings, S. D.—This contract (Vol. 7, p. 917), which provides for furnishing the fuel requirements of the local Light, Heat and Water Department, will not be let before July. In the meantime competitive tests are being conducted with various coals in order to determine which will give the most economical results. Address Supt. A. W. Morton, Light, Heat & Water Dept., Brookings, S. D.

+No. 777—Washington, D. C.—Bids on this contract (Vol. 7, p. 956), which provides for furnishing the Capitol Bldg. with coal, were as follows:

Company		Ash	Carb.	Vo. Mt.	Sul.	B.t.u.	Coal
White Oak Coal Co.	$2.90	6.00	.....	18.20	....	14,900[1]	White Oak Special
Commercial C. M. Co.[2]	2.88	4.85	73.75	20.86	1.42	14,967	Star Miller Vein
Enterprise F. Co.	2.87	7.50	71.72	22.23	1.37	14,500	"B" or Miller Vein
Enterprise F. Co.	2.94	7.50	75.43	17.31	1.42	14,550	Gantier Miller Vein
Enterprise F. Co.	2.98	6.20	71.30	22.50	0.75	14,580[2]	Peerless Miller Vein
Vinton Coll. Co.	2.84	6.09	73.55	20.36	2.12	14,801	Miller "B" Smokeless
J. M. Dove	2.82	5.30	74.76	18.85	1.07	14,922	Logan mine-run
J. M. Dove	2.87	4.80	72.56	22.64	1.00	14,700	New River
Thorne Neal & Co.	2.90	7.44	73.15	19.02	1.68	14,301	Sonman "E" vein
B. Nicoll & Co.	3.00	7.00	74.00	18.00	1.10	14,600	Glendale (Penn.)
B. Nicoll & Co.	2.83	8.00	72.00	20.00	2.00	14,350	"B" or Miller vein
Bradford & Co.	2.80	7.27	68.81	22.92	1.10	14,472	Berwindale (Penn.)
Bradford & Co.	2.99	6.12	69.70	22.10	0.85	14,685	Vivian (Penn.)
Hendley & Co.	2.95	5.06	69.00	25.85	....	......	Clearfield, Penn., 4 & 5
Stewart & Co.	2.95	6.60	68.50	24.90	1.05	14,550	Rich Hill (Penn.)
White & Co.	3.10	4.70	77.30	18.00	0.80	14,960	Eureka, B.W.C.M.C Co., Penn.

[1] Average. [2] Contractor for year, ending June 30, 1915.

The Logan Coal Co. bid $2.83 on "B" or Miller vein, South Fork coal. The Maryland C. & C. Co. bid $2.89 on Imperial No. 1 (Guyon), $2.94 on Imperial No. 2, both Clearfield County, Pennsylvania, and $3 on New River. Lynah & Read bid $2.85 on Cardiff mine-run. Address Elliott Woods, U. S. Capitol Bldg., Washington, D. C.

New Business

+No. 782—White Plains, N. Y.—Sealed proposals will be received until 5 p.m., June 14, for furnishing about 1000 gross tons of bituminous coal for the local water-works. A certified check for $100 must accompany each bid. Address Board of Water Commissioners, 64 Martine Ave., White Plains, N. Y.

+No. 783—Indianapolis, Ind.—The Board of Trustees of the Central Indiana Hospital for Insane will receive bids until June 9, for furnishing 24,000 tons of steam coal f.o.b. hospital switch. Bidders must state the grade of coal they propose to furnish, block, lump, steam lump, nut, mine-run, slack or other grades, must give name and location of the mine or mines from which the coal is mined and submit an analysis with their bid. Deliveries are to begin Oct. 1, 1915, and to be completed Sept. 30, 1916 and are to be in such quantities and at such time as required. Coal is to be accepted at hospital weights. Sufficient bond must be given and a certified check for $500 accompanying each bid. Address Secy. L. Ert. Slack, Central Indiana Hospital for Insane, Indianapolis, Ind.

No. 784—Louisville, Ky.—William Schuff & Co., tanners, at this place, will be in the market about July 1 for two car loads of nut and slack coal per month during the ensuing year. Address Supt. F. W. Wagner, William Schuff & Co., 803 South 12th St., Louisville, Ky.

+No. 785—Tupelo, Miss.—The Water and Light Plant at this place will be in the market about June 30 for its annual requirements of coal, involving 'about 4500 tons. Alabama bituminous coal is ordinarily used and the cost is approximately $2.05 per ton. The call for bids is advertised. Address W. H. St. John, Box 565, Tupelo, Miss.

+No. 786—Elgin, Ill.—The Board of Education will contract some time during the latter part of June for approximately 1575 tons of Christopher, Franklin County, Ill., coal. The business is let on competitive bids, which are advertised in the local papers for 10 days. The present contract is being filled at about $3.12 per ton in the bins. Address Supply Committee, Board of Education, Elgin, Ill.

+No. 787—Springfield, Ohio—The Hospital Board at this place will receive bids until noon, June 15, for furnishing the coal required during the period ending May 1, 1916. Bids should cover cost of delivery in bins and must be accompanied by satisfactory bonds for $200. Address Clk. William H. Mahoney, Bd. of Hospitals, Room 2, City Bldg., Springfield, Ohio.

No. 788—Chicago, Ill.—The American Varnish Co. will contract about July 1 for a year's supply of Illinois or Indiana mine-run or nut coal. This company consumes about 70 tons per month. Address Pur. Agt. Seegers, American Varnish Co., Chicago, Ill.

No. 789—Louisville, Ky.—The Louisville Hotel will close contract about July 1 for 3500 tons of nut and slack coal to be delivered throughout the year at the rate of approximately ten tons per day. The contract is let by competition. Address Mgr. Herman Steinhilber, Louisville Hotel, Louisville, Ky.

No. 790—Chicago, Ill.—The Bryant Mfg. Co., will be in the market about July 1 for one year's contract, for 200 tons of 72 hr. Connellsville coke. Address Purchasing Agent, Bryant Mfg. Co., Chicago, Ill.

No. 791—Louisville, Ky.—Various distilleries and breweries in Kentucky are in the market for 600,000 tons of slack, nut and lump coal. The contract will be closed July 1. Specifications as to kind of coal and place and conditions of delivery can be secured now. Address R. E. Wathen, 104 West Main St. Louisville, Ky.

No. 792—Louisville, Ky.—The Joseph Schwab Jr., Distillery, will contract July 1 for a year's supply of nut and slack coal. Seven tons a day is consumed, which is delivered by rail. The present contract is held by the Continental Coal Corp. Address Joseph Schwab Jr., Distillery, 815 Logan St., Louisville, Ky.

+No. 793—Atlanta, Ga.—The Georgia Railway & Power Co., at this place, will be in the market about July 1 for 50,000 tons of Alabama coal which usually costs about $2.50 per ton delivered. Address Purchasing Agent, Georgia Railway & Power Co., Atlanta, Ga.

+No. 794—Jackson, Miss.—Sealed proposals will be received until noon, June 7, for furnishing the state institutions at this place and at Meridian, with coal as follows: East Mississippi Insane Asylum, 1500 tons; State Insane Hospital, 2500 tons for delivery on switch at asylum in suburbs of Jackson; State Capitol Building, D. & D. Institute, Blind Institute, State Charity Hospital, 2000 tons. No. 2 lump coal only is required, and the successful bidder must furnish a bond for $2000. Address Secy. Joseph W. Power, Bd. of Public Contracts, Jackson, Miss.

+No. 795—Cullman, Ala.—The Light and Water Plant at this place will be in the market about July 1 for 2400 tons of washed nut coal, which is usually bought at $2.60 per ton. The business is let on a competitive basis. Address Supt. B. Kiel, City of Cullman Light and Water Plant, Cullman, Ala.

+No. 796—Havelock, N. D.—The Board of Education at this place received bids until noon, June 1, for furnishing four or five double car loads of coal for each of the four schools in District No. 3. Address Clk. Mrs. Geo. B. Bagley, Bd. of Edu., Havelock, N. D.

+No. 797—Higginsville, Mo.—Municipal Electric Light & Water Plant at this place will be in the market the first Monday in July for 1440 tons of bituminous mine-run coal. The current contract is being filled at $2.56¼ at boilers. The business is let on a competitive basis. Address Supt. D. Riepe, Municipal Electric Light & Water Plant, Higginsville, Mo.

No. 798—Iowa Falls, Iowa—Sealed proposals were received until 7:30 p.m., June 4, for furnishing the Local Board of Education with approximately 200 tons of Brazil block lump coal, proposals to cover the cost of delivery at the school houses. Address Secy. T. E. Bell, Bd. of Edu., Iowa Falls, Iowa.

+No. 799—London, Ohio—The Municipal Light plant at this place will be in the market about July 1, for 1800 to 2000 tons of coal. Smithers Creek, W. Va., coal is being used at present, the cost being $2.35 per ton delivered. The coal is bought on competitive bids. Address Supt. H. W. Dickinson, Municipal Light Plant, London, Ohio.

No. 800—Nevada, Mo.—Bids will be received by the Lincoln Institute at this place, until June 9, for furnishing its coal requirements during the fiscal year ending July 1, 1916. Bids should cover cost of delivery in bins at the school. Address Secy. Nelson C. Burch, Lincoln Institute, Nevada, Mo.

+No. 801—Henderson, Ky.—The Municipal Electric Light Station at this place will be in the market July 1 for about 9000 tons of slack coal. The coal is bought on competitive bids, and the current contract is being filled on the basis of about $1 per ton. Address Supt. L. P. Hite, Municipal Electric Light Station, Henderson, Ky.

No. 802—Boston, Mass.—The Bay State Ry. Co. will contract about July 1 for about 150,000 tons of bituminous mine-run coal and 4000 tons of anthracite screenings. Deliveries are to be made at various points, principally by water. Address A. P. Emmons, Bay State Ry. Co., 84 State St., Boston, Mass.

+No. 803—Jackson, Mich.—The Board of Education at this place will be in the market about July 1 for approximately 350 tons of anthracite, 280 tons of Pocahontas, 700 tons of West Virginia splint and 400 tons of steam nut. The anthracite is usually purchased at $7.75; Pocahontas, $5; West Virginia splint, $3. The call for bids is advertised. Address Committee on Fuel, Board of Education, 331 Ten Eyck St., Jackson, Mich.

+No. 804—Newcomerstown, Ohio—Sealed bids will be received until noon, June 1, for furnishing the Board of Education at this place with 4000 bu. of forked screened coal, 5000 bu. of mine-run, and 1000 bu. of slack coal. Two-thirds of the requirements are to be delivered by Sept. 15. Address Clk. H. H. Eagon, Bd. of Edu., Newcomerstown, Ohio.

+No. 805—Caldwell, Kan.—The Light & Water Plant at this place will contract, about July 1, for approximately 3000 tons of mill coal, which is usually bought at $2.85 per ton delivered in the bin. The business is let on competitive bids. Address Supt. H. W. Baker, Caldwell Light & Water Plant, Caldwell, Kan.

+No. 806—Galveston, Tex.—Sealed proposals will be received until 10 a.m. June 10 for furnishing the Depot Quartermaster of the U. S. Army at this place with approximately 1000 short tons of coal per month during the ensuing year. The coal is for use at the Port of Embarkation. Bids should be submitted covering cost of delivery and trimming in transport bunkers at Galveston and Texas City, Tex.; delivering in transport bunkers but not trimmed; delivered and trimmed in transport bunkers at contractor's dock; the same not trimmed and delivered in contractor's barges alongside of transport; delivered on government barges at contractor's dock; delivered from chutes into transport but not trimmed; delivered in contractor's barges at contractor's dock. All bidders must submit certified check for 15% of the amount involved in the proposal or furnish other satisfactory evidence for the faithful completion of the work. Address Lt. Col. C. R. Krauthoff, Quartermaster Corps, U. S. Army, Galveston, Tex.

No. 807—East Lansing, Mich.—The Michigan Agricultural College will receive bids until noon, June 16, for supplying the Institute with approximately 8000 tons of bituminous nut, pea and slack coal, and 100 tons of bituminous ¾-in. lump. Bids should be made f.o.b. the College siding, via Pere Marquette R.R. Deliveries will be required at the rate of about six cars per week. Bidders must state whether the coal they propose furnishing is mined in Michigan and also give the minimum B.t.u. value guaranteed. Address Secy. A. M. Brown, Michigan Agricultural College, East Lansing, Mich.

+No. 808—Philadelphia, Penn.—Sealed proposals will be received until June 8, for supplying the Bureau of Charities with anthracite stove and pea coal during July, August and September, and the Bureau of Correction with gas coal. All bids must be accompanied by the customary certificate required by the city, guaranteeing the faithful performance of the contract and bids must also be submitted on printed forms which may be had on application. Address Dir. Herman Loeb, Room 312, City Hall, Philadelphia, Penn.

+No. 809—Colfax, Wash.—The Whitman County Government will receive bids until 11 a.m. June 7 for 100 tons of lump coal to be delivered at the Court House in Colfax and 20 tons for delivery at the County Farm nearby. Address County Auditor A. R. Metz, Colfax, Wash.

+No. 810—Oelwein, Iowa—The City Government will receive bids until 8 p.m. June 7 for furnishing approximately 900 tons of coal. Quotations should be f.o.b. Oelwein. Address City Clk. E. H. Burlingham, Oelwein, Iowa.

+No. 811—Chicago, Ill.—The City Government will contract about July 1 for approximately 123,000 tons of lump coal, which is usually bought at about $2.81 per ton. Address Business Manager, Tribune Bldg., Chicago, Ill.

+No. 812—East Providence, R. I.—The Board of Education at this place will receive proposals until June 4, for furnishing about 900 tons of stove, egg and pea coal, delivery to be made during the fiscal year ending June 1, 1916. Address Clk. G. H. Blackwell, Grove Ave., East Providence, R. I.

No. 813—Boston, Mass.—The Stone & Webster Co. at this place will be in the market in July or August for approximately 15,000 tons of New River or Pocahontas mine-run coal for shipment at one of the lower Lake ports. Address R. E. Hamilton, Stone & Webster Co., 147 Milk St., Boston, Mass.

+No. 814—Lawrenceburg, Ind.—Bids will be received by the Board of Education until 7:30 p.m., June 7, for 10,000 bu. of coal for the lighting plant. Address City Clk. Frank Globe, Lighting Plant, Lawrenceburg, Ind.

+No. 815—Toronto, Canada—The Separate School Board at this place received tenders until May 31 for furnishing 200 tons of Pocahontas lump or mine-run coal; 300 tons of anthracite stove and egg coal each, and 200 tons of anthracite grate. Address the Toronto Separate School Board, Toronto, Canada.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

+No. 489—Staples, Minn.—This contract (Vol. 7, pp. 665, 748), which provides for furnishing the Municipal Electric Light Plant at this place with coal, has been awarded to the **Dover Lumber Co.,** who was the only bidder. The business was closed at $2.40 per ton f.o.b. Duluth. Address Supt. John Effinger, Municipal Electric Light Plant, Staples, Minn.

+No. 558—Hamilton, Ohio—This contract (Vol. 7, pp. 709, 794, 834), which provides for furnishing the fuel requirements of the local Board of Education, has been awarded to the **Pyrd-Brunner Coal Co.** for furnishing the 1600 tons of smokeless nut and slack. This company was the lowest bidder at $2.38. The business is being handled on a heat unit basis. Address Clk. Charles F. Holdefer, Bd. of Edu., Hamilton City School District, Hamilton, Ohio.

+No. 574—Cincinnati, Ohio—The awards of this contract (Vol. 7, p. 749), which provides for furnishing the local Board of Education with fuel requirements, were as follows: **Marion M. Allen Supply Co.,** smokeless mine-run, District No. 1, $2.81; District No. 2, $2.90. **The Reliance Coal & Coke Co.,** bituminous nut and slack, District No. 1, 2.17; same, bituminous lump, $2.64. **B. H. Wess Grain & Coal Co.,** smokeless mine-run, District No. 3, $2.92; same, bituminous lump, $2.50. **Hyde Park Supply Co.,** District No. 4, smokeless mine-run, $2.94, same, bituminous lump, $3. Address Business Mgr. C. W. Handman, Bd. of Edu., Cincinnati, Ohio.

+No. 593—Boston, Mass.—This contract (Vol. 7, p. 750) was awarded to **Batchelder Bros.,** at $4.23 for bituminous, $5.68 furnace, $6.13 egg and stove and $2.50 screenings, or a gross of $154,589.85. The Staples Coal Co. bid a total of $160,174.90; City Fuel Co., $160,841.75. Address Supt. D. Frank Doherty, 808 City Hall Annex, Boston, Mass.

+No. 664—Washington, D. C.—Partial awards have been made on this contract (Vol. 7, pp. 836, 953, 954, 955), which provides for the fuel requirements of the U. S. Navy, as follows: **J. H. Weaver & Co.,** Class 2a, $3.20, 2b, $3.60. **Quemahoning Coal Co.,** Class 3a, $2.65, 3b, $2.75, 3c, $3.05, 5a, $2.58, 5d, $2.87, 5e, $3.38. 6a, $2.57, 6b, $2.70, 6c, $3.17, 6d, $3.07. **Crozer-Pocahontas Co.,** Class 8, $2.60. Classes 1, 4, 7, 9 and 10 have not yet been awarded. Address Paymaster General of the Navy Samuel McGowan, Washington, D. C.

+No. 696—Salem, Mass.—This contract (Vol. 7, pp. 877, 955) has been awarded as follows: **John Girdler,** Georges Creek Cumberland coal for delivery at Salem, 450 tons at $4.55 and 300 tons at $4.65. **G. L. Gage,** 250 tons of New River coal for delivery at Lawrence, $4.95. **Cross Coal Co.,** 200 tons of New River coal for delivery at Lawrence, $4.95. **Atkinson Coal Co.,** 200 tons of New River coal for delivery at Ipswich, $4.70, and 150 tons for delivery at Newburyport, $4.47. **Theberge Bros.,** 450 tons of New River coal for delivery at Lawrence, $5.14. **Charlotte Fairfield,** 25 tons of anthracite for delivery at Salem, $6.85. **M. O'Mahoney,** 25 tons of anthracite for delivery at Lawrence, $8.45, and 30 tons for delivery at Lawrence, $7.45. Address Clk. H. E. Thurston, Essex County, Salem, Mass.

Contract Notes

Baltimore Exports—Baltimore has made a new record for coal exporting. During May a total of more than 230,000 tons was sent out by foreign ports.

Birmingham, Ala.—Contracts aggregating over 750,000 tons of coal are expected to be closed in this district shortly, most of this tonnage going on large contracts to railroads. Most of the Southern roads contract during the summer months.

Indianapolis, Ind.—Coal contracts for the fiscal year beginning June 1 have been awarded by the board of park commissioners. The Indianapolis Mortar & Fuel Co. will supply shoveled lump Pocahontas, 65% lump, at $3.95 a ton. The Frederick Coal Co. will supply mine-run Pocahontas at $3.40 a ton.

Birmingham, Ala.—The Seaboard Airline R.R. has placed an order for 140,000 tons of steam coal with the Alabama Co. This is the first of the big railroad contracts to be closed this season. This coal is for the entire Southern Division of the Seaboard and is for delivery in equal monthly installments over the next twelve months.

+Washington, D. C.—Bids received in response to the request for telegraphic proposals for the delivery of 5000 tons of coal at the Naval Station, Key West, Fla. were as follows: Pocahontas Fuel Co., $4.54; Penn Fuel Co. $4.88; Smokeless Fuel Co., $4.54; J. H. Weaver & Co., $4.65; Willard Bros., $4.60; West Virginia Coal Co., $5.23; Castner, Curran & Bullitt, Inc., $4.45; Chesapeake & Ohio Coal & Coke Co., $4.78; William C. Atwater & Co., $4.80. It has been decided to reject all bids and use coal from their regular supply. Address Paymaster Gen. of the Navy Samuel McGowan, Navy Dept., Washington, D. C.

Buffalo, N. Y.—The award of contract for furnishing coal to the institutions of Erie County, N. Y. (Vol. 7, p. 957), is further postponed by the Board of Supervisors at Buffalo to afford time for looking into the legality of one of the low bids.

Northfield, Minn.—The Manhart Coal Co. was awarded the contract for furnishing 400 tons Pocahontas smokeless mine-run coal by the local School Board.

Lockport, N. Y.—The bids on this contract, which provides for furnishing 438 tons of anthracite egg, stove and chestnut coal, were as follows: Entire supply—Lockport Ice & Cold Storage Co., $2369; R. M. Hovey (egg and stove $6, nut $6.25), $2539.25; Graham Coal Co., $2480.40; M. J. Crowe (egg and stove at $5.85), $2503.95; George T. Lennon, $2562.95. Portions of contract—Mahar & Son, egg and stove, $5.51; Lockport Ice & Cold Storage Co., nut $5.78, pea $4.29, egg and stove $5.50; Hinch & Son, stove and egg, $5.55.

COAL AGE

Volume 7, No. 24
Issued Every Saturday
Hill Publishing Company

NEW YORK, JUNE 12, 1915

Price, Ten Cents
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Advertising Index, Last Page

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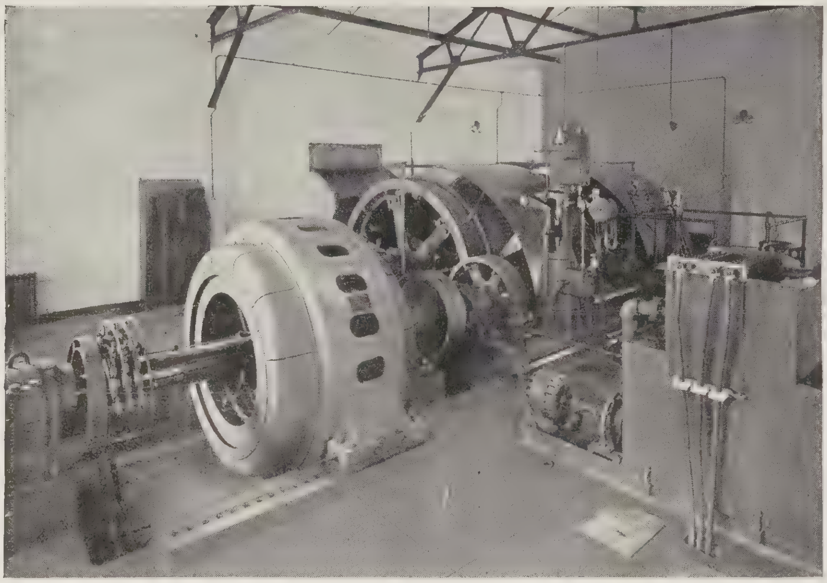

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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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ON YOUR BUSINESS AND OURS

By the Business Manager

IT was a wise man who said, "If your business isn't worth advertising, advertise it for sale."

Only reliable products can be advertised profitably.

"ADVERTISING is not material substance. It is service," says John Lee Mahin.

"Space, type, words and pictures are only tools the master-workman uses to express an idea. The finished result of the expert work of the advertiser is not a material substance which can be seen with the eyes or touched with the hands, but a definite, positive impression on many human minds which is shown by the voluntary purchase of goods the advertiser wants to sell."

The ads in Coal Age are an exhibit of the best in mining machinery and equipment.

WE are all buyers and sellers. And the first thing necessary between buyer and seller is information.

You don't buy a pump without knowing something about it, and no one buys your services without knowing something about you.

We are a nation of *good* buyers and sellers — we lead the world commercially.

And coincident with that we lead the world in advertising.

We were first to realize that there is no good in unknown good; first to understand that if we could make a little better plough, an improved scale, a more advanced harvesting machine, the world wanted to know about it and was ready with a hand back of each ear to listen.

Then we were the first to see that the cheapest and most effective way to advertise was through printers' ink.

We Americans have learned better than anyone else in the world how to sell goods by learning better how to tell the buyer more about them, in a more interesting, more concise, more time-saving way.

Keep yourself acquainted with the advertising in your field and you'll always be able to buy wisely, safely and with the greatest economy.

That's the American way.

COAL AGE

Vol. 7 NEW YORK, JUNE 12, 1915 No. 24

Selecting A Mining Machine

A Manager of a Large Coal Mining Company put the Following Question to Us:

QUESTION:

"I have decided to equip one of our mines with mining machines throughout; we have never had any experience with such machines, and I want to know how to decide upon the make or type of coal cutter that I ought to adopt. I am a great believer in standardizing equipment and I want to make sure that I get the right machine so that I won't have to keep shifting around, and incidentally I desire to avoid filling our supply house with repair parts that will never be used."

FORTUNATELY for our reputation, the manager did not expect an answer; at any rate he didn't allow us time to give one, but continued about as follows:

"First I decided to give the various machine manufacturers opportunity to make test runs, but after investigating, I learned that such tests generally proved that one of the machine runners making the test was head and shoulders above the others, so that as to the actual merits of the machines little could be learned.

"Then I decided to make inquiry as to the cost of upkeep on the different makes, but here again I got nowhere. None of the users of the machines were willing to furnish me with copies of their cost sheets. They volunteered certain figures, but I had no common basis for comparison. I was forcibly reminded of the fact that I have never been very cordial myself toward my neighbors when they sent in requests for information which I considered private property, and this had reference to cost sheets particularly.

"Then it occurred to me that it wasn't necessary to get such cost figures; the companies whose figures I so earnestly desired must surely profit by their own experiences and all that would be necessary would be to watch the purchases of these large companies with years of experience to guide them. But here again I found that I was on the wrong track.

"Three companies, having identical conditions, favored three different machines; a little questioning indicated that in one case salesmanship was the deciding factor, in another a prejudiced master mechanic and in the third the manufacturer of one of the machines was a large customer of the mining company.

"And so it goes; every one has a different idea and a different standard for comparison."

We were on the verge of suggesting that every one has a peculiar way of gathering information and weighing and considering it after it has been gathered.

But our friend came at us suddenly with this: "If there were only one make of mining machine on the market that could be called a success, do you suppose I could afford to adopt it and thereby place myself entirely at the mercy of a single manufacturer?"

We didn't know, and we still don't know. We wonder if the makers know and if they do know would they tell?

Mining Coal with Friable Roof and Soft Floor*

By Fred C. Keighley†

SYNOPSIS—This paper is reproduced because we believe it the last monograph written by the author, who died Apr. 14 of this year. Mr. Keighley had a large experience in mining coal which had not only undesirable roof and floor, but was in addition quite friable itself.

The coking coal known variously as the No. 8, Pittsburgh or Connellsville seam has in places an extremely bad roof. This difficulty is strongly marked in the Connellsville basin, but can be found in other troughs.

In those parts of the area where operations have been conducted for many years it has been noticed that the bad roof usually appears wherever a valley traverses the surface of the coal field. It seems that this is true regardless of the depth of the coal. The bad roof appears whether the coal lies at a depth of 100 or of 600 ft. below the surface.

Why Roof under Hills Is Sometimes Weak

As a rule when the coal seam lies under the plateaus or hills, the roof over the coal is good, and this is true till the coal seam is at a depth of 300 to 400 ft. Thereafter the friability of the roof seems to increase with depth, and thus in many of the mines the roof is somewhat generally brittle. This characteristic seems to be independent of surface topography, and possibly there are three ways in which to explain it:

1. At greater depths there is an increased strain on the strata when mining operations are under way, and possibly the material so burdened fractures and becomes more or less disintegrated. At shallow depths this would not occur.
2. In some cases the first covering of the coal may have been swept away by subsequent erosion and the coal covered later by a deposit of weaker material than that of which the first covering was comprised.
3. In other cases, the friability may arise from conditions which existed when the measures were even deeper than they are now. In other words, the roof was weakened before erosion had carved out the valleys and rounded the hills.

But whatever the cause, the Connellsville seam must be worked exhaustively if there are to be any profits from mining it. The thickness of the coal and its softness might lead one to anticipate that it could be mined cheaply, but the friable roof creates a difficulty which its other qualities cannot overbalance. Much of the coal of the Connellsville region is mined by pick only, and the scale of wages is lower than in other regions where the coal is harder and more difficult to mine. Yet owing to the conditions noted the mining cost is not low.

Many plans have been adopted for mining the coal with the minimum expense where the roof conditions are unfavorable, but no plan seems to be a great improvement over the ordinary methods when everything is considered.

I have had charge of Connellsville coking-coal mines for about 33 years, and all these workings had some areas with bad roof. I have projected workings at depths ranging from 200 to 700 ft., using a dozen or more different schemes, and have never found any marked difficulty in protecting the main headings and air-courses of any mine. But I have experienced some trouble occasionally in protecting the branch, or butt, headings, and I have always had more or less trouble with the rib coal in the rooms.

The Difficulties Are Largely in Rooms

It is true that in many cases the roof will fall in headings and air-courses in spite of all that can be done, but such falls are gradual and are removed as part of the regular mine operations. On the other hand, when falls occur in the rooms they often come suddenly and cover a large area and the break extends so far above the coal that they often reduce and may entirely cut off the production from a certain section of the mine, not only for a day, but perhaps for weeks at a time.

It is clear, then, that any improved method of mining must provide for the protection of the rooms rather than for the care of the headings. Before considering methods that may be improvements on present systems, I would say that I have tried and have seen tried plans such as are outlined in the following paragraphs.

Panels have been projected 1000 ft. wide and 2000 to 4000 ft. long. These constituted what miners term a "pair of flats" because the hauling road and its parallels which traverse the panel by its longer distance are driven on a low grade or on a level. This also results in the Connellsville region in their being driven on the face of the coal.

Such a panel is subdivided into a number of smaller panels that are themselves served by two parallel entries driven at right angles or at some other angle to the flat or face heading depending on the pitch of the coal. These are known as butt headings. These sub-panels are generally 1000 ft. long and 300 to 600 ft. wide. They are divided into a number of working-places known as rooms, and the driving of these leaves strips of coal known as ribs. The number of rooms turned off the butt headings of one of these subdivisions determines in a large degree the size of the pillars, or ribs, left between the rooms.

The rooms being projected from headings driven on the butt of the coal are themselves worked on the face of the seam. They are laid out 40, 50, 60, 80 or 100 ft. apart. As the rooms are generally made 10 ft. wide, the ribs are 30, 40, 50, 70 and 90 ft. thick. The mining code of Pennsylvania requires that airways be driven across from room to room at distances which must not exceed 105 ft. Thus the mine is cut into blocks which cannot measure more than 105 ft. in their smaller dimension.

Various widths have been chosen for rooms with 8 to 30 ft. as limits, but the general belief is that rooms and headings should be driven 10 ft. wide in the Connellsville region. There seems to be no opportunity to improve on this width. The best work has been obtained with large room ribs—50, 70 and 90 ft. thick; but the success has not been as great as might be expected, though, with room ribs of the two larger dimensions, and with any ordinary care in mining a general creep or squeeze cannot occur.

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*Paper read before the West Virginia Coal Mining Institute at its winter session, Dec. 10, 1914.

†Late general superintendent of mines, Oliver & Snyder Steel Co., Uniontown, Penn.

This is not true when room ribs are made of smaller dimensions, such as 30, 40 or even 50 ft. In the initial stage of rib drawing with such light ribs great success is secured, but when trouble occurs it is usually in the form of a general squeeze or creep that almost paralyzes the output. It has often seemed for a time that the small ribs in the rooms resulted in cheaper mining; but when a squeeze or creep took place the small rib did not permit of the driving of a new road with safety and profit, and consequently the coal remaining in the rib could not be taken out.

With 70-, 80- or 90-ft. ribs there is always sufficient coal left to permit driving a new road with safety through the pillar no matter how badly the roof may have fallen or the coal be shattered on the edges of the pillars. Sometimes a skip off the rib is taken in place of a split, but in any case splitting or skipping of the large ribs entails the use of much timber.

Wide Pillars Certainly Pay Where Coal Is Thick

It is often said that if the extra time and expense of laying out workings with large rib dimensions and the heavy cost of timber were all taken into consideration it is doubtful whether the wide rib would after all be any more profitable than the narrow rib except that a great yield would be obtained per acre. When, however, coal such as the Connellsville seam brings from $2500 to $3500 per acre, it certainly does not pay to lose any of it.

Nearly all experienced miners concede that with narrow ribs only 50 per cent. of the coal is recovered. The best result claimed is 65 per cent., while 90 and 95 per cent. has often been recovered with the larger-rib system. The problem is whether the heavy cost of timber and the still greater cost of labor will counterbalance the loss of from 35 to 50 per cent. of coal. I am disposed to believe that the larger rib, making a larger yield possible, will assure a handsome margin.

Cost of Timbering Is the Main Problem

But I have been puzzled for some time, not so much on the way in which ribs may be made larger, but on the saving of timbering. It must be remembered that the timber and timber work do not represent the whole of the cost of mining rib coal under the conditions which I have stated. It often happens that the removing of falls involves as much expense as first timbering, for not only does the timber have to be reset, but more timber is required.

In other words, an advancing room or the space in front of a rib which is being drawn may cave in and remain quiescent for perhaps a whole year, yet when the débris is removed new falls may occur and the timber may have to be renewed throughout. I have known this to be done several times, and the bottom has had to be ripped every time before a satisfactory tonnage per acre could be obtained.

Reviewing the general conditions to which I have referred and passing judgment on them, I think the following statement can safely be made: Whether the rooms be narrow or wide and the pillars thin or thick under the friable roof of certain portions of the Connellsville coke region the fall of the roof will be equally widespread, and when the room ribs are small sooner or later a general squeeze or creep will take place. With larger ribs the roof will fall and the bottom will heave, but there will be no general squeeze. So it would appear that if the roof must come down, perhaps it would be best for us to take its fall for granted and to make up our minds to let these falls take place when conditions are suited. We should assist the roof, if possible, to come down.

Roof Weakened Far Back of Rib Line

I and others have noticed that after a series of falls have taken place in rib workings the roof conditions appear for a limited time to be much better over the coal remaining unworked in the ribs. Some relief seems to have been given to the overlying measures by the falls, and I depend on this very fact for the operation of my proposed method of working coal having a friable roof and a soft floor.

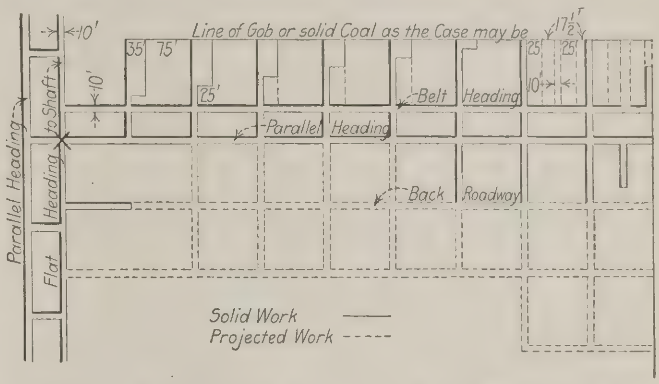


FIG. 1. KEIGHLEY'S PLAN TO AVOID EXPENSE IN TIMBERING

Moreover, falls in rib workings appear to occur in layers. In deep mines after the ribs have been drawn back 100 to 200 ft. from the point where the rib drawing started and a general fall or movement of the roof occurs, the rupture or disturbance does not run up more than from 5 to 30 ft. above the coal. Very often such falls not only take place in the large open spaces where the coal has been withdrawn entirely, but extend into the roof of both rooms and crosscuts for 100 or more feet back from the rib line. Sometimes this resulting weakness may cause falls for several hundred feet.

In coal having 500 or more feet of cover after these falls are cleaned up and rib drawing proceeds as far as 400 or 500 ft., there will be another general fall which seems to reach up 100 ft. or more above the coal and often to the surface. When this occurs it not only breaks the timber at the working-places, but often crushes it several hundred feet away. The timber will often begin to crush several weeks before the fall occurs.

If the cover is 400 to 600 ft. thick and the coal has been thoroughly mined when the rib drawing reaches a point say 1000 ft. from the starting point, the rib work is not nearly so troublesome or expensive, but still there is room for improvement.

These are the conditions which must be considered, and I have schemed the following method of removing the difficulties described. It is illustrated in Fig. 1. Drive an entry or passageway 10 ft. wide at right angles to the flat or face headings. This will run on the butts of the coal and parallel to the edge of the area to be worked by this entry, being distant in the clear 105 ft. at all points. This entry would of course be driven at a different angle if the pitch of the coal would not permit of driving directly on the butt.

A second parallel passageway similar to the one described should be driven 50 ft. from it in the clear. With the conditions as in the illustration, this heading should be placed on the right-hand side of the entry as driven. It will be termed in this description the "parallel heading." Crosscuts should be cut between the two at distances of 105 ft. in the clear.

These roadways may be termed a pair of butt headings, and they may be driven 1050 ft. in addition to the distance allowed for the pillar flanking the face entries, a pair of which will ultimately be driven beyond the butt headings now discussed. In addition they must be long enough to provide a flanking pillar for the face entries from which they are driven. This of course applies only to coal of light pitch. When the pitches are steeper the distance must be shortened.

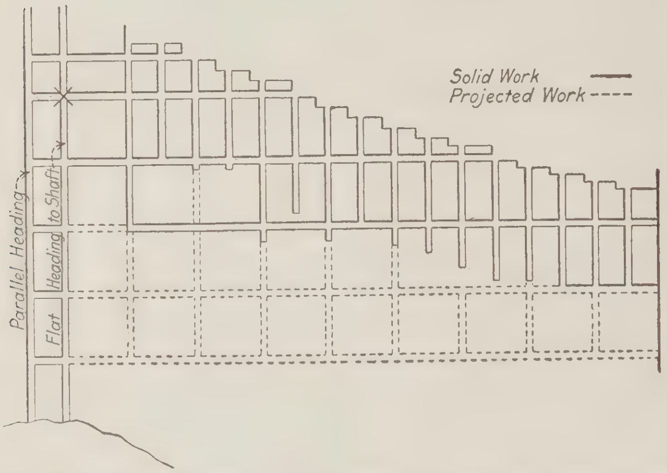


FIG. 2. THE SAME PLAN AFTER IT HAS REACHED ITS FULL DEVELOPMENT

HOW THE ROOMS ARE DRIVEN AND PILLARS DRAWN

Rooms are turned to the left of the first butt heading, these being spaced at $52\frac{1}{2}$-ft. centers. Thus there will be 20 rooms in the butt heading. The first room turned is to be driven up its distance of 105 ft., then 25 ft. of the rib of that room is to be worked back to within 30 ft. of the butt headings, thus leaving a road rib of $17\frac{1}{2}$ ft. for the room above when it is worked. The next room is not to be turned until the second stage of working is reached. In other words, every other room will be worked forward and drawn back as just stated.

The alternate rooms will not be driven until the upper end of the 1050-ft. section is reached. Then these will be turned off successively from the top down, keeping pace with the drawing of the butt-heading stumps as they are withdrawn down toward the foot of the panel.

The rooms on the parallel butt heading will remain undriven until the latter is in a distance of 600 ft. At this point, which will be termed the "600-ft. point," a roadway should be turned off. This will be termed the "600-ft. roadway." It will be driven 105 ft. and at the end of that distance will be turned to the left so as to form an entry on the butts of the coal parallel to the other butt heading and 105 ft. away in the clear. This will be driven to the end of the panel and will be called in this description the "back roadway."

From the 600-ft. point to the limit of the panel on the parallel heading, rooms will be turned to the right at $52\frac{1}{2}$-ft. centers. These will intersect the back roadway. Each room will be 105 ft. long. As soon as the last room is driven through, the coal from the rib work will be hauled down the back roadway through the 600-ft. roadway and thence down either the parallel or the butt heading as may appear best. When the retreating rib work has reached the 600-ft. roadway, another back roadway will be driven upward from the first room of the parallel heading.

BREAKING LINE IS DULY STEPPED

Sketch No. 2 shows the workings when further developed and after rib drawing has been started at the top of the 1050-ft. panel. It will be noted that the work proceeds in steps, as is the general practice in well-ordered rib drawings. It will be seen that, by this arrangement of headings and roadways, crosscuts (except those between the butt heading and its parallel) are entirely eliminated, the back roadways taking their place and being driven as required by the advance of the rib work. Of course, the crosscuts cannot be eliminated between the butt heading and its parallel.

LOWER ROOF IS PERMITTED TO FALL

The object of driving the alternate rooms to the left of the butt heading and drawing out a 25-ft. skip from the pillars is to allow the lower roof to fall. In a panel of 20 rooms 10 would be driven up and drawn, and I believe that the fall of the roof provided by this method of mining would relieve the tension under which a friable roof with soft bottom is usually found when rooms are first driven.

The purpose of laying out blocks 105 ft. square is to avoid conflicts with the mining law of Pennsylvania, as that is the distance beyond which places cannot be driven without providing crosscuts. Perhaps some will wonder that a mining man should wish to avoid the driving of crosscuts, and I admit the care taken to avoid making them has a somewhat "shady look"; but my experience, with that of others, is that crosscuts are a prolific source of roof and floor trouble and one of the principal causes of crush or creep. Many accidents occur because coal and slate fall from both roof and sides where the material which falls has been weakened by the presence of these crosscuts.

TROUBLES WHEN CROSSCUTS ARE REACHED

In rib-work we invariably have much trouble when approaching an old crosscut. The lower roof has nearly always fallen and much slate has to be handled. By my method there would be no crosscuts driven except those from the butt heading to its parallel, and they can be protected by timber work. The rib drawing by this method is all in one direction and *en echelon,* and I think the plan will lower the cost of producing coal whenever covered by a friable roof and supported by a soft bottom. It will also be of value where the roof is friable and the floor is hard.

The work can be developed much faster by my method than by any other because once the upper limit of the panel has been reached there are many points of attack. Moreover, it is not necessary to develop continually by butt headings as the result may be obtained through the driving of 105-ft. places and the extension of back roadways to intersect.

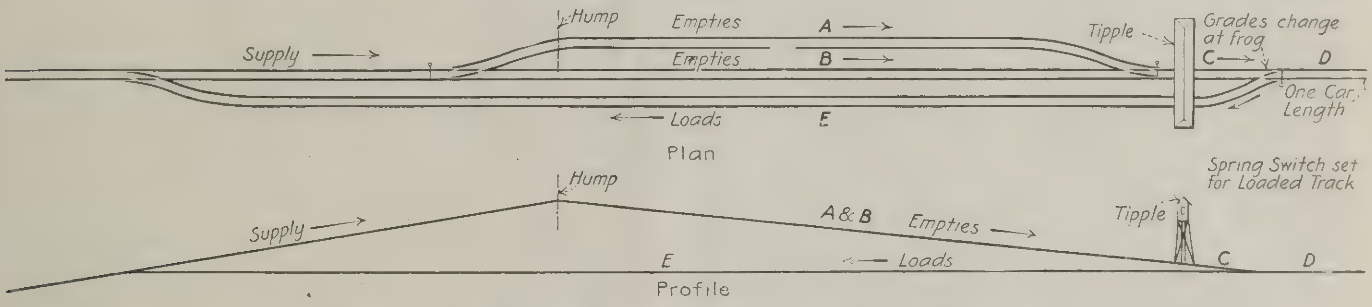
Of course care must be taken not to overdevelop the mine, as under those circumstances the places will stand too long. The system which I propose is elastic, and with good judgment much heading work and consequent driving of crosscuts can be avoided. The so-called back roadways are in a sense crosscuts, but in reality they are haulage roads and airways. They stand open only a short time as compared with the butt headings and parallels in the mines of the Connellsville region. These stand sometimes for as much as 10 years.

Nor is there any need to leave rooms to stand, as under present methods, for years before the ribs are withdrawn. It is no uncommon condition for rooms to be left standing almost as long as the headings. Such delays in room-rib drawing invariably result in the breaking of the posts, timbers and lower roof and entail enormous expense for cleaning up and retimbering the workings.

A Plan for Tipple Tracks

By V. S. Veazey*

It is often impossible to obtain room for a tail track above the tipple location, because the latter sometimes is necessarily situated near the head of a stream or other physical obstacle. The accompanying illustration shows an arrangement which can be adapted to any case where such a condition exists.



Track Arrangement Where a Tail Track Is Impractical

The general plan of operation in the scheme shown in the sketch is to place the empty railroad cars on tracks *A* and *B*. These cars are dropped one at a time downgrade to the tipple, where they are loaded and afterward run by gravity down the grade *C* about 100 ft. In going down track *C*, the cars attain a sufficient momentum or speed to carry them up the grade *D* through a spring switch. Here they come to a stop and run back by gravity down the loaded track *E*.

The railroad locomotive pushes the empties up the supply track and over the knuckle onto tracks *A* and *B*. The locomotive then returns and goes onto track *E*, where it picks up the loaded cars.

* * *

The passage of the compensation bill through the Pennsylvania Senate on May 19 was highly gratifying to all the miners and most of the operators. W. W. Inglis, of the Pennsylvania Coal Co., expressed his approval of its passage.

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*Chief engineer, McKell Coal & Coke Co., Glen Jean, W. Va.

How the Chinese Mine Coal

William Barclay Parsons in an address before the Franklin Institute states:

China's mineral wealth is both varied and abundant, and, fortunately, coal is found in great quantities through almost the whole country; in fact, there is scarcely one of the 18 provinces that does not contain coal in paying quantities. Through lack of extensive railways and of power-consuming industries and on account of the great poverty of the people, the consumption of coal per capita is very small. There are a few factories, of course, at Shanghai and other treaty ports, but coal is not in demand otherwise for manufacturing purposes. Nevertheless, about 15,000,000 tons are produced annually from Chinese mines.

The Chinese native mine is a singular affair. The native attacks the bed at the outcrop and usually, for some unknown reason, at a point where the measures are dipping into the hill. He drives a small tunnel not over 5 ft. high and not more than 4 ft. wide, so as to avoid timbering. This he extends downward till his native pump can no longer handle the inflow of water. At that point the mine is considered worked out and is abandoned.

From the initial drift there are no side galleries and no rooms. On the floor of the drift are laid two longitudinal timbers like rails. The coal is loaded into wicker baskets and then hauled up the narrow passage on these rails by manual power. In the native mines of Hunan which Mr. Parsons visited light was secured by burning joss-sticks of punk, giving of course nothing but a faint glow.

Much of the Chinese coal will coke. Some of the anthracite is sufficiently hard and firm to stand the burden of a blast furnace, though nearly all is much softer than its American namesake, but similar in chemical composition. Much of the bituminous coal has a large percentage of ash, and very much of it is so friable as to produce only a small proportion of lump.

When the coal deposits are worked on a large scale it will undoubtedly be found advantageous throughout China to crush most of the coal, wash it and convert it into coke or compress it into briquettes. The natives are already briquetting coal, taking the coal dust, mixing it with clay and selling the coal balls in Chinese cities for local consumption.

By washing the coal from the Ping Hsiang mines, from which is made the coke for the Hankow iron works, the ash content is reduced from 28 to 8 per cent. and the sulphur from 0.65 to 0.1 per cent.

New Tipple at Havaco, W. Va.

By H. Reisser*

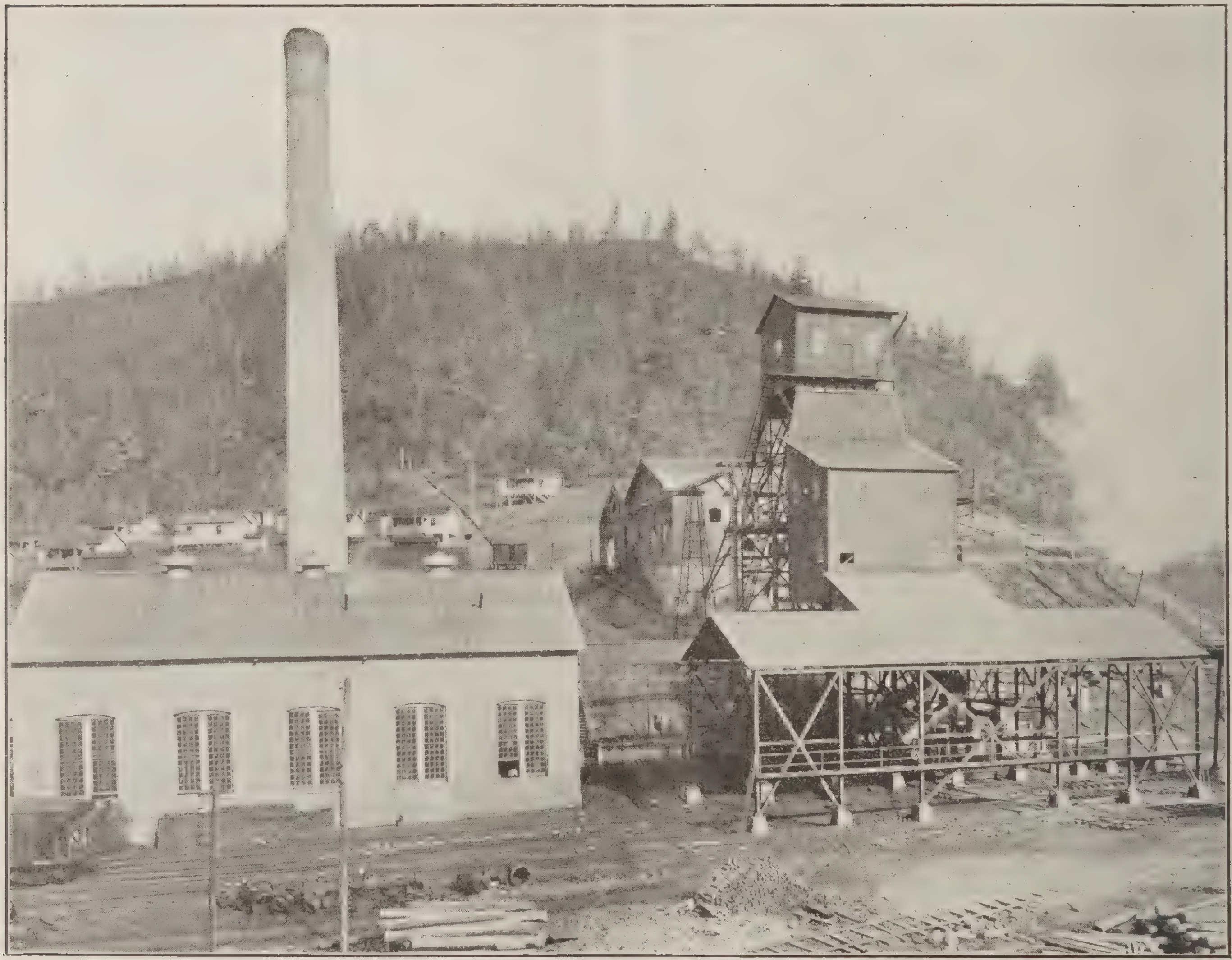
SYNOPSIS—An uptodate tipple and power plant. designed and constructed to secure a high quality product with an equipment as nearly fireproof as possible.

A recent article in Coal Age explained in detail how thoroughly and efficiently the concrete work for both the fan and the cage shafts of the New River & Pocahontas Consolidated Coal Co.'s operation at Havaco, W. Va., were constructed. This article outlines the work done in connection with the plant aboveground, describing in detail the tipple which loads the coal into railroad cars, the power house, the boiler house and the hoist house.

The mine is situated at Havaco, about two miles from Welch, on the Tug River branch of the Norfolk & Western R.R., and is in the heart of the Pocahontas region. The coal needs no further mention, except that it is known to the trade generally as being the best steaming coal so far discovered.

The shaft was driven at a point such that all coal is taken away on the rise, and extends downward some 285 ft. from the surface to the coal bed. By doing this two important things were accomplished: 1. All drainage can be accumulated at one central pumping station by gravity. 2. The loaded mine cars are all brought to the loading point on favorable grades, thus minimizing the haulage expense.

The seam of coal known as Pocahontas No. 3 is about 5 ft. 6 in. thick and runs uniform in height, allowing the use of large mine cars holding three tons each. Electric locomotives are employed to gather the cars and bring them in about 30-car trips to the shaft bottom.



General View of the Tipple and Power Plant

In order that no congestion may occur at the loading point where the cars are put on the cages, double loaded tracks have been constructed, and the cars are loaded singly onto the cages by gravity. This double-trackage system extends back for a distance of some 400 ft., and the roof of the coal bed is supported by 15-in. steel I-beams, placed at 36 in. centers. The same construction is followed for the empty return track for about 150 ft.

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*Engineer, Link-Belt Co., Nicetown, Philadelphia, Penn.

where the trips are again made up by gravity preparatory to being returned to the working rooms.

It is a well-known policy of this company, of which Howard M. Bertolet is the general superintendent, to secure two essentials in all its operations: 1. Quality is to be primarily considered. 2. Equipment must be as near fireproof as possible.

The tipple is placed immediately over the shaft and is constructed of steel throughout, wood being used at no point except for runways at the side of the railroad cars for the use of the loaders. All other floors, walks, stairways, etc., are made of diamond-checkered steel plates.

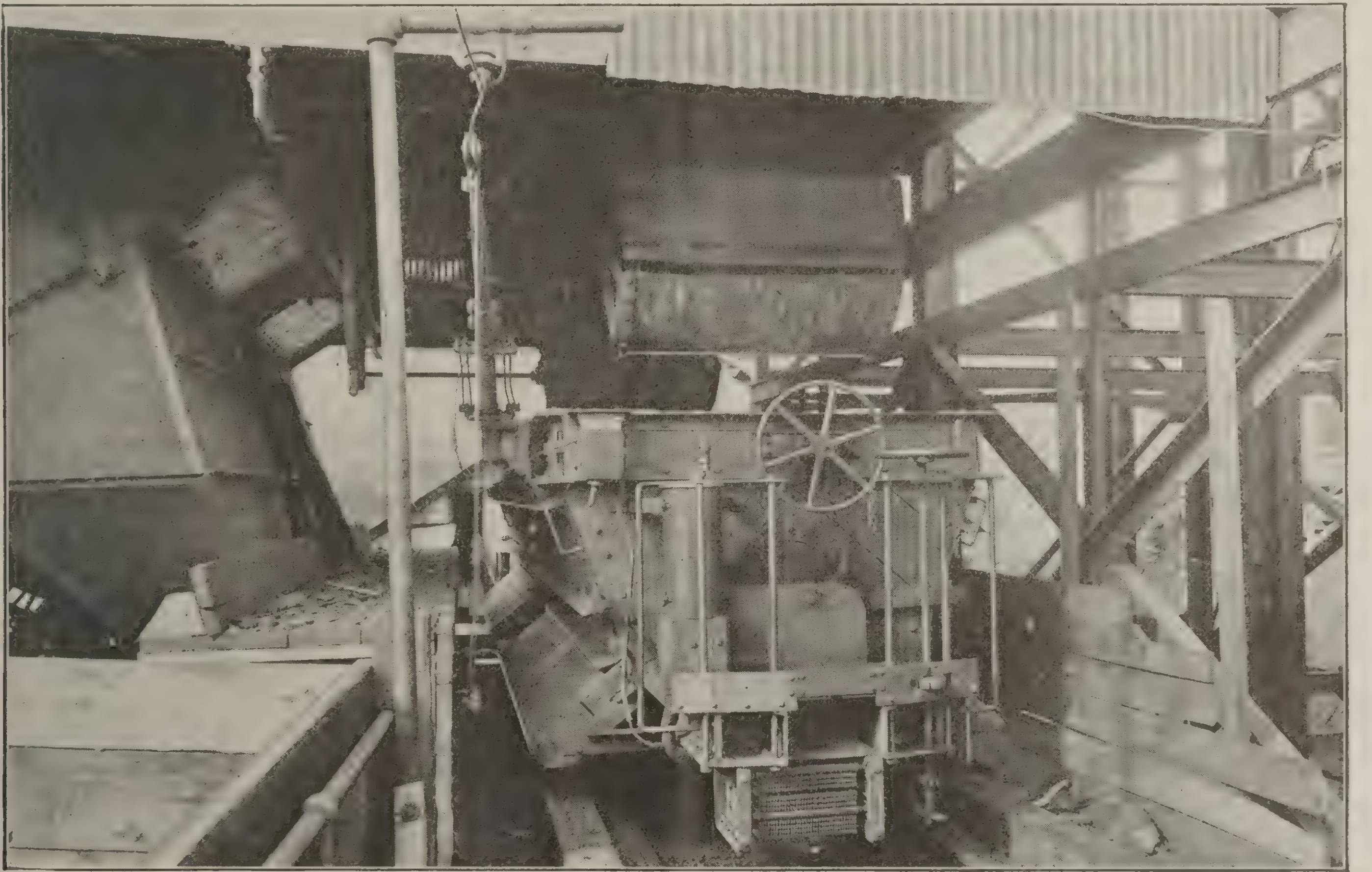
Lepley Cages Are Employed

The Lepley patent self-dumping safety cage, probably the heaviest device of its kind manufactured, is employed to carry the mine cars from the shaft bottom to the elevation of the dumping point. The cars are held in the cage by steel-plate horns, readily opened by the attendant at the foot, to release the empty car and fasten the loaded one preparatory to its being hoisted. As the loaded car reaches the dumping point, it is gradually tilted to an angle of 45 deg., the end gate on the car being automatically opened, so that the only function of the attendant at the top is to inspect the coal and remove the check of the miner from the car and pass it on to the weighmaster in the scale room.

At the top of the structure the 8-ft. diameter bicycle sheaves are placed. These are constructed of heavy cast-iron rims carrying deep V-grooves and connected to the hub centers by steel spokes. In them travels the 1⅜-in. cable, which is attached to the cages at one end and to the hoisting drums at the other, lowering and raising the cages to their respective terminals.

From the cars the coal is discharged into a heavy plate-steel dump hopper, from which it passes into the weigh baskets. Each weigh basket is connected with a 10-ton suspension scale by adjustable forged-steel hanger rods, while the beams are placed in a separate room directly above, in which the weighmaster both records the weight and controls the operation of the basket gates, allowing the coal to move on when released. After leaving the weigh baskets the coal passes over sections of gravity bar screens suspended by hanger rods. These are unveiled, allowing ¾-in. slack coal to pass into hoppers for boiler-house fuel, which when filled close up the spaces between the bars, allowing all coal to pass over them. In this manner boiler fuel is always stored automatically and needs no attention.

A tapered gathering chute, suspended below the screens, centers the coal, discharging it into a double spiral chute, which is provided with a fly gate so that coal may be loaded onto either of two railroad tracks below. A chop gate placed at the end of the spiral chutes allows the railroad cars to be changed when full without spilling the coal onto the tracks. Steel hinged extension chutes are attached to the ends of the chutes and are controlled by hand and geared winches from the loader walks so that high as well as low railroad cars can be filled with minimum drop for the coal.

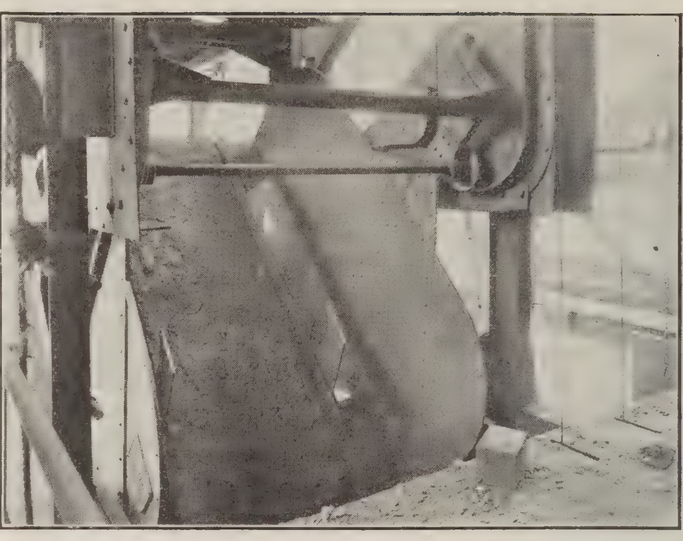


The Self-Propelling Rock Car and Trailer under the Rock Chutes

Self-Propelling Rock Car Handles the Refuse

The ever-present and important problem of disposing of rock and slate is solved as follows: In the dump hop-

Suspended Screens for Boiler Fuel



Lepley Cage in Discharging Position

pers, fly gates are provided, which are thrown open when rock is hoisted. Directly under these gates is placed a common rock bin of about 20 tons' capacity. This is constructed of heavy plate steel and is reinforced with I-beams placed at close centers under the plates. The discharge of rock is controlled at two points by Link-Belt undercut gates.

A feature of the completeness of this plant is the Link-Belt power-driven side-dump rock car with its trailer, each designed to hold seven tons of rock. The discharge points of the rock bin are so placed that they are central over the rock cars when they are coupled together. These cars are built of a skeleton steel frame lined with oak planking on which are placed steel lining plates. They are mounted on 24-in. car wheels with roller bearings. The power car is fitted with a 25-hp., series-wound, interpole, ball-bearing, variable-speed motor, with incased gearing and controlled by a drum situated on the back platform of the car. This car has a speed of from 10 to 15 mi. per hr.

Loading Chutes above Two Railroad Tracks

The control of the side-dump gate is also located on this platform, while the control of the trailer gate is located on the front platform so that the attendant, in addition to running the cars, can operate the gates of both without moving from his position.

An elevated structural-steel trestle extending over the loading tracks to the rock pile forms the runway for the cars, and as the pile reaches the elevation of the tracks they are extended indefinitely, the rock forming the ballast beyond the end of the trestle.

For safety, the entire shaft opening is surrounded at surface elevation by a steel-picket fence with gates which are kept locked. Supplies are taken into the mine at this elevation, and at such times the empty cages rest on sets of cast-steel landing dogs which are thrown in place by an attendant.

The entire tipple structure is constructed of solid steel members, giving easy accessibility for painting. Steel loading sheds over the railroad cars extend both in front of and behind the tipple center line for 60 ft., providing protection for the car loaders in bad weather.

Trolley Beams Are Placed Where Needed

Trolley beams with geared trolleys are placed both at the top of the sheave house and over the screens and chutes below, their function being to facilitate the quick removal of sheaves from the top of the building to the ground or any machinery needing repairs. The building is covered with corrugated iron roofing and siding and is provided with a maximum amount of light, necessary walks, stairways, etc.

The tipple complete, including the power rock car and the boiler-house fuel system, was designed and erected by the Link-Belt Co., of Philadelphia, Chicago and Indianapolis.

No picking of coal aboveground is considered, it being cleaned in the mine as it is loaded. Inspection of the coal occurs both at a point where it is dumped and as it passes into the railroad car.

The power house, which is constructed of stone, adjoins the tipple at a distance of about 60 ft. The roof is constructed of steel framework covered with corrugated iron. This building is well lighted and ventilated. The floor around the boilers is of concrete.

The boiler house contains two 300-hp. Stirling boilers with underfeed stokers and Williams automatic feed-water regulators. The boilers are connected to the brick chimney, which is 150 ft. high, by steel-plate breechings. The stokers are supplied with coal as follows: The slack hoppers under the screens in the tipple discharge the slack coal into a conveyor consisting of malleable-iron flights suspended on a single strand of chain traveling in a steel trough. This extends upward from the tipple and over a set of steel hoppers holding three tons of coal each, located directly in front of and above the boilers. By means of chutes and gates, coal is automatically fed into the receiving hoppers of the stokers.

The generating equipment comprises two 150-kw. steam-driven units and one 300-kw. motor-generator set, power for this latter unit being received from the Appalachian Power Co.'s system, which is fast being extended throughout this region.

The brick hoist house is located directly behind the batter posts of the tipple. It contains the two 24x42-in. Vulcan steam engines, which are direct-connected to two 10x8-ft. conical drums. The attendant has a dial in front of him with a pointer mounted thereon, showing him at all times just what position the cages are in, from which he is able to determine exactly where to stop the engines.

O. M. Knouff is the superintendent of this mine, assisted by J. L. Ascough as mine foreman and R. M. Lambie as fireboss.

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Extracts from a Superintendent's Diary

Today has been a Blue Monday. Things began to happen early. In attempting to start the hoisting engine at No. 2 shaft this morning the engineer wrenched one of the cylinders entirely free from the guide barrel and we won't be able to hoist another ton of coal for several days at best.

Last Saturday was payday, so the engine had been standing nearly two days and quite a quantity of water had condensed in the steam line between the throttle and the separator. For some unaccountable reason the enginer gave the engine full steam on the first stroke and the water did the rest.

As soon as I learned of the accident my impulse was to discharge the engineer, but on second thought I decided that he would be the last man on earth to tear up another engine, so I changed my mind. Several years ago we had a similar accident, and I paid the engineer off and ordered him out of camp as soon as I became convinced of the cause of the accident. Had he been retained, today's accident would probably not have occurred.

In recalling that occurrence of several years ago, I am reminded that the engineer was not the only one who lost prestige on account of that accident. My experience along mechanical lines had been rather limited and the possibility of wrecking a hoisting engine with a slug of water had never occurred to me.

The engineer took advantage of my ignorance and after the accident insisted that a flaw in the engine casting coupled with a poorly designed frame was responsible for the accident. His contention looked reasonable enough, so I hurried to the office and sent a long telegram to the builder describing the break, and to insure proper consideration, I intimated in the message that they would not get a look-in on future purchases of our company unless they adjusted the matter promptly and to our entire satisfaction.

The president of the engine company arrived in our camp the following day, in answer to my telegram, and he was accompanied by the president of our company. They lived in the same city—in fact were neighbors.

The hoisting engineer and myself were still examining the wrecked machine, wondering how we might make a temporary patch, when the two presidents arrived. After introductions all around, Mr. Avery, of the engine company, took our engineer in hand and began to ask questions.

Did the accident happen on the first trip Monday morning? Had the engine been standing since Saturday afternoon? Did he start up slowly and listen for water? Did he suppose that the relief valves could relieve a cylinder full of water? The hoisting engineer was game enough, but he realized that the whole truth would have to come, so he made a clean breast of it and admitted that water was the cause of the accident.

That satisfied Mr. Avery, but the president of our company, Mr. Small, was far from satisfied; what he wanted to know was why it had been necessary to bring Mr. Avery all that distance to do our investigating.

Mr. Avery, realizing no doubt that Mr. Small was in a fair way of becoming fretted, came to my rescue. He assured Mr. Small that a superintendent couldn't be expected to know as much about a hoist as the hoist builder, and as a matter of course the first thing that suggested itself to any man having trouble with a hoist was a telegram to the builder. I still feel friendly toward him.

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The Teton Basin, Idaho, Coal Field

From time to time during the last six or eight years there have been persistent rumors that a large field of high-grade coal lies southeast of St. Anthony, Idaho. As the development of such a field would be of great advantage to a large tributary region containing extensive mining and agricultural developments, and as samples from the field seemed to corroborate the rumor regarding the quality of the coal, E. G. Woodruff, of the U. S. Geological Survey, made an examination of the field to determine its prospective value.

He found that the reports concerning the quality of the coal were substantially correct, but that the beds are so broken by faults and the area known to be underlain by the beds is so small that the field will probably never supply more than the local market and cannot become a factor in the development of the general region of the Snake River Valley. His report has been published as Bulletin 541-I, a copy of which may be obtained free on application to the Director of the Geological Survey, Washington, D. C.

Mining Laws and Legislation

SYNOPSIS—An address delivered by J. T. Beard at the semiannual meeting of the Kentucky Mining Institute, held at Louisville, Ky., Dec. 4 and 5, 1914. General review of efforts made to improve mining conditions. Deficiency of state mining laws in respect to the clear and specific definition of terms used in the law describing mining conditions and requirements. The need of an equable classification of mines. Mining examinations and certification of mine officials.

Mr. President and members of the Kentucky Mining Institute: I always consider it a great privilege to be asked to address a mining institute or any gathering of men who are greatly interested in the many subjects of economic mining. The very fact that you have an institute here in Kentucky—the fact of its existence is evidence of the progressiveness of Kentucky along the line of intelligent, economic and safe mining. We have been, as you know, for many years endeavoring to improve mining conditions, which at the best are arduous. We have of late years done a great deal in the way of first-aid and educational work.

It seems to me that in our efforts to improve mining conditions we frequently view the subject too much from our own standpoint. The operator is prone to consider the economic aspect as most important and in doing this is brought face to face with the problem of rightly informing his officials and the men in charge of the work. But he often goes further than that. Many companies, as you know, have undertaken sociological work and have done much to improve mining conditions both in the home surroundings of their men and in their educational advantages. They have accomplished much in that respect, and great credit is due them for their efforts.

When your secretary wrote me some time ago and asked me to prepare a paper for this meeting, he gave me the privilege of selecting my own subject. I wrote him that I would not be able to undertake the preparation of a paper with the work already in hand; but would be glad to help in any way I could in pushing along such work as you gentlemen are doing. I wrote him that I would be glad to give a brief address along the line in which I had been interested lately.

Intelligent Control of Mining Conditions

Referring to this question of improvement, it seems to me that, while we are interested deeply in educational, first-aid and sociological work and the improvement of social conditions among the men, mine laborers and mine workers, we overlook what might be called a fundamental element; and that is, using proper means to put our operations under such conditions that they can be intelligently controlled. This thought brings us at once to the consideration of existing mining laws and mine regulations and needed mine legislation.

Many of our states have admirable mining laws in some particulars, while in others they are not so good; and yet there is scarcely a single state whose mine laws are anywhere near perfect. They sometimes err, and perhaps chiefly so in not being *specific* in the definition of the terms used in the laws. They err again in not giving sufficient authority to the men—the officers whose duty it is to see that the laws are enforced. I may say that this is one of the greatest difficulties that confronts the mine inspectors in the state of Pennsylvania today. According to the testimony of the majority of state mine inspectors, it happens frequently that when they attempt to enforce a law standing on the statute books they find themselves helpless to do so. It often occurs that either the influence of politics, controlling or restraining the court, or some technicality in the wording of the law renders them helpless to enforce the very law that in their judgment should be enforced in order to make the mine safe.

Uniform Publication of State Mining Laws

Recently I have been looking through the mining laws of the different states; and just here I want to make the suggestion, gentlemen, that all mining laws should be printed in such a shape that they can be distributed and carried about in a small convenient form. So many of these state laws are printed in a large and bulky shape. Your law in Kentucky is in a convenient form; but the laws of many of our states are published in a form that cannot be distributed. This is not the fault of the mining department, but is largely due to a lack of appropriation to print the laws or to print them separate from other reports. I remember that a few years ago the laws of Alabama could be obtained only in such a large or bulky form that it could not be carried around or referred to conveniently.

Many of the state laws are not indexed, so that we find when we undertake to look up a particular question there is no way to refer to it and find it quickly. The mining law of Tennessee has a marginal index. I want to compliment you gentlemen and particularly your chief, Professor Norwood, on the indexing of the Kentucky mining laws. I believe I have never picked up a pamphlet of mining law that is so well indexed as this mining law of Kentucky.

Need of Specific and Clear Definition of Terms

Speaking of the lack of specificness and clearness in the definition of terms in mining laws, I want to refer briefly to one or two points, though many others will occur to you gentlemen. As I told your secretary, I think that more can be gained by a heart-to-heart discussion of mining laws, or of any subject for that matter, than can be gathered from the reading of a prepared paper. One point worthy of careful consideration, in respect to improving our laws, is that in relation to clearness of definition. Let me ask, How many of the mining laws of the states clearly define what is meant by a gaseous mine? As you are aware, the laws of the states commonly classify the mines in such a manner that those mines designated as "gaseous mines" are subject to restrictions and measures that call for an increased outlay and increased expense of operation; and these restrictions fall as a burden on the operator if his mine is classed in that category.

Classification of Mines

In many cases, the laws of the state leave the question of what is meant by a "gaseous mine" so indefinite that it throws the whole burden of classification on the mine inspector. He must say, according to the law, whether or not a mine is a gaseous mine. That difficulty, I believe, exists in your neighboring state of Tennessee. The mines in that state are divided into four different classes, A, B, C and D, and are classified in such a manner that the mine inspector must determine what mines fall in class A, as a gaseous mine, or belong to class B, and also to determine whether or not that mine is more dangerous from having an accumulation of dust. Now, the only distinction that the Tennessee law makes in class A mines is that they generate sufficient gas to be detected on a safety lamp—I believe that is the reading of the law. But I don't think that it states just where or when, thus throwing the whole burden of classification on the inspector.

In your Kentucky law there is a specific classification in that regard. "A gaseous mine is one in which the percentage of explosive gas exceeds three-fourths of 1 per cent. in the return airway of any one split in a dusty mine; or exceeds 1¾ per cent. in the return airway of a split in a non-dusty mine." That is a very good provision and an excellent definition. It gives a specific method for the classification of the mine. The Tennessee law simply says that the mine to be classed as "gaseous" shall generate sufficient gas to be detected on a modern testing lamp, without stating where or how. We all know there are numbers of lamps for testing for gas, some claiming to detect gas as low as one-half of 1 per cent., and others three-fourths of 1 per cent.; and if I read the law rightly, such indications would have to be regarded as determining the classification of a gaseous mine, but subject of course to the final decision and ruling of the mine inspector.

A Practical Illustration

Imagine, gentlemen, for a moment the mine inspector approached by a company. He sees the superintendent or the manager and tells him that he has detected gas—we will say possibly 1 per cent., possibly 1½ per cent. He has detected gas, and it falls under the classification "A." The superintendent calls up his foreman and with the inspector they go below, where the inspector shows them that there is gas. The superintendent explains that it is "only in one place" and after awhile prevails on the inspector to let the classification stand as it is, and the inspector reluctantly complies, as he has that authority. But the conditions change before the time arrives for the next inspection, and that small amount of gas has increased—indeed is coming in other places. Still there is no change in the classification of the mine, and the restrictions with regard to gaseous mines are not made, because the operator is not compelled to meet them.

Of course, we all know that many of these conditions in coal mining throw a burden on the operator; and unless it is necessary for the safe operation of the mine, the law ought not to be so specific as to impose the burden. The first condition in coal mining, however, we must all admit, is to make the operation safe. It is admitted quite generally in print that "safety is the first consideration"; but we know—many of you know that miners are prone to run much risk. Perhaps there is no industry in which the industrial workers themselves are given to taking greater risks than in coal mining. It is therefore a question just how specific the law should be—it is a question for you gentlemen to discuss, to enable you to reach some intelligent and capable understanding, as to what is necessary to make operations in coal mines safe. It is a difficult question; it is a hard question.

In studying this question of law in relation to mining, we must bear in mind one thing and that is when we make a law it must be drafted and enacted in explicit terms, so that an unnecessary burden is not thrown on any one man or class of men. No one appreciates that point more than the mine inspector. No one more than he feels the importance of clearly defined mining laws. When he is called upon to stretch his conscience—when he is called upon to underclassify a mine that he knows and his better judgment tells him should be classified as a "gaseous mine"—when he is urged on one pretext or another to place the mine in the lower class in order that it may be operated at a less expense, the mine inspector would rejoice to have such a specific law as I am talking about.

Mining Examination for Certificates of Competency

As I have said these are difficult questions and I, for one, would not attempt to suggest a solution. They are questions that must be freely discussed and carefully considered. One question of great interest in the same connection is the examination for certificates of competency to act as mine foreman, assistant mine foreman and fireboss. For fifteen years, I believe I held nearly every position in a mine and performed all kinds of mine work except digging and driving. For the past twenty years, my time has been devoted to the education of mining men, particularly mine foremen and firebosses, by classes, by private instruction work, by correspondence and in other ways. I have tried to assist them in some way, if possible. to a more intelligent method of performing their work. Just how much I have accomplished, it is not for me to say. But the matter of examination for certificates of competency is one that comes right home to me. I know what it means to a great many mining men, having been secretary of the Iowa State Examining Board for a number of years.

Let me illustrate: Here is a man who has been serving as mine foreman with more or less success—a good, practical man. But conditions arise in the mine that he is unable to combat, because he doesn't understand them; and he naturally and necessarily endangers not only his own life, but the lives of others working under him, simply through his lack of knowledge. It may seem hard to say that the law should require the examination of mine foremen and their certification because these men are mostly practical men with no knowledge except what they have gained in the mine. But when we look at it from the point of safety it is not so hard, because we know that the conditions of mining in this country and elsewhere have so increased in their danger within the past few years that it is necessary that we should understand more about the *theory* and *principles* of mining.

Changes in Mining Work and Equipment

The equipment of mines has changed wonderfully in recent years. Take the question of installing electricity or the use of gasoline engines and locomotives in mines. We don't all agree on the question of gasoline locomotives for mining use. Many hold that it is the most economical machine that can be put into a mine for the purpose of hauling coal. It is certainly very flexible and economical, but it cannot be denied that at times, under conditions incident to mining, it generates a dangerous amount of gas and if the ventilation is deficient becomes a dangerous factor in the mine. It is necessary that mine foremen should better understand these points. It is necessary that they should understand the influence of *dust*. Until recently, how few of our mine foremen have considered dust at all dangerous? Even at the present time I meet many mine foremen who do not regard mine dust in the sense in which it should be regarded.

Some States Hold No Examinations

But speaking of examinations, as we all know, many of the coal-mining states do not have examinations. West Virginia has no examination required by law, but it is the practice of the Department of Mines of West Virginia to demand an examination of all mine foremen. And this has received the hearty support of most of the coal operators in that state. When Mr. Paul, who read the last excellent paper, was the chief of the Department of Mines in West Virginia, I believe he demanded an examination wherever he could force it upon the operator. But the practice is now quite general throughout the state although not the law. The same is true of Ohio—the law does not require the examination of mine foremen. In Indiana the examination of the mine foremen is in the hands of the mine inspector, as required by law. I believe here in Kentucky the examination is in the hands of your excellent chief, Professor Norwood.

Character and Purpose of Mining Examinations

What appeals to me most strongly is the character of these examinations. Examining boards, in the majority of cases, are politically constituted. These boards are largely composed of men the majority of whom do not fully understand the questions they ask, and their vote to pass or not to pass a candidate's paper is based on their limited knowledge of the candidate's written answer. I have frequently criticized questions asked by state examining boards. Some of the questions put to candidates in examination could not possibly be answered, and yet the candidate is expected to give an answer. We are frequently confronted with a question that is absurd.

When you think of it, the purpose of an examination is not only to find out what a candidate knows, but what he doesn't know. In this matter we are up against the question of the ability of the examiner to pass on the questions asked intelligently himself. Many a time I have had the answers given in their examination papers sent to me by candidates who had been through the examination, but had failed to pass. They asked me to kindly look over the paper and pass on the questions. I never like to do that, but in some cases have done so. In one instance in one of the Western states, I was called by the governor and asked to go into the matter of the board's markings with him. I think he was thoroughly interested in the complaint of a candidate and wanted to know wherein the paper was incorrectly marked. I did so and went through the paper with him. It took a little time, but it was very interesting work, as he was wholly satisfied that an injustice had been done candidates in the method of marking adopted by the board.

The fact that a candidate does not pass an examining board does not in any wise prove that he is not well informed on the theory of mining. My experience in connection with examining boards, private instruction and correspondence work has been perhaps as varied and as long as most men engaged in coal mining, since for the past 30 years I have been much interested in this subject. I regret to say that in 1885 and 1886, when Secretary of the Iowa Examining Board, we passed some men that I could not conscientiously pass now. At one time when Governor Boise, a Democrat, had been inducted into office (the examining board, of course, was largely Republican, holding over from the last administration), we passed certain candidates by the adoption of rules which, though legitimate, were at the same time not fair to all candidates. I say that frankly; and that is the common experience of most examining boards. In nearly every instance they are governed, to a greater or less extent, by politics or political influence.

Appointment of Examining Boards and Requirements

Going back, now, to the question of what ought to be required of examining boards, let me say that they should be men who are technically qualified to pass on the questions they propound. I believe that most thoroughly, gentlemen. Now, in reference to the matter of the appointment of examining boards. As you know, the board frequently is composed of one engineer, two mine operators and two miners. As a rule, the members of the board who are miners know nothing about many of the questions and often the superintendents know little more.

Miners should hold certificates to be eligible to appointment as board members. Superintendents appointed as board members should also hold certificates. Engineers, of course, if they are competent are supposed to be qualified as engineers and to understand the theory of mining and to be qualified to pass on technical questions, but this is not always true. Some self-styled engineers are only practical men. That operators, superintendents or miners, to be eligible as board members, should be qualified from having passed a similar examination themselves, I conclude after giving much time and thought to the subject. I think it should be a requirement that should be read into every mining law in every coal-mining state in this country.

Mr. President, there are many other points that could be discussed further along this line, and I would appreciate it if these gentlemen would follow in such a discussion. I believe that a great many present could discuss these questions in a way that would be valuable to all of us and especially to this Institute, as well as to this state and to the country.

You are justly proud of Kentucky, and in closing I cannot refrain from repeating a little verse that I found in one of your papers as I was coming on the train. It warmed my heart as I read it, and I hope it will make you feel as good as it made me feel.

KENTUCKY

Not the oldest, nor yet the youngest;
Not the richest, nor yet the poorest;
Not the largest, nor yet the least
  But, take it all in all—
For men and women,
For flocks and herds,
For happy homes and loving hearts—
  The best place outside of heaven
  The good Lord ever made.

Successful Use of Refuse Coal

By E. B. McConnell*

SYNOPSIS—Bone coal possessing a large heat content is often rejected from picking and preparation plants in great quantity. The disposal of this refuse is an item of considerable expense at many plants; others are successfully employing it as a boiler fuel through the installation of shaking grates.

The careful sizing or preparation of coal for market is comparatively new so far as bituminous fuel is concerned. It is becoming more popular, however, as time goes on, and most mines now opened embody some kind of preparaplant.

During the recent depression in the coal business the mines that thoroughly clean their coal have sold their product, while those that do not either operated from one to three days a week or closed down entirely. Purchasers refused to buy coal containing a large percentage of ash.

The type of preparation plant employed and the amount and thoroughness of the preparation vary widely with the kind of coal mined and the number and size of the slate bands, partings and bone present in the coal measure worked.

However advantageous it may be to the consumer to be able to secure "clean" coal free from bone and slate the question of the economic disposal of these impurities is one ever present with the operator, and the manner in which the problem is solved sometimes has no small bearing on the cost sheet.

In many instances the refuse from the picking table contains as high as 40 per cent. or more of fixed carbon and from 25 to 30 per cent. of ash. This is not of course pure bone or slate, but is composed for the most part of thin pieces of bone, slate or rock to which the coal adheres tenaciously upon either side. No means of freeing this bone from the adhering coal has yet been devised which can rightly be termed a commercial proposition. While it is true that separation may be accomplished by hand work, its cost is disproportionate to the results obtained.

In the Thacker and Kenova fields in West Virginia and Kentucky there are partings from 2 in. to 6 or 8 in. thick of alternate layers and from 1/8 to 3/8 in. thick of low-grade slaty bone and the best quality of coal. This is known as laminated bone. These thin layers cannot of course be separated, and recently purchasers have insisted that this material be entirely rejected.

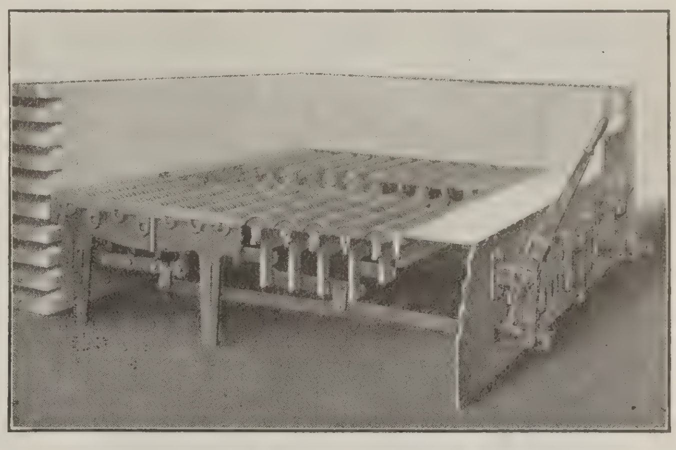
Refuse with 40 per cent. of fixed carbon and, say, 30 per cent. ash has a definite fuel value; but this is difficult to secure through the medium of ordinary hand-fired, stationary-grate boiler furnaces because the ash content is so high that this inert material soon accumulates in such quantity as to choke the fire and render frequent and almost incessant cleaning necessary.

Some Stokers Are Successful Bone Burners

Some types of automatic stokers are so built as to be fairly successful with high-ash fuels. Preëminent among these are chain-grate stokers, which dump the ashes over the back of the grate continuously, also those varieties which are provided with a dumping plate at the rear of the furnace by means of which the ashes are precipitated into the ashpit at frequent intervals.

The high cost of these stokers practically prohibits their use in the small coal-mine power plant, where there can be no saving in labor to counterbalance the interest on the investment, and therefore few coal-mine plants are equipped with automatic stokers of these types.

In the ordinary hand-fired plant the great problem in burning high-ash fuel is to keep the ashes from accumulating on the grates and shutting off the air-supply. This difficulty may be overcome by the use of shaking grates, such as the Ajax manufactured by the Valley Iron Works, Williamsport, Penn., by means of which the ashes may be frequently shaken through into the ashpit.



Constructional Details of the Ajax Grate

Many mines have successfully solved the problem of refuse-coal disposal by means of these grates. For more than four years the power plant of the Derry No. 1 mine of the Latrobe-Connellsville Coal & Coke Co., at Latrobe, Penn., has used as fuel nothing but refuse from Bradford breakers containing from 45 to 50 per cent. of fixed carbon and from 25 to 30 per cent. of ash. The mines of the Cascade Coal & Coke Co., at Tyler and Sykesville, Penn., for more than three years have burned breaker and washer refuse containing about the same proportions of carbon and ash as the fuel just mentioned.

The power plant of the McCandlish mine of the Hutchinson Coal Co., at Meadowbrook, W. Va., for more than a year has used as fuel nothing but bone coal, consisting of a slaty parting with good coal adhering to both sides. C. J. Ryan, general superintendent, reports a saving of $200 per month in fuel cost at this mine.

Bone coal is also burned at the Hutchinson mine at Mt. Clare, W. Va. The Grey Eagle Coal Co., Kermit, W. Va., is burning all the laminated bone it produces, which is about one-half of all the fuel used. The fires have never been cleaned through the fire-door, but all the ashes have been shaken through the grates and taken out of the ashpit. The McAlpin Coal Co., McAlpin, W. Va., the New River Collieries Co., at Eccles, W. Va., and numerous other mining firms burn all the refuse rejected

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*207 Fulton Building, Pittsburgh, Penn.

from the mine output in the cleaning and preparation processes.

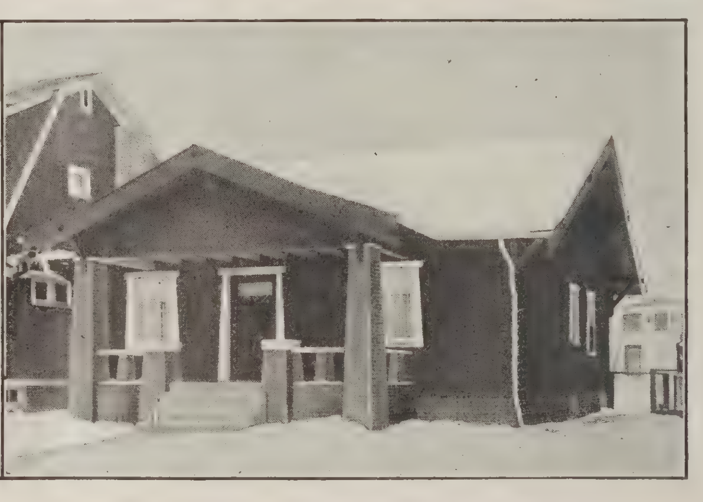
It is a grave question whether many mines that now purchase current from a central-power station could not produce it more cheaply by burning the refuse bone coal now thrown away. They might also afford to clean and pick the output more thoroughly and thus secure a cleaner product if an economic use could be made of the "pickings."

Miners' Homes

Building houses is a specialty just as much as any other work. No engineer of mines wastes his time designing a pedestal block for an engine or planning a steam hammer. He may prepare rough specifications, but he leaves the details to the manufacturer, and in most cases a specification is merely a trap for the coal company which involves it in difficulty rather than saves it from losses; for the mining engineer is not a machine designer, nor is he a builder and architect.

It is far better to get a house supplied by a concern which troubles its mind with no other problems and can afford to make the necessary variety of residences because it makes 20 or more houses every day. There is no reason why a company cannot be relied on to supply a suitable house from its own plans and specifications just as we can feel assured that we will receive a satisfactory engine from a reputable engine-building firm.

Simple Five-Roomed House

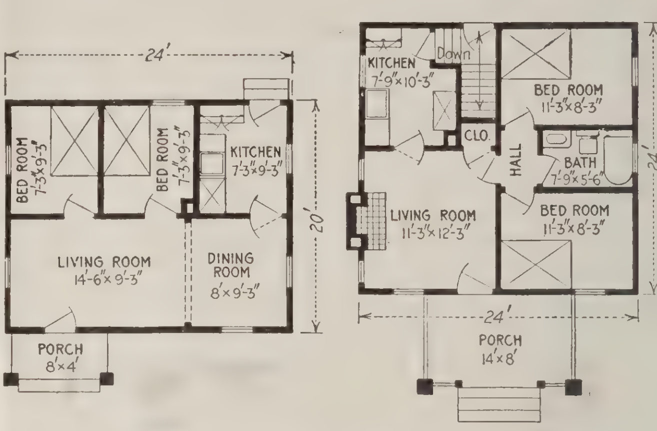


House with Striking Individuality

A concern which ships a knock-down house direct to the purchaser saves in freight because it only ships useful lumber and not waste material, and it also saves in material, because it can scheme to reduce waste in cutting. Seeing that the cutting is done by special machinery instead of hand tools the cost of framing is divided by three. The time in which the house is erected is also considerably reduced. The design is also almost sure to be superior to the work of a country architect and certainly better than a mining engineer is likely to evolve, for he does not keep himself posted by reading architectural literature.

Such houses can be put up without skilled labor because no framing has to be done, and with full directions sent by the firm supplying the lumber, men with little natural ability and no experience can do the work of erection.

By means of these economies the International Mill & Timber Co., of Bay City, Mich., states it can supply a five-room house with porch and back steps complete from foundation to gable, with all paint and plaster at $390. Two houses are shown in this article which roughly represent the 50 different models which it has on the market. The prices range up to $2213 for a 10-room house.



Plans of the Two Residences Illustrated below

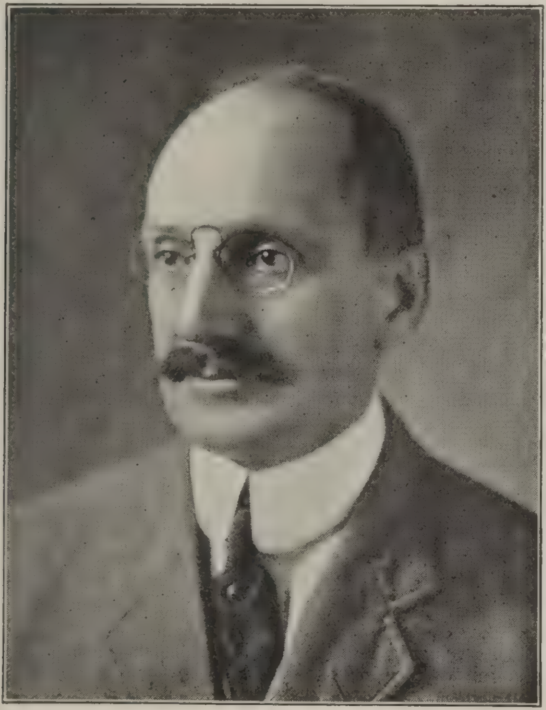
Operators who are encouraging their miners to build could well urge their men to buy houses from this or a similar firm, for they could erect them in their spare time and save the profits to architects, carpenters, retailers, wholesalers and middlemen and furthermore eliminate some rehandling and reshipment of material which occurs when lumber is bought from a retailer. The company is as ready to supply a single house as a hundred and will agree not to sell a similar house to anyone in the same vicinity. In the summer months when the coal trade is dull thrifty employees would have a splendid opportunity to erect their homes with but a little help for bricklaying and for plastering if plaster-board is not used.

If the operator is contemplating starting a band in his mining village, he will not consider securing a tailor to furnish the uniforms, but he will write to a uniform-furnishing house. Similarly, if he does not own a merchantable forest or a lumber yard, he will do well to buy his houses by mail order as he would buy the band its suits. Since it is not necessary to fit the house to the lines of the tenant, it is really easier to buy a knock-down house than to purchase a clothing outfit.

Change in the Bureau of Mines

Herbert M. Wilson, engineer in charge of the Pittsburgh Experiment Station of the United States Bureau of Mines, has resigned from the Government service to become director of a newly formed organization to be known as the Coal Mine Insurance Association.

Mr. Wilson was closely associated with Director Joseph A. Holmes in the inception and development of the Bureau of Mines. Early in 1907, when Secretary James R. Garfield added a technologic branch to the United States Geological Survey, Director Charles D. Walcott of the Survey selected Joseph A. Holmes as chief of the new division and Mr. Wilson was appointed as his principal assistant. With the creation of the Bureau of Mines, Mr. Wilson became engineer in charge of the Pittsburgh station, a position which he has held ever since.



H. M. Wilson

Mr. Wilson was educated in mining as well as in civil engineering, graduating from the School of Mines, Columbia University, New York. He has spent the last eight years in developing mining experiments, including the use of explosives, experimental investigations in electricity and lighting, and especially in the mine-safety, mine-rescue and first-aid operations of the Federal Bureau of Mines. As evidencing his interest and activity in matters of safety, he is on the advisory council of the Underwriters' Laboratory, Chicago; he is one of the organizers and is on the executive committee of the National Safety council and was the first president and is now the secretary-treasurer of the American Mine Safety Association. He is familiar with the coal-mining industry in every state, having personal knowledge of many of the mines.

The Coal Mine Insurance Association, of which Mr. Wilson is to be the director, is a combination of ten American and British insurance companies that have associated themselves for the joint underwriting of coal-mine accident insurance.

An extended review of Mr. Wilson's life was published in Coal Age, Jan. 31, 1914, Vol. V, pp. 204 and 205.

The Labor Situation

Owing to the improvement in business many plants are resuming operations in eastern Ohio, where the 13-month strike was recently settled. About one-third of the miners in the district are now employed, but they are probably not working full time. However, the work of preparing other mines for operation is being rushed, and before long most of the plants in the district will be working.

The officers of district No. 5, which comprises the eastern Ohio field, are endeavoring to sell or lease several thousand tents bought to house the miners against whom eviction notices were issued last winter. The men were never evicted and the tents were not used. The money received from the sales is being expended in "strike" benefits for those still unemployed.

The men at the Wheeling Creek mine of the Lorain Coal & Dock Co. have refused to work on the basis of an allowance of 33⅓ per cent. for the slack which passes through the screen and is accordingly not weighed. There will probably be no more work until the tipple is remodeled, so that all the coal mined can be weighed and paid for at the run-of-mine rate. Some other mines are working on this basis, and some have already made arrangements to weigh the coal in bulk.

The actual slack content in eastern Ohio is 36 per cent. But the miners insisted they were making an equivalent contract when they replaced a rate of 69.5c. per ton for screened coal by 47c. per ton for run-of-mine. This would have been a fair equivalent had the slack content been 32.37 per cent.

Some operators have endeavored to arrange temporarily for a percentage somewhat more liberal to the miner—namely, 33⅓ per cent. As a matter of fact the miner knows he has made an advance in the rate per ton in return for other concessions, and he cannot see why the operator, whom he has been contradicting, should now proceed on the basis that the miners' contention was correct. The miner refuses to be "hoist with his own petard," forgetting that he has for months asserted that his petard was a harmless firecracker.

Coming Meetings

Illinois and Wisconsin Retail Coal Dealers' Association will hold a convention June 23-24, at the Jefferson Hotel, Peoria, Ill. Secretary, I. L. Runyan, Chicago, Ill.

West Virginia Coal Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel Du Pont.

M. O. I. Coal Association's annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland, Ohio.

American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

American Mine Safety Association will hold the following meets: July 2-3, Big Stone Gap, Va.; July 23-24, Billings, Mont. Secretary, H. M. Wilson, 40th and Butler St., Pittsburgh, Penn.

The Order Kokoal will hold its annual pow-wow at Chicago, Ill., July 13 and 14, 1915.

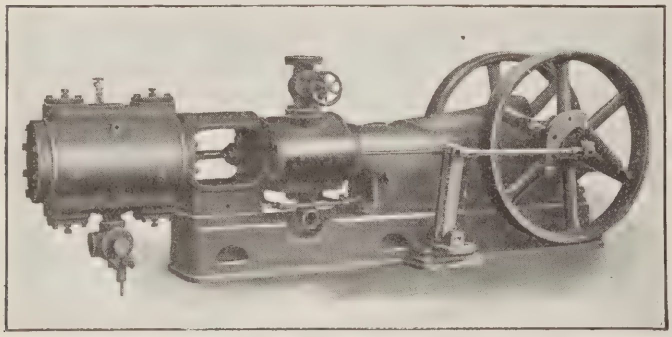
Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel Du Pont. The first two days of the convention will be devoted to business, including exhibition of coal-handling machinery in action, supplies and motor trucks. The U. S. Bureau of Mines will show by motion pictures every detail of anthracite mining, accompanied by a lecture by Charles Enzian, of Wilkes-Barre, Penn. The "Queen Anne" has been chartered to take the members and their friends on June 17 down Delaware Bay.

New Apparatus and Equipment

Efficient Small Air Compressor

The constant demand for higher efficiency and greater economy, as well as the increasing tendency toward the use of higher steam pressures, has led to the development by the Ingersoll-Rand Co. of the small steam-driven high-speed air compressor shown in the accompanying illustration.

This machine is designed along the same lines as the company's former small steam-driven type, but embodies many improvements which give it a higher efficiency in air compression and a considerably lower steam consumption. These improvements are:



Small Steam-Driven Air Compressor

1. The "Ingersoll-Rogler" air valves, which are now standard on the extensive line of steam, power and electric driven compressors known as the "Ingersoll-Rogler" line. They allow of high speeds, give high compression efficiency, are almost silent in operation and are independent of any operating mechanism. Before adopting the Ingersoll-Rogler valve a thorough test was conducted to determine the life of this type. This test consisted in running a 12-in. stroke compressor 400 r.p.m. over a period of one year, during which time no valves were broken nor any adjustments required. In the two years in which this type of valve has been on the market there has been practically no valve breakage.
2. Balanced-piston steam valves, which type of steam valve was adopted after extensive research. It is designed after the most successful European practice, permits of higher speeds and the use of high-pressure superheated steam, at the same time giving a higher efficiency under ordinary low-pressure steam conditions.
3. Automatic cut-off control, giving the highest possible steam economy under conditions of varying load or fluctuating steam pressures. This control is regulated by a centrifugal flywheel governor which shortens or lengthens the stroke of the piston valve, thus changing the cut-off.
4. Automatic splash lubrication, by means of which all wearing parts are copiously and automatically oiled.
5. Inclosed construction and removable covers, making for cleanliness with great accessibility.

The machine is designed and constructed with great thoroughness in detail. Materials are so disposed as to secure great rigidity without excess weight; bearing surfaces are large and carefully finished. Special provision has been made for ready adjustment of all parts, without loss of time.

The automatic cut-off control is supplemented by an air unloader, assuring great economy at the same time possessing a high degree of automatism, which is essential in a small compressor designed for severe duty and often subject to considerable neglect.

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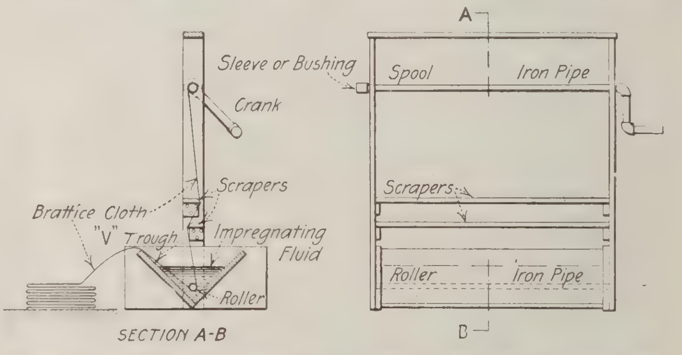
Brattice Cloth Treating Rack

By Davis Crow*

The accompanying sketch shows a rack for treating brattice cloth with tar or other impregnating fluids. This rack has been devised and used by B. B. Hollis at one of the Houston County Coal & Manufacturing Co.'s coal mines and is a useful piece of apparatus. By regulating the speed of turning the crank the quantity of fluid taken up by the cloth can be readily governed.



Side View and Section of the Rack for Treating Brattice Cloth

The rack is simple and can be built easily and quickly. All the material required is a few 1-in. boards, strips, pipes and nipples, elbows and sleeves, also a few nails. If tar is used in the trough it flows into the cracks and makes the cloth airtight. The tar must of course be first heated in order to give it sufficient fluidity.

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Use of Silica-Graphite Paint

A practice that is fast gaining adoption in progressive power plants is the use of paint for the inner surface of steam boiler drums. This is said to afford protection against pitting. Silica-graphite paint is used for this purpose, and for a number of years the manufacturers of this paint have coated the steam drums of five B. & W. boilers developing 1800 hp., with the result that the drums are in almost perfect condition.

Another instance is a plant equipped with B. & W. boilers developing 8400 hp., where the interiors of the drums were scalded, painted both above and below the water-line and allowed 48 hr. to thoroughly dry. This treatment was repeated every 10 months, and not only did it stop pitting, but where it had previously taken six men seven days to clean the drums of one boiler, two men now clean them in one day. This latter experience is quoted from a letter of the chief engineer of the New York Life Insurance Co., in the April issue of *Graphite*.

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*Engineer, Houston County Coal & Manufacturing Co., Crockett, Tex.

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Improved Method of Bagging Coal

Bagging coal which has to be delivered from a coal yard has always been considered as a sort of necessary evil wherever local conditions at the delivery point rendered the chuting of coal directly into cellars an impossibility. Those yards which are blessed with pockets found the bagging problem comparatively easy, as with an abundant supply of coal overhead the drawing off of the material into bags could be accomplished by one man as rapidly as the bags could be disposed of in the wagon. Where coal was carried in ground storage, however, it was more of a problem. The loading of bulk coal has been reduced to a simple matter by the advent of the mechanical wagon loader, which has completely overcome the handicap of ground storage and brought it up to the efficiency of the pocket.

It only remained for a further adaptation of the wagon-loader principles to simplify the bagging problem. By using an elevator to keep a bagging bin constantly full of coal, the equivalent of bagging from a pocket has been reached.

The Link-Belt Coal Bagger in Operation

The accompanying illustration shows how this has been accomplished. The machine consists in all its essential features of an elevating and screening medium which is identical with that in successful use today on scores of machines loading bulk coal to wagons. The elevator buckets are 16x6½ in. in size and are attached to a double strand of closed joint chain. The screen is of the shaking type, set at such an angle that only by vibrating can the coal be made to flow over it. This slow vibratory motion over the screen insures the coal being thoroughly cleaned.

The motor for operating the loader is of 2 hp., and the transmission is by cut gears throughout. In actual operation with two men bagging from this machine, coal has been bagged at the rate of over 21 long tons per hour, an advance of several hundred per cent. over the tedious method of hand shoveling over yard screens.

The loader is light, and as it is provided with wheels 48 in. in diameter, it is easily moved from one bin to another. The screens are interchangeable for the various sizes of coal from pea to egg, all of which are handled on this machine with equal facility. This loader is made by the Link-Belt Co. of Philadelphia, and embodies the result of many years of experience.

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Economical Method of Making Coupling Pins

A Leyner drill sharpener in the shops of a coal mining company was recently fitted with special dies for forging coupling pins for mine cars. This resulted in a considerable economy of the blacksmith's time.

For this purpose a piece of iron stock 1¼ in. in diameter and about 14 in. long is placed in the dies, projecting about 2 in. The flat-faced hammer or dolly upsets the head, as shown in Fig. 1, bringing down the length of the pin to about 12½ in. The machine operates with compressed air and is controlled entirely by a single lever.

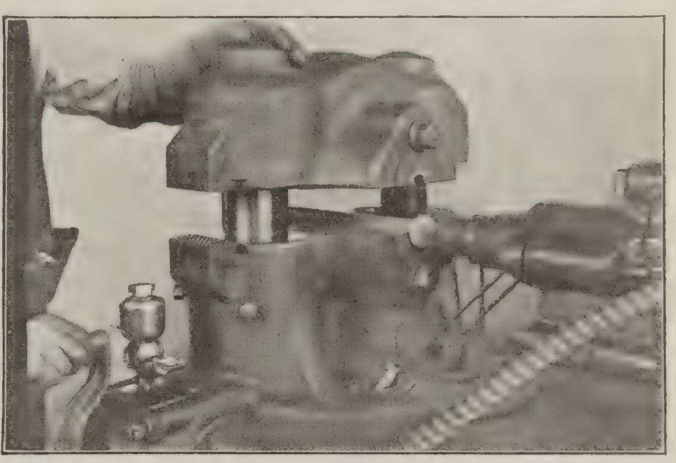

Fig. 1. New Dies and Pin in the Sharpener

By equipping the sharpener with suitable dies and dolly the pins were turned out at the rate of about two per minute. This rate could have been even greater if it were not that there were only three forges in use and they could not supply the heated stock any faster.

Fig. 2 shows the special dies and dolly used for forging these pins, as well as a blank and a finished pin. It is planned to make other special dies and dollies so that the machine can be used for miscellaneous blacksmith work, such as welding car couplings. In addition to this special work, the sharpener is used for pointing various styles and sizes of drill steel used for cutting rock and coal in the mine.

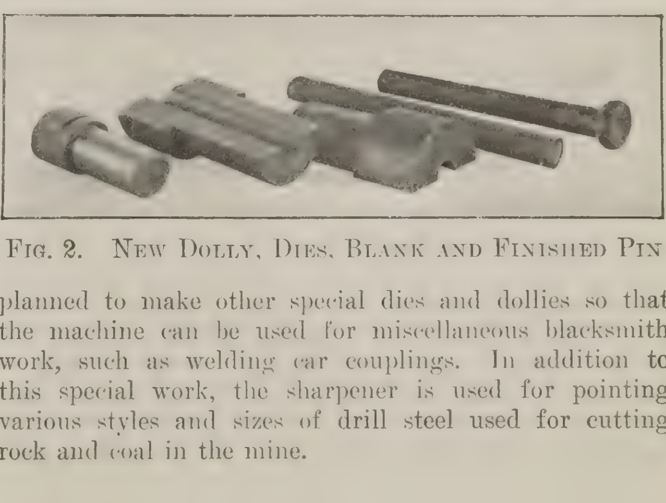

Fig. 2. New Dolly, Dies, Blank and Finished Pin

Editorials

Have You a Lodge?

Not the drinking kind of course, but a benevolent lodge which teaches the brotherhood of man and gives play to the better instincts. There should be no favorites. Masons, Knights of Columbus, Odd Fellows and Maccabees all are good. They teach the brotherhood we all should feel and knit up the community life. Sometimes churches are almost impossible and lodges are not. In all cases it is well to have one if you cannot have both.

For anything which teaches a man about his fellow's rights prevents the clash of interest. Even the unions are not wholly given to destructive energy. They do not entirely labor to pull down what others upbuild.

It is pleasing to notice the recent attitude toward coöperation in store management especially among the unions of Illinois and Indiana. The stores may never succeed—though we hope they will—but if they educate the shareholders they will do an acceptable work. It is sincerely to be desired that they will be prosperous, for they will certainly promote thrift. Unfortunately the irregular operation of the mines makes it difficult to conduct such a business without credit, and it is difficult to give credit without a large bank account. Accordingly in bad times the coöperative stores do little or no business and lose the goodwill of their patrons.

But successful or not, it is a good sign, for it is constructive work, as is also the generous support recently given to first-aid work in Illinois. If the unions thus begin to show a large sense of their duties of citizenship and cease to criticize benevolence as robbery of their rightful dues they will then be claimants like the lodges to the blessings of mankind.

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Powdered Fuel on Railroads

Among the great changes of the future as viewed from the broadest national standpoint will be the use of powdered fuel on railroads if ever that plan is made a success. Everyone should combine to aid this desirable development. In fact, why should not the Bureau of Mines equip a crushing station and, under an arrangement with some railroad, operate a locomotive on a spur of railroad having much heavy traffic, and thus prove what can be done?

The problem interests more than the railroads and is a proper question for national investigation; for when the happy time comes that coal is burned in powdered form the forests will once more be able to grow to maturity freed from the periodical fires formerly started by locomotives. The air along the railroads will be so purified that it will be more possible to have the best of residences facing the track.

Of course the noise of the exhaust would also have to be removed, but even that can easily be done if approached seriously. In fact the railroad engineers, like the mine managers of our forefathers' days, ventilate by exhaust steam, an uneconomical method of creating a draft of air. If the exhaust were used for driving a blower a steady draft would be possible. There are many uses for this steam more acceptable to the general public than that of scattering ashes live and dead over the lawn, porches and weekly wash and over the dead and living leaves of the forest to burn or deaden the trees which are striving to grow.

The mines also will be helped by the use of powdered coal. The loud condemnation of miners for blowing their coal to pieces, instead of mining it, simply because it is unscientific and not in accord with early practice, has always seemed ill-judged. Wherever, and that is in most localities, shooting coal from the solid is under present conditions unsafe it should be unsparingly condemned. Where it prevents coal from entering the market it should be firmly forbidden. But where it is safe and where slack is as desirable as lump coal why condemn the miner to undermine his coal?

The miner is showing that he is not a slave to ancient practices when in the Connellsville region he puts in a blast and shoots the coal from the solid, apparently bringing it down without danger and in such a condition that it is well-suited for coking. Safe methods of shooting even the harder coals from the solid may yet be found as soon as the need for large coal is removed.

We wish to get beyond the time when coal must be mined with such care. We would see it produced cheaply, even though not scientifically, and the use of powdered coal foreshadows the time when coal will be ground out of the hill and handled without the care now devoted to it.

And such coal will be burned with the utmost economy, for perfectly smokeless combustion will result from its comminution. The cost of crushing has always been regarded as a disadvantage, but we believe that the labor cost can be made negligible.

The unfortunate man who now has to be ready to dump coal at irregular moments during the night or day will be made happy by having something to occupy his spare moments—namely, the crushing machinery. He can attend to this work when he is not coaling engines. Of course a more skillful man will have to be chosen, but in the days to come we shall have skillful men everywhere and not in a few selected positions.

Speaking before the International Railway Fuel Association, W. L. Robinson, supervisor of fuel consumption of the Baltimore & Ohio R.R., enumerates 18 advantages in the use of powdered coal, including sustained boiler horsepower; ability to run locomotives for relatively long, continuous mileages or periods; automatic firing; absence of cinders, sparks and smoke; material reduction in cylinder back-pressure through greatly enlarged exhaust passages; saving in inspection, maintenance and operation through the complete elimination of grates, ash pans, dampers, operating gear, smoke-box diaphragms, baffles, netting, spark hopper, hand-hole plate, coal pushers, fire tools, squirt hose and like equipment.

Furthermore he shows that the inclosed fuel container prevents the spilling and loss of coal and keeps it free from snow, rain and other unfavorable conditions; that a more uniform furnace temperature is maintained, reducing the liability of leakage of firebox and flues; and that no special fuel is required for firing up.

He adds that with powdered coal an inferior quality of coal can be used; that the heat losses in combustion are reduced; that fires are not started; that there are no delays for the building, cleaning or dumping of fires at terminals or the cleaning of flues and smokeboxes. Ashpit tracks and ash-handling facilities at terminals and intermediate stations are unnecessary, superheater units and boiler flues will not be clogged, poisonous gas will not be formed by combustion, there will be no cinders and ash in the ballast to cement it together and burn out the ties, and the work of maintaining the fires in a locomotive in fit condition will take less training and involve less labor.

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Obsolescence

It will pay us all to be occasionally reminiscent and to remember how we used to do things around the mine in the close of the past century. Few there are of us who can recall having used electric mine locomotives more than 20 years ago. Most of us will be prepared to assert that wooden rails were not only the standard form of track in the rooms of the mines in which we operated, but also found their way quite freely into the entries. We do not recall seeing kick-back dumps at that early date.

A mine which every one would have thought quite up to date at that time became ten years later entirely behind the times, so rapid was the progress of mining science. Today we are traveling along much faster than we were then, and the prudent mine owner will put his factor for the obsolescence of some of his plant at 10 per cent. per annum. Some equipment of course will hardly live that long, but where it is constantly replaced in some parts and repaired in others it never really wears out. But there does come a time when the old outfit is not worth refurbishment. It will no longer do the work with the new economy demanded.

The little mine car of the last century may still be running and be as efficient or even more efficient than it ever was. Wheels have been replaced; the irons have been renewed; new planks have been supplied. Some trifling changes even have been made in its size—the wheels are larger and more easy-running, the car is better braced, the wheelbase has been increased; but radical improvement involves a larger gage. Such a change demands the transference of the obsolete car to another mine or a bold confronting of the problem of obsolescence and the casting away of valuable later replacements and improvements as well as of those parts which are valueless because it is so long since they have been renewed.

The same is true of the headings, air-courses and shafts. They may be kept in repair and even in some cases improved, but they cannot thereby be saved from obsolescence. In time they become out of date and must be entirely reconstructed or replaced if they are to keep up with modern requirements.

Machinery and boilers in the past wore out almost as fast as they became obsolete. Consequently a generous depreciation allowance was sufficient to make an obsolescent charge unnecessary. But the progress of science is so great that obsolescence will soon be the major item in the cost of amortization, and it will have to be figured not only on constructive details such as headings, shafts, bins, railroad tracks, coke ovens and houses, but on machine units.

The biggest burden of the future will be the burden of reconstruction, but it will be cheerfully borne because of the marvelous economies accompanying it. The progress in mining in the 100 years of the last century was not as important as in the last 20, and it is likely that within 10 years the speed of development will be so great that we shall compress into half a decade the former progress of a century.

In 1895 the mine manager studied mine gases, rope haulage and geology. Today these are relatively negligible studies to a man who has an electric plant, a machine shop, a foundry, coal-cutting machines, a steam shovel and even a sanitation plant on his hands. If he cannot handle these it will avail him little to be an expert on the others.

The man who studies the lore of 1895 is as obsolete as his studies. He must keep up with the progress of the times and constantly remodel his mind, and unless he does he will find that a new man, built like the new mine car on an entirely new model, is the man of the hour.

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Western Coal-Selling Plans

The Indiana coal operators have formed a coöperative selling plan, and concerns whose output aggregates 80 per cent. of the coal tonnage of the state have agreed to market their product through a common selling agency. It is understood that Morton L. Gould, president of the Gould Coal Washing & Mining Co., of Indianapolis, will be the executive head of the association.

Mr. Gould has had many years' experience in the production and sale of Indiana coals. He is one of the most prominent and best-known men in the coal trade of Indiana, and his appointment gives assurance that the plan will be successful. It is now expected that within 60 days the new organization will be in operation, and it is anticipated that its headquarters will be in Terre Haute, branch offices being opened in Chicago and Indianapolis.

The Franklin County Operators' Association, in charge of Dr. F. C. Honnold, with headquarters in the Fisher Building, Chicago, is progressing satisfactorily and receiving unqualified support from all its members. Despite the unusually dull times that have prevailed recently, prices have been well maintained on the basis agreed upon, and the operators composing the organization feel that much good will result from their concerted efforts later in the season.

The Williamson County operators have recently organized an association on the lines of that of the Franklin County shippers. This will be in charge of J. L. Keiflein, formerly secretary and treasurer of the New Kentucky Coal Co. The headquarters of the association will be in the Fisher Building, Chicago, and activities will commence on June. 1.

Sociological Department

Rescue-Work in Illinois

SYNOPSIS—The Illinois State rescue corps having given such an excellent account of themselves at Royalton and elsewhere, a description of their training methods is of interest. A well-equipped corps without training or with its apparatus out of order will jeopardize the lives of its members without effecting any good work.

In January, 1910, after the mine fire at Cherry, Ill., where about 300 lives were lost, a special session of the State Legislature was called for the purpose of considering legislation to promote safety about coal mines. At this session, a bill was passed establishing the Illinois Mine-Rescue Station Commission.

Under this act three rescue stations were established to provide prompt and efficient means of fighting mine fires and to save lives and property jeopardized by fires, explosions and other accidents in the coal mines of Illinois. These stations were constructed, equipped, and have been continuously maintained at public expense, to serve the northern, the central and the southern coal fields of the state.

Lecture Room at Benton Mine-Rescue Station

The control of these stations is vested in a commission of seven members, appointed by the governor of the state, including two coal-mine operators, one state mine inspector, one representative of the department of mining at the University of Illinois and one representative of the Federal Bureau of Mines. After the organization of the commission, sites for the stations were selected at La Salle, in the northern district, Springfield, in the central district, and Benton, in the southern district; and a superintendent and assistant superintendent were appointed for each station.

At the time of the building of the stations, the commission also acquired three cars—one by purchase from the Pullman company, one donated by the Chicago, Milwaukee & St. Paul Ry., and the third the gift of the Chicago & Northwestern Ry. The last two cars were fully equipped by the railroad companies, the one purchased by the commission being outfitted by that body from its own funds.

These cars were attached to the stations, a suitable barn for their storage being built on the station grounds and a track being run in from the nearest railroad. These cars have lately been taken from the road, and the equipment from them has been used for the establishment of substations at Herrin, Harrisburg and Duquoin. The cars are kept on mine spurs in the towns where the substations are located, so that the equipment can be taken easily to any place from which a call is received.

The equipment at the six stations is as follows:

Breathing apparatus: Fleuss type—Proto, 41; Salvator, 6; Smoke helmet, 3. Draeger type—2-hr., 18; ½-hr., 12. Westfalia type—2-hr 7..

Oxygen pumps: Draeger type, 6; Fleuss type, 3.

Safety lamps: Electric—Hubbell, 44; Draeger, 3; Fleuss, 2. Oil—Hailwood, 12; Wolf, 25; Davy, 6.

Testing apparatus: Fleuss meter, 4; Draeger water gage, 6; Draeger testing bag, 3.

Pulmotors, 6; mine cages, 3;

In addition to this standard apparatus, the teams at each station have been provided with special apparatus as follows:

Two canary birds, 1200 feet of life line with reel, 1 gross of chalk, 7 signal horns, 1 thermometer, 2 hatchets with shields and belts, 1 8-lb. sledge, 1 saw, 7 flash-lights, 2 lb. of nails and rolls of brattice cloth.

Until September, 1914, the work at each station was done by the superintendent and his assistant, relying on such certificated men as could be secured on call. Realizing that they could improve this method of working, the commission ruled that there should be at each station a team of five men, who would take regular training in rescue and first-aid work and who should sign an agreement to respond to all calls received by the station. The value of such a team was proved when the Benton station received a call at the time of the Royalton explosion. On that occasion eight trained men from the station arrived at the mine in less than three hours from the time when the call was received.

When the cars were kept traveling about the state, a minimum of six days of training was required before a certificate and a rescue-corps button were awarded to those who were trained. These six days were so arranged that a man made six trips in the smoke gallery and received 12 lessons in first-aid work. The following test was required of those seeking final certificates as mine-rescue men:

TWO-HOUR TEST

1. Make eight complete trips around the gallery on the ground floor.
2. Make ten trips over the overcast.
3. Carry 25 bricks over the overcast.
4. Crawl through the tunnel three times
5. Carry four props over the overcast.
6. Saw two props.
7. Set five props and knock them out.
8. Hang a canvas, take it down and fold it up.
9. Pull the weight 60 times.
10. Two men carry a dummy once around the gallery, lifting it over a car.
11. Two men push a car once around the gallery.
12. Make eight complete trips around the gallery on the ground floor.

SEVERE TRAINING REQUIRED OF CERTIFICATED MEN

With the formation of teams at each of the stations, a change was made in the method of training, the number of lessons being increased to 12. For the team training, the following schedules have been arranged:

SCHEDULE NO. 1

1. Walk the entire length of the gallery and back again ten times. (This distance is equivalent to a quarter of a mile.)

2. Erect a temporary stopping under the overcast with brattice cloth, cutting two props and a collar the proper length for supports.

3. Two men build a brick stopping 1½ bricks wide, in front of the temporary stopping, the other three men supply them with bricks carried in gunny sacks, 10 bricks to each sack load.

4. Take down both the stoppings and return them to the point where they were found.

5. Alternately pull weight five times and walk around the gallery twice until the 2-hr. period has expired.

SCHEDULE NO. 2

1. Walk ½ mi. and return across country.

2. Enter the gallery in team formation with life line and other regular equipment and restore ventilation by carrying brattice cloth down the middle of the roadway, using one side of the cloth for the intake and the other for the return, always assuming the gallery to be filled with dangerous afterdamp from an explosion.

3. Crawl through the tunnel three times.

4. Take brattice down and return to the point where it was found.

5. Push mine car around gallery and pull weight until the 2-hr. period has expired.

SCHEDULE NO. 3

1. Carry six props over the overcast and set under a collar.

2. Saw off the ends of three props.

3. Carry ten bricks in gunny sacks around the gallery five times, passing over the overcast, and leave them at the point where they were found.

4. Carry dummy which weighs 150 lb. over the overcast and around the gallery on a stretcher.

5. Substitute a man for the dummy and give artificial respiration by the prone or Sylvester methods.

6. Use a pulmotor on the patient.

7. Alternately pull the weight and walk around the gallery until the 2-hr. period has expired.

SCHEDULE NO. 4

1. Enter gallery in team formation with the life line and other regular equipment, including one ½-hr. apparatus. Each member of the team will assist in carrying this outfit, being relieved by some member of the corps after traveling about 200 ft.

2. Make eight trips around the gallery, passing over the overcast on each trip.

3. Assume that a man in the lecture room is barricaded from afterdamp; apply the ½-hr. apparatus, load him on a stretcher and carry him twice around gallery and to fresh air; unload him and for one minute use artificial respiration, by the prone or Sylvester method.

4. Resume work and build a stopping of rock or brick under the overcast near the farther end of the same.

5. Cut and set up a row of props under the overcast and hang canvas on the props from a point near the stopping to the tunnel. This also may be continued for the length of the tunnel.

6. Take down the stopping, canvas and props, and place where found.

7. In turn make trips around the gallery, pull the weight and crawl through the tunnel, using horn signals during the operation and continue till the 2-hr. period has expired.

SCHEDULE NO. 5

1. Make 10 trips around the gallery as if exploring a mine after an accident, working in team formation by horn signals.

2. In exploring, a fire is found; the captain gives a signal to that effect. Seal off the burning area by a temporary brattice, then by a permanent 12-inch brick wall, the bricks being carried from the extreme end of the gallery on an improvised stretcher. Take down the wall and put the bricks back where they were found. (Not less than 600 bricks shall be used in building the wall.)

3. Form the team in line and examine the gages. Apparatus men Nos. 1, 2 and 3 go through the tunnel, while the others walk once round the gallery, meeting the three men at the end of tunnel. Apparatus men Nos. 4, 5 and 6, now in front of the line, go through the tunnel, while the others go round. Meet as before at the end of the gallery, all the men being in their proper places. Repeat this three times.

4. Carry dummy around gallery and over mine car, changing men each trip as if in relays. Do this four times.

5. Each man saw the ends off two props and pull the weight 25 times.

SCHEDULE NO. 6

Imagine an explosion in the gallery, which, for the purpose, represents a slope mine. The entire mine is filled with dangerous gases. The roof at one end of the overcast is in unsafe condition. All stoppings are blown out. A man is at the far end of the mine from the main entrance near the escapement shaft. The main entrance is that farthest from the overcast. The escapement entrance is full of débris and is inaccessible, and entrance to the mine must be obtained at the main slope, which is the intake. The fan is uninjured. A fire is burning in the mine about halfway inby.

Rescue the man and extinguish the fire, observing as nearly as possible the rules to be observed in case of mine fires and explosions, particularly those relating to work that should be done before entering the mine, the establishment of an inside base, the handling of supplies to that base, the relief of rescue teams at regular intervals and the keeping of accurate records of every event.

The horn signals to which reference is made in these schedules are those used by the Federal Bureau of Mines, given in "Miners' Circular 15, Rules for Mine-Rescue and First-Aid Field Contests," and are as follows:

Number of Blasts	Command Indicated
1	Crew at rest—start to march, captain in lead; maintain 2-yd. intervals.
1	Crew marching—halt.
2	Turn on oxygen and close apparatus.
3	About face.
3-1	Each member examine and read pressure gage, holding gage for inspection by captain, who will record pressure and time of day.
4	Bring forward stretchers, load injured, and lift stretcher preparatory to removal to fresh air.
3-3	Rescue man in distress; all members go to his relief and assist to fresh air; give first-aid treatment.
2-2	Fire discovered; bring fire extinguishers and attack fire.
2-3	Crew retreat toward fresh air.

THE LARGER COAL COMPANIES IN ILLINOIS ALL HAVE APPARATUS

Besides the apparatus and stations of the Illinois Mine-Rescue Station Commission, several coal companies in Illinois have equipped mine-rescue stations of their own, some of them being well equipped. The companies owning oxygen breathing apparatus are:

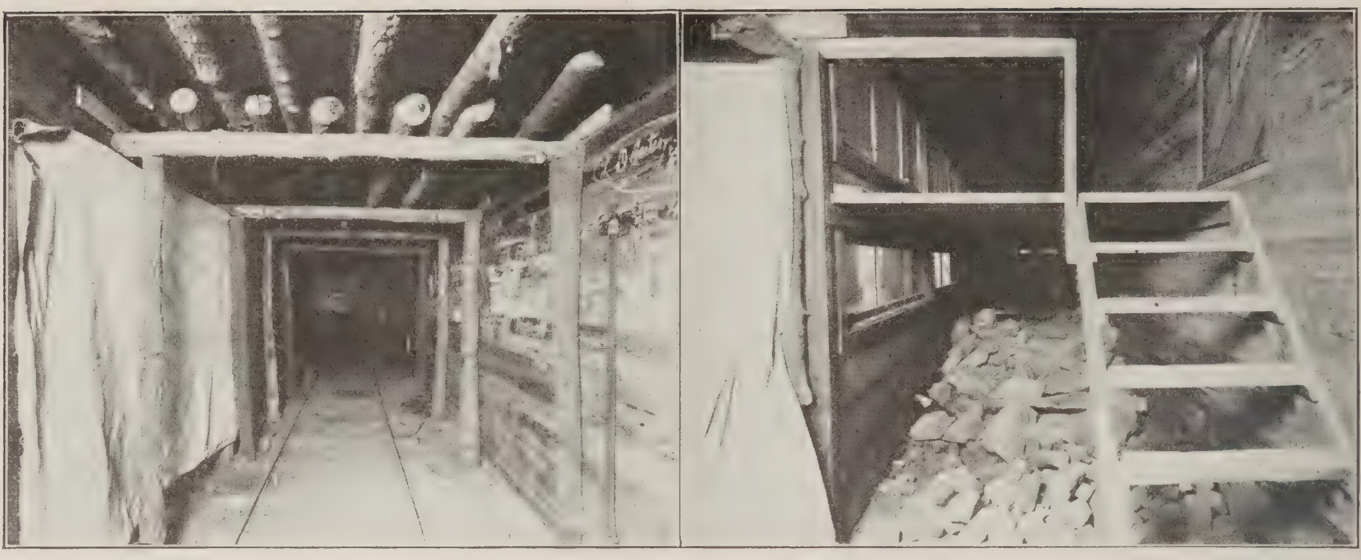
Bell & Zoller Mining Co., Zeigler, 8 sets of Draeger.
Breese-Trenton Coal Co., Breese, 3 sets of Fleuss.
Chicago & Carterville Coal Co., Herrin, 1 set of Fleuss.
Chicago, Wilmington & Franklin Coal Co., 3 sets of Fleuss.
Johnston City Coal Co., Johnston City, 2 sets of Draeger, 1 pulmotor.
Madison Coal Corporation, 18 sets of Fleuss, 6 Salvators.
Mt. Olive & Staunton Coal Co., 3 sets of Draeger self-rescuers.
O'Gara Coal Co., Harrisburg, 2 sets of Draeger, 1 pulmotor.
Saline County Coal Co., Harrisburg, 2 sets of Draeger, 1 pulmotor.
Spring Valley Coal Co., Spring Valley, 4 sets of Fleuss, 5 sets of Westfalia, 1 pulmotor.
Superior Coal Co., Gillespie, 4 sets of Fleuss, 2 sets of Draeger, 1 pulmotor, 6 sets of Draeger self-rescuers.

That there is need for the number of rescue apparatus that there is in Illinois is well set forth by the calls to which men from the different stations responded in 1913-14, as follows:

Mar. 31, 1913, Southern Coal & Mining Co., Oak Hill mine, Belleville. Opened up fire that had been sealed off.

Apr. 9, 1913, Southern Illinois Coal Co., Freeman mine, Herrin. Fire extinguished.

May 24, 1913, Carterville District Coal Co., Marion. Fire controlled. One shotfirer saved, one dead.



LONG SIDE OF TRAINING GALLEY IMAGINARY OVERCAST AND ROCK FALL

VIEWS OF BENTON MINE-RESCUE STATION

June 13, 1913, Dering Coal Co., No. 11 mine, West Frankfort. Opened up fire area that had been sealed off.

June 17, 1913, Lovington Coal Co., Lovington. Opened up fire area that had been sealed off.

Nov. 8, 1913, St. Louis-Coulterville Coal Co., Coulterville. Fire extinguished.

Nov. 14, 1913, Franklin Coal & Coke Co., Royalton. Fire controlled.

Nov. 30, 1913, Franklin Coal & Coke Co., Royalton. Opened up fire area that had been sealed up.

Dec. 14, 1913, Franklin Coal & Coke Co., Royalton. Opened up fire area that had been sealed up.

Feb. 21, 1914, Lake Creek Coal Co., Johnston City. Explosion; two men killed.

June 29, 1914, Lake Creek Coal Co., Johnston City. Fire controlled.

July 21, 1914, Lake Creek Coal Co., Johnston City. Opened up fire area that had been sealed off.

July 24, 1914, Zeigler Coal Co., Zeigler. Fire in escapement shaft; one man killed. Fire extinguished.

Aug. 6, 1914, United Coal Mining Co., Christopher. Fire controlled after 24-hr. work.

Aug. 22, 1914, Dering Coal Co., Mine No. 11, West Frankfort. Explosion; two men and one mule killed. Rescue apparatus of great service in recovering bodies.

Sept. 1, 1914, Joseph Kuskowski, La Salle. Overcome with gas. Revived after 40 min. with pulmotor.

Sept. 2, 1914, Big Muddy Coal & Iron Co., Mine No. 7, Herrin. Fire sealed off.

Oct. 27, 1914, Franklin Coal & Coke Co., Royalton. Mine explosion; 52 men killed. Mine completely explored within 24 hr. and one man rescued.

Dec. 27-29, 1914, Saline County Coal Co., Grayson mine, Eldorado. Mine recovered. Both shafts had been sealed at the surface on account of an underground fire. Men succeeded in confining the fire to the face of two entries by erecting stoppings therein. The fire was over 2500 ft. from the shaft bottom, and breathing apparatus had to be worn from the surface, as the shaft bottom was so arranged that it was impractical to establish a base of operations at that point.

The following men are in charge of the different stations and substations: La Salle station, Alexander Jones and William McMillan; Springfield station, Thomas English and George Smith; Benton station, James Towal and M. J. Carraher; Duquoin substation, Charles Swan and William Cummings; Harrisburg substation, Walter Scott and Walter Nichols; Herrin substation, Thomas Rodgers and James Weir. The members of the commission are Thomas H. Devlin, Assumption, chairman; H. H. Stoek, Urbana, secretary; Fernand Bernard, Westville, assistant secretary; John Slattery, Toluca; Thomas Jeremiah, Willisville; George H. Deemy, Peoria; Joseph A. Holmes, Washington, D. C.

For the guidance of rescue men when they are called upon, the commission has issued the following rules, to be observed in case of fires and explosions:

DUTIES OF RESCUE-STATION SUPERINTENDENT

1. Communicate directly with a responsible officer of the coal company in order to find out the exact nature and extent of the disaster.
2. Notify the Springfield office by telephone or telegraph.
3. Send for emergency men.
4. Arrange for transportation. (a) With railroads, if the car is to go by scheduled train or by special engine. (b) With owners of automobiles or other vehicles, if better time can be made than by rail.
5. Start as soon as possible; read the mine map en route.
6. Upon arrival, confer with the state inspector of mines and the mine officials to learn additional details of the disaster and to decide upon methods of action.
7. Organize rescue squads, which shall consist of not less than 5 men each and which shall advance in the following order: (a) Breathing apparatus or advance squad. (b) Relief squad. (c) Stretcher squad. (d) Temporary ventilation squad. (e) Material squad. (f) More permanent ventilation squad.
8. Establish an "inside station" at a suitable point in the mine to serve as a base of operations for the advance work.
9. Appoint a competent man in charge of the inside station. He should re-examine all safety lamps before they are taken into the interior of the mine; and he should keep records of the details of the rescue work so that complete data may be obtained for studying the efficiency of the men and of the various breathing apparatus.
10. If possible, provide a telephone at the inside station to communicate with the surface, and to be extended into the workings.
11. Allow no person to go in advance of the ventilating current except the breathing-apparatus squad.
12. Maintain a patrol of all doors and brattices leading up to the inside station.
13. Maintain strict discipline at all times.

DUTIES OF THE RESCUE-STATION ASSISTANT

1. Assume entire responsibility for the condition of the breathing apparatus and rescue equipment, both before and during rescue operations.
2. In packing the equipment at the station, check off each item from a previously prepared list, thus guarding against the omission of anything.
3. Test the breathing apparatus as follows: (a) See that each apparatus has a full charge of oxygen and contains a fresh, unused charge of regenerating chemical. (b) The pressure gage should read 120 atmospheres for the Westfalia, Fleuss and 1907-type of Draeger and 150 atmospheres for the 1910 Draeger. (c) If using an injector type of apparatus, connect the water gage to the inhalation and exhalation tubes and ascertain the pressure and vacuum. This should be 3.15 to 3.94 inches (8 to 10 cm.). (d) See that the circulating system, helmet, face-mask or mouthpiece are airtight. (e) Con-

nect the inhalation tube to a measuring bag or gas meter, and ascertain the quantity of air circulating per minute. This should be 1.77 cu.ft. (50 liters). (f) See that all unions are tight. (g) Place the apparatus on a man. (h) Turn on the oxygen. (i) Test the relief valve to be sure it works properly. (j) In some small building, burn sulphur, hay, rags or other pungent material and have each person test his apparatus for possible leaks before entering the mine.

4. After a breathing apparatus has been worn, examine it carefully before permitting anyone to use it again.

5. To guard against the possible use of an untested apparatus, place on each apparatus that you have examined and found in perfect condition, a white tag with the words "examined; ready for use. In case an apparatus is damaged, and cannot at once be repaired, place thereon a red tag with the words "defective; dangerous to use."

6. Always have a pulmotor at the inside station.

7. Arrange a system for relaying oxygen, potash or soda, etc., from the base of supplies on the surface to the inside station.

DUTIES OF THE SPRINGFIELD OFFICE

1. Notify the manager of all the details of the disaster.
2. Instruct the men in charge of the rescue cars to be in readiness for a call.
3. Render promptly any assistance requested by the rescue-station superintendent.

DUTIES OF THE ADVANCE SQUAD

1. Follow the direction of the leader, who is in full charge.
2. Keep close together; do not separate under any condition.
3. Before starting the work, sit down for 5 min. with the apparatus on and in operation. Advance two or three hundred feet and make another stop of at least 3 min. By this means, all in the party will have regained their composure.
4. If one of the party is overcome or injured, the entire squad must immediately conduct him to fresh air.
5. Each member of the squad should hold a rope which leads to fresh air, in order to prevent them from being lost.
6. Mark the location of the dead and living with chalk on the roof and rib, and number the bodies in the order in which they are found.
7. Chalk your way in and out of the mine.
8. Advance to the face of an entry; do not leave any part unexplored.
9. Have a relief squad at the inside station in readiness to assist at a moment's notice.
10. The relief squad should have the apparatus on and ready for instant service. They can leave the mouthpieces open, or the nose clips off; but these should be ready for instant adjustment.
11. Make careful examination for gas, indications of fire, and other dangers.
12. Mark as dangerous unexplored as well as dangerous workings.
13. Do not work with breathing apparatus in a mine at mosphere hotter than 85 deg. F. wet bulb, unless you are within 100 ft. of good air, and then only for a few minutes at a time.

DUTIES OF THE MINE MANAGEMENT

(These duties may be best accomplished by appointing a competent man to assume entire charge of the surface operations.)

1. Maintain strict discipline on the surface.
2. Cut out all electrical currents which enter the mine.
3. Guard all entrances to the mine by establishing safety lines about each opening.
4. Permit no open lights within these safety lines.
5. Take necessary steps to repair any damages to the ventilating or hoisting equipment, and station a reliable man at the fan to make sure that it is in constant operation.
6. Examine all safety lamps before permitting them to be taken underground.
7. Allow only authorized men to enter the mine.
8. Keep a record of the names and time of the men entering and leaving the workings.
9. Arrange for a sufficient supply of nails, ship-lap lumber, brattice-cloth, saws, hammers, axes, etc.
10. Furnish promptly all supplies needed by the rescue squads in the mine.
11. Organize and hold in readiness repair gangs to enter the mine when called for.
12. Appoint men to take charge of each underground shift (except those wearing breathing apparatus).
13. Prepare a list of the missing miners, and arrange for the care of the survivors.
14. Provide food and shelter for those engaged in rescue work.
15. Have a physician on hand.
16. If possible, have a physician at the inside station with necessary supplies for his use.

GENERAL ADVICE

If there is a possibility of saving life, hasten; but be cautious and prudent. Remember that if the life of one of the rescue party is sacrificed, a bad matter is made worse and the resulting delay may make it impossible to reach the entombed men in time to save them.

Remember also that the state inspector of mines and the county mine inspector are not only men of experience, but are vested with state authority to take charge of mining properties in case of disaster. The rescue-station men should, therefore, coöperate heartily with the inspectors in this great work of saving life and property.

The temporary-ventilation squad should not leave gas behind them in side or cross entries, if it can be avoided. Ventilate or brush it out if it is at all possible.

The breathing squads should not begin the first exploration after an explosion by attempting to descend into the mine by means of the escapement stairway. The stairway should always be examined from below and not from above, as there is great danger of the lower portion of the stairway being destroyed by an explosion. A man descending from the top might fall down the stairway on acount of his inability to see the damage that had been done. If he comes to the bottom of the stairway first, he will avoid this.

Do not forget the collapsible cages stored on the rescue cars. If the mine cages are destroyed, or it is necessary to descend by way of the air shaft, these cages may be of great service.

The roof of the mine should be carefully examined by the breathing squad before fires are fought. Water from the hose should never be thrown on the roof if it is possible to avoid doing so. If the roof is of black slate, there is great danger of the water causing the roof to work; for this reason it is safer to timber the roof before starting to fight a fire. A row of props well set is generally sufficient.

Oklahoma First-Aid Meet

By B. E. Clark*

The second annual first-aid contest among the miners of Oklahoma was held at McAlester on Saturday, May 22, under the auspices of the Mine Operators' Association and the United Mine Workers of America. Nine teams from Coalgate, Brewer, Lehigh, Savanna, Dow, Wilburton, School of Mines, Gowen and Krebs participated. There were about 600 spectators. The direction of the meet was under Bureau of Mines officials—Dr. J. J. Rutledge, K. H. Chisholm, J. W. Koster and W. D. Ryan. The men were trained by Messrs. Chisholm, Koster, Young and East, all of the Bureau of Mines.

There were three separate contests—the one-man event, the two-man event and the team event. For the one-man event the first prize was a Koehler safety lamp and a Justrite carbide lamp and first-aid packets. The second prize was a Koehler safety lamp and a Justrite carbide lamp. In the two-man event the first prize was two Wolf safety and two Justrite carbide lamps and first-aid packets. The second prize was three subscriptions to "Coal Age." In the team event the first prize was the silver championship cup, six American Mine Safety Association medals, first-aid packets and a trip to the Kansas City meet provided by the miners' and operators' associations. The second prize was six Justrite lamps and six subscriptions to the "Mine Workers' Journal." The third prize was six Baldwin lamps and six subscriptions to the "Colliery Engineer." The results were:

One-Man Event.—First prize, Krebs, score 100 in five events; second prize, Savanna, score 100 in four events and 92 in last tie, general average 98⅔.

Two-Man Event.—First prize, Krebs, score 100 in two events; second prize, Gowen, score 100 in one event and 94 in tie-off, general average 97.

Team Event.—First prize, Lehigh, score 100 in three events; second prize, Dow, score 97⅔ in three events; third prize, Krebs and School of Mines tied with 97. In breaking the tie Krebs received 100 and School of Mines 90.

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*Mine engineer, Dow Coal Co., Savanna, Okla.

State-Wide First-Aid Contest in Illinois

By Oscar Cartlidge*

SYNOPSIS—The labor unions in Fulton County, Illinois, all but one, financed this state-wide contest by giving 5c. per member. The operators gave $10 per mine. One local union was represented by a competing team.

The Fulton County First-Aid Association was organized in January of the present year with a large and enthusiastic membership, which immediately began planning ways and means to promote and encourage the first-aid cause in that district of Illinois.

David Z. Thrush, state mine inspector, Farmington, was elected president; John Woods, miner, St. David, secretary; M. S. Coleman, superintendent Big Creek Coal Co., Canton, vice-president; Samuel McKinley, miner, Norris, treasurer.

Shortly after the organization it was decided to hold a first-aid contest on May 1 which should be open to the entire state, and Oscar Cartlidge, chairman, Springfield; James Taylor, Peoria; M. S. Coleman and William Spenny, Canton, were appointed to arrange a program and select the prizes.

A finance committee was named, and the Canton Commercial Club offered $75, agreeing to settle any deficit that might exist after the contest was over. Mr. Woodruff was also active in assisting to carry out the thousand and one details that arise at an affair of this kind.

DUE TO LIBERALITY OF UNIONS AND OPERATORS

Big Muddy Coal & Iron Co. Team, Which Landed the Second Prize

Natty Team of Bunsen Coal Co., Danville, Which Ran Third

Each local union in the county was requested to assess the membership 5c. per capita, and each mine was asked to give $10. It is worthy of note, as indicating the interest in this work in Fulton County, that every mine paid the amount requested and also every local union but one.

The program recorded below was followed to a successful conclusion, even to starting and finishing on time, which is rather unusual:

At 9:30 a.m., parade of first-aid teams and miners, around City Square, headed by the Joe Hooker Martial Band. 10 a.m., address of welcome, by Mayor R. M. Kingsland, of Canton. 10:30 a.m., response by D. Z. Thrush. At 11 a.m., one-man event. First prize: Gold medal for contestant; bronze medal for subject; $10 cash. Second prize: Silver medal for contestant; bronze medal for subject; $5 cash. Third prize: Silver medal for contestant; bronze medal for subject; $2.50 cash. This event to be followed by dinner.

At 1:30 p.m., team event for five or six men. First prize: American Mine Safety Association medals; a silver loving cup and $50 in cash. Second prize: Gold medal for each member of team and $30 in cash. Third prize: Silver medals for each member of the team and $15 in cash.

Event for teams of boys, 16 years old and under. First prize: Junior gold medal for each member. Second prize: Junior silver medal for each member.

The prizes were awarded in the Princess Theater at the close of the contest. The appointed judges of events were: Judge-in-chief, Dr. J. E. Coleman. Judges: Dr. P. S. Scholes, of Canton; Dr. J. C. Simmons, of Norris: Dr. R. G. Richards, of St. David; Dr. Will Plumer, of Farmington; Dr. D. S. Ray, of Cuba. Five others were afterward added so that each of the entering teams had a judge.

At 6:30 p.m., a lecture by W. D. Ryan of the United States Bureau of Mines, at Princess Theater. 7:30 p.m., free moving picture show in the Princess Theater showing mine-safety methods. Reels loaned by the United States Bureau of Mines.

The following discounts were used, being those recommended by the committee of the American Mine Safety Association, which was appointed to regulate first-aid training and contests:

	Per Cent
1. Not doing the most important thing first	6
2. Failure of captain to command properly	1
3. Slowness in work and lack of attention	2
4. Failure to entirely cover wound or ignorance of location of injury	4
5. Ineffective artificial respiration	11
6. Splints improperly padded or applied	6
7. Tight, loose or improperly applied bandages	5
8. Insecure or "granny" knot	4
9. Unclean first-aid material	3
10. Failure to have on hand sufficient and proper material to complete a dressing	3
11. Lack of neatness	2
12. Awkward handling of patient	4
13. Assistance lent by patient	3
14. Tourniquet improperly applied	7
15. Failure to stop bleeding	8
16. Not treating shock	5
17. Failure to be aseptic	7
18. Incorrect treatment	12
19. Failure to temporarily control hemorrhage until tourniquet is applied	7
	100

Samuel Pascoe, miner, of Farmington, was named officer of the day and was delegated to present all prizes, except the medals of the American Mine Safety Association, which were presented by the writer.

The teams entered were as follows:

1. Local Union No. 860, St. David, Ill.; W. Thomas, captain. 2. Big Creek Coal Co., St. David, Ill.; K. Hogan, captain. 3. Big Muddy Coal & Iron Co., Herrin, Ill.; B. Milam, captain. 4. Cuba team, Cuba, Ill.; J. Cooper, captain. 5. Brewster & Evans Coal Co., Peoria, Ill.; T. Trigg, captain. 6. LaSalle Mine Rescue Station, LaSalle, Ill.; W. Kemery, captain. 7. Bunsen Coal Co., Danville, Ill.; J. Krainock, captain. 8. Farmington team, Farmington, Ill.; W. Craine, captain. 9. Gillespie First-Aid Association, Gillespie, Ill.; G. Mauchlin, captain. 10. Gillespie team No. 1, Gillespie, Ill.; J. Struthers, captain. 11. Dewmaine team, Dewmaine, Ill.; E. Russell, captain.

Following are the junior teams: Farmington team, Farmington, Ill.; H. Steel, captain. St. David team, St. David, Ill.; L. Canfield, captain.

Three problems were given in the team event, and the average rating received determined the standing of the team, the judges changing places each time. The problems were handed to the team captains in sealed envelopes and they were allowed 5 min. in which to read them over.

Problem No. 1.—Compound fracture of left thigh with profuse arterial bleeding; compound fracture of right forearm; cut from outer corner of right eye to top of right ear with bleeding. Time 10 min.

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*Manager, Illinois Mine-Rescue Stations, 1363 Whittier Ave., Springfield, Ill.

Problem No. 2—Fracture of pelvis, left side. Fracture of sixth, seventh and eighth ribs, right side. Fracture of left elbow. Fracture in right shoulder joint. Deep laceration of calf of leg, right side, with profuse venous hemorrhage. Deep scalp wound with hemorrhage from right outer corner of eye to above right ear. Time 18 min.

SUPERIOR NO. 1 TEAM, WINNERS OF FIRST PRIZE
From left to right, in rear, Oscar Cartlidge, W. D. Ryan and James Boston

Problem No. 3—Powder keg exploded, burning miner severely on face, neck, chest, right arm and both hands. Carry 50 ft. on improvised stretcher and treat. Time 12 min.

The standing of the teams at the conclusion of the event follows:

Team	Ratings			
	Event 1	Event 2	Event 3	Average for Events
1—Union 860	99	84	98	93⅔
2—Big Creek Coal Co.	100	88	100	96
3—Big Muddy Coal Co.	100	100	94	98
4—Cuba	100	92	96	96
5—B. & E. Coal Co.	85	81	97	87⅔
6—La Salle Rescue Sta.	95	91	93	93
7—Bunsen Coal Co.	97	100	94	97⅓
8—Farmington	90	78	96	88
9—Gillespie F.-A. Assoc.	98	82	98	91⅓
10—Gillespie No. 1	98	99	98	98⅓
11—Dewmaine	87	76	95	86

This gave first place to the Superior Coal Co. No. 1, of Gillespie; second place to the Big Muddy Coal & Iron Co., of Herrin; third to the Bunsen Coal Co., of Danville.

The Bunsen and Gillespie teams have competed in many events, and neither team has ever failed to be among the prize winners. The former team is the present champion of the United States, having won that honor at the Terre Haute meet last year.

BEST TEAM OF JUNIORS, A ST. DAVID ORGANIZATION

Nos. 2 and 4 having tied for the highest score made by a Fulton County team, with 96 each, the captains drew lots to see which should get a Johnston & Johnston first-aid cabinet presented by B. Greenwell, with the result that it went to No. 4, the Cuba team.

Two teams entered the junior event, and the boys did creditable work, attracting fully as much attention as the regular teams. The first prize went to St. David and the second to Farmington.

Forty-two men entered for the single event, the problem being:

One man event: Miner overcome by gas in 3-ft. seam; simple fracture of right arm; remove 20 ft. and treat.

Six tied for the first place and so the following problem was given:

Fracture of left knee cap; severe scalp laceration back of right ear. The result was that James McKenna, Big Creek Coal Co. No. 2, was declared winner of first prize; Robert Weir, Superior Coal Co., Gillespie, second; Charles Miller, Superior Coal Co., Gillespie, third.

The four reels of pictures loaned by the Bureau of Mines were greatly enjoyed by a crowded house, as was the address by W. D. Ryan. He was formerly secretary and treasurer of the Illinois United Mine Workers' organization and hence has a large acquaintance in Fulton County.

W. W. Fleming, a Bureau of Mines first-aid worker, on my invitation, was sent to assist in promoting the contest, and spent about 30 days in the county. Much of the success of the meet, which was pronounced by several competent persons the best ever held in the state, was due to his effort and that of the president, D. Z. Thrush. To them, the miners' and operators' committees, and the Canton Commercial Club too much praise cannot be accorded.

* * *

Miners Own Homes and Automobiles

In these days when the high cost of living makes the average tradesman or laborer hustle for a living for himself and family, and real luxuries are not considered, it is interesting to note that in a mining town in the New River field of West Virginia there are several coal miners who own automobiles, and good ones, too, and get as much pleasure out of them as the capitalist in his six-cylinder. The fact that they have been able to buy them is not surprising, for when conditions are normal they can make more money digging coal than could be earned by many college graduates, who could not dream of the luxury of an automobile.

And in this same town are a number of coal miners who own their own homes—men who have worked for good wages where living is not excessively high, and are the proud possessors of comfortable homes for their families.

And a visit to the bank in this same town, where all the residents make their living directly or indirectly from the mines, disclosed the fact that there were at least 400 industrial depositors in the savings department, one Italian miner heading the list with $3000 to his credit, and many others with accounts running into four figures. A number of these men could buy automobiles if they wanted them. On the street a husky colored miner was asked to tell the most he had ever made in one month in the mines, and his reply was $327.82, out of which he paid his helper at the rate of $2.50 a day. The truth of this statement was vouched for by the mine manager.

These facts give weight to the claim that of all classes of workmen the West Virginia coal miner has the best opportunity to earn good wages, and save if he wants to.

* * *

Misdealing by Coal Company's Representative—Where bills of lading covering shipments of coal came into the rightful possession of a fuel company, and its representative, claiming to own the coal individually, sold it to plaintiff and procured substituted bills of lading in favor of the latter, appropriating the proceeds to his own use, plaintiff remained liable to the fuel company for the value of the coal, although innocently reliant upon the representative's misstatements, where an examination of the substituted bills of lading would have put plaintiff on inquiry as to the representative's right to deal with the coal as his own, since they showed that the substitution was made at the request of the fuel company. (Colorado Court of Appeals, Rocky Mountain Fuel Co. vs. George N. Sparling Coal Co., 143 Pacific Reporter 815.)

Discussion By Readers

The Miner and Safety

Letter No. 2—Referring to the letter of James T. Reynolds, Coal Age, May 15, p. 861, permit me to say that I have frequently heard experienced miners make remarks similar to those recited by Mr. Reynolds. I have also heard experienced miners who are sensible in other respects and who ought to have known better, upon their attention being called to the danger of certain things that they are doing, reply, "Oh, I have been doing that for 20 years and never been hurt yet," or make some such foolish remark.

Now, when the mine superintendent or foreman is given such a reply to his well-meaning remonstrances, I believe much good can be accomplished if he will then and there sit down and have a heart-to-heart talk with the man and try to convince him of the folly of his way, and point out to him that, even though he has been indulging in such dangerous practices for a number of years without being hurt, it is within the range of possibility that he may be the very next one to be injured as a result of the risk he takes so willingly.

A foreman will always be able to recall instances where men have been injured and perhaps killed by practices that they had always considered harmless. In remonstrating with miners along this line, it is well for the foreman to mention one or more of these particular cases and strive to drive the lesson home in a way that will be effectual in stopping the practice. The miner should be made to feel that it is more good luck than good management on his part that he has escaped thus far.

I believe much good can also be done, in this respect, by occasionally getting as many of the men as possible together and giving them a talk on safety; or, better still, get somebody else to do the talking. Many large coal companies are doing this and illustrating the talks with lantern slides, which always impress the men more vividly than a simple unaided talk. This can be done very conveniently in connection with "first-aid" meetings.

Edward H. Coxe.

Knoxville, Tenn.

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Longwall in Pittsburgh Seam

Letter No. 10—In reading a recent issue of Coal Age my attention was drawn particularly to the longwall-retreating plan proposed by John Oldroyd for working the No. 8 seam in Ohio. This proposed plan is described in Letter No. 7, May 15, p. 859.

I am an old coal miner, my first experience in longwall work having been gained at Bagillt, North Wales, in 1867, when I was employed as "drawer" in a mine worked on the longwall-advancing system. Since that time, I have worked in mines in several counties in England and Wales, as well as in several of the states. My mining experience in this country began at Pocahontas, Va., 1885.

This experience has made me familiar with almost every method employed in the mining of coal, and I have taken great interest in studying these different methods closely. I cannot say that I have ever yet seen a mine worked on the longwall-retreating plan that proved successful from an economical standpoint. On the other hand, the longwall-advancing system has many advantages. As mine manager for the Oglesby Coal Co.'s mine at Oglesby, Ill., for over eight years, I had a good opportunity of judging of the practical benefit derived in mining coal on this system.

Since 1900 I have changed the plan of working a mine in Iowa from the room-and-pillar system to the longwall-advancing system, the change proving successful in every respect. More recently, I opened a drift mine on the outcrop in this state, and although I had the longwall-retreating system on the brain at that time, having studied it carefully, I did not venture to adopt it in the development of the mine. I may say that I have long since given up the idea that the retreating plan of longwall can be applied as economically or I might even say as safely as the longwall-advancing system. I shall be glad to hear from anyone who has made a success of that method of mining coal for a period of, say, five years.

I was much pleased with G. R. Waddell's letter No. 6, Coal Age, Apr. 24, p. 732. His letter has the clink of a true longwall man. I fully agree with Mr. Waddell that the No. 8 seam in Ohio can be worked successfully on the longwall-advancing plan. I would say, however, that an expert longwall boss will be required and a few good longwall miners to start the work successfully.

E. J.

Sparta, Ill.

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Rotary Converter vs. Motor-Generator Set

I was much interested in the article by Thomas Robson Hay, entitled "Rotary Transforming Equipment for Coal-Mining Work," Coal Age, May 22, p. 880, and I desire to offer a few comments bearing on the choice between the rotary converter type of machine and the motor-generator described so fully in the article.

High-tension lines now traverse industrial sections and coal fields and sell their energy for the mechanical operation of mines and factories. The adoption of machinery for utilizing and converting this power into the desired or prescribed voltage for mine service is of the first and greatest importance to the purchaser of electric power.

The article in question is especially favorable and partial to the synchronous motor-generator set. However, the 25-cycle rotary converter has been used for years in general and severe railroad work and has stood the test of time. Rotary converters are used exclusively by the Berwind-White Coal Mining Co. and the Pennsylvania Coal & Coke Co. and very largely by the Consolidated Coal Co. and the H. C. Frick Coal & Coke Co.

These companies maintain underground and surface substations equipped with this type of machinery. It would therefore seem that Mr. Hay's article apparently places the rotary converter on trial; and for the benefit of those mine operators and officials who are using electric power from high-tension lines, it is up to the manufacturer and the master mechanic to seriously scan and analyze the advantages here claimed for the synchronous motor-generator set.

The rotary converter is not an intricate machine. Practically all the adjustments possible on the motor-generator set are possible on the rotary converter. The strongest difference is that the rotary converter delivers 275 volts flat. The service companies are now prohibiting the installation of induction motors on account of their large current drafts. The mechanic having charge of mine machinery is quite as capable as the mechanic in other industries, and the attendant is usually as desirous of acquiring technical information. The old custom of mine operators buying machinery that will not "rip, wear or tear" and overlooking the points of efficiency and economy is a thing of the past. At any rate the rotary is fast coming into use for mine service and the discussion of the advantages and disadvantages of these types of machines mentioned is abreast of the time.

Edward Roberts.

South Fork, Penn.

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Labor in Mining

Letter No. 2—Referring to the query that appeared on the editorial page of Coal Age, May 22, p. 896, asking why it is necessary for the coal industry to be always in a strike turmoil, permit me to say that in my opinion there are two general causes for the existence of this condition: 1. The activities of the labor agitator and radical labor leaders. 2. The unfairness of certain employers of labor and the consequent injustice that is often done the miner.

The first of these two causes needs no explanation, and I can offer no suggestion as to the best means to be adopted to rid the coal-mining industry of the evil effects of the work accomplished by these unwelcome parasites. It seems almost a foregone conclusion that the labor agitator and the radical labor leader are necessary adjuncts of coal mining, and those familiar with mining operations are too well acquainted with their methods and work to need further explanations.

In regard to the second cause mentioned, however, there is much room for suggestion and improvement. I refer, here, to the unwise and thoughtless disposition on the part of many employers of labor to treat their employees with manifest unfairness, completely ignoring or giving slight attention to their complaints and frequently compelling them to work under conditions that are unhealthful, dangerous and unnecessarily arduous.

My reference to the unfairness of many employers includes all mine officials in authority, both underground and on the surface, who are prone to treat their employees with little consideration and who frequently try to take advantage of them and keep them in ignorance, many times, of conditions that interest them and concern their welfare. Such employers, on being approached by workmen with a just complaint or grievance, refuse to listen to them at all or perhaps put them off with a promise that they have no intention of fulfilling.

When men are treated like *machines* instead of human beings it creates a spirit of unrest and dissatisfaction that, to the agitator, is half the battle. The trouble from this source can be wholly prevented if employers will deal with their men with absolutely fairness and justice. In that way only can they expect to keep the respect, confidence and loyalty of their employees. Employers must manifest a personal interest in the welfare of both their men and their families, safeguard the men at work, provide comfortable and sanitary houses, garden spots, playgrounds and other amusements, as well as schools, churches, hospitals and first-aid training and educational classes. These things all tend to make better and more contented employees.

Labor is as important to capital as capital is to labor. *Both are entitled to fair treatment and equal consideration.* Neither can prosper without the other. An employer cannot expect his men to be fair, honest and considerate of his interests unless he manifests the same interest and disposition toward them. In times of prosperity, when coal brings high prices, labor should be given a proportionate increase in daily wages or made to share proportionately in the prosperity. This is just as true as the fact more readily accepted that a decrease in wages is necessary during a business depression, when coal brings low prices in the market.

In closing, I may be permitted to refer briefly to a third condition or class of people whose baneful influence in promoting discord among workers often escapes notice because of their position and the trust imposed in them. I refer, here, to the disloyal official who has his eye on the job of someone higher up and who strives by underhand methods to stir up discontent among the men, hoping thereby to discredit the one whose position he covets. The tin-can remedy should be applied in such a case as soon as the party is discovered; in other words, he should be promptly "canned."

Edw. H. Coxe.

Knoxville, Tenn.

Letter No. 3—The request is made on the editorial page of Coal Age, May 22, p. 896, that someone enlighten Mr. Le Baron, who asks, "Why is it necessary for the coal industry to be always in a strike turmoil?"

This is an easy question to answer when one gives it careful consideration. I used to ask myself the same question until later when I discovered its solution. The mining industry is communistic, in the sense that its workers form a community in themselves. Their relation to each other and their mutual dependence are almost as close as is the case with the crew of a ship. They live together as a great family.

The ordinary mining town of today is composed of, say, 200 houses, nearly all being built alike and possessing no distinctive characteristics save the number of the house. The lots are of the same size, the houses of the same color and all rent for the same amount. A host of other details are likewise the same for each family. As a result, they think the same thoughts and act on the same principles. I say this condition is peculiar to mining as the industry is conducted in this country today.

In the ordinary mining camp today there is little if any social life except among neighbors whose household details are the same in every respect. The fashion of the clothes worn by men and women is the same and often strikingly different from that of the outside world. The family income, with few exceptions, is practically the same and the expenses the same. In fact, every detail of life, school, provisions, medical care, etc., is the same for each family so far as the rank and file of the mining town is concerned.

Now, keeping this idea of the sameness of community life in mind, is it any wonder that it becomes an easy matter to stir up trouble among workers who touch elbows so closely that a grievance of one, however slight, becomes a common grievance, recognized and supported by all. It matters not how small or insignificant the complaint may be if it is only strongly asserted and repeated. The community come to feel and act as one. Its members will work together for a long time in peace, with an undercurrent of good-will, and for the most part an ideal of good work, good pay, good health and enjoyment is plainly manifest. Under these conditions there is a general feeling of satisfaction that pervades the entire place.

Assume, however, that something goes wrong and note the suddenness of the change that follows. Ideals of peace, good work, good pay, good health and enjoyment are exchanged for ideals of distrust, enmity and war. The issue is now one of labor against capital, growing out of an assumed or common belief that capital is against labor. The feeling is, as of old, "'Our handicraft is in danger'—the means of our support is menaced," and the common thought among the workers is, Labor must win; Capital must yield. In every mining camp or village there is the same community life whether union labor or nonunion labor is employed. The word "scab" has become a social weapon and is hurled with terrible force and effect against one who essays to stand out or separate himself from the community of workers.

To illustrate the strength of this social weapon, suppose a big man came into your office and demanded that you throw off your linen collar and your $1.50 necktie and not wear them again. You wear these items of dress because a hundred other fellows do the same. You picture yourself coming downtown in a collar button without collar or tie, and reply that you will quit your job before you will part with these necessities of dress. They are good things that any self-respecting man will refuse to lay aside because requested to do so by another who hails from a Patagonian tribe and is noted for his hatred of clothes, collars and ties, but adores a dress of untanned cowhide as does every self-respecting Patagonian.

When one considers, therefore, that corporate handling of labor is often productive of trouble when least suspected, unless careful consideration is given to avoid these pitfalls, there need be no marvel that strikes occur as often as they do. The marvel is rather that they are not more frequent and that we live and work together in comparative harmony in most mining districts and produce the coal that warms and energizes the world.

N. D. MONSARRAT.

Columbus, Ohio.

Letter No. 4—The recent reference to this subject in COAL AGE leads me to make a few comments on what I believe is a most serious feature of the labor problem and one that is likely to confront the mining interests in the United States, especially those of West Virginia, when the European war is ended. From its importance to the coal industry, this problem demands attention.

Having spent my boyhood days in the old country, I am familiar with labor conditions there as well as here in the United States. It is obvious to even the casual observer that the main reason foreign labor emigrates to this country is because of the better wages paid for the same work. The majority of these people, however, expect to accumulate enough money from their savings to enable them to return to their old home in a few years and live in what they consider comfort the rest of their days. Many and probably the majority of the foreign laborers employed here in coal mining never learn the English language to speak it fluently, and as a result they do not become acquainted with American ways and customs.

The question for us to consider in this connection is what is likely to take place when the war is over. Will there be an influx or an exodus of labor in this country? In my opinion, the exodus will largely overbalance the influx. It may be argued that taxation in Europe will be very high at the close of the war—so high as to be burdensome; but, even so, it must be allowed that such taxation will be adjusted among different classes of taxpayers, the laborer bearing the smallest part. At the present day, the German government is paying to unskilled laborers wages that are 100 per cent. higher than were paid to the average German laborer four years ago. In Great Britain demands for increased wages are now being made and this will undoubtedly be repeated in other European countries.

As a result of the war, there will be an extraordinary demand for labor, not only to go into the mines, but to rebuild cities, cultivate land and, in fact, work along every line of industry. If the question is asked, How will the money be raised to pay for such work? it is only necessary to recall the rapid rebuilding of San Francisco, following its destruction by earthquake and fire in 1906, and observe how readily the capital was advanced for rehabilitating that devastated area in a miraculously short time. There is little doubt that the same experience will be repeated in Europe at the close of the war. Reconstruction will then take place on a much larger scale; competition will be severe not only in coal mining but in other industries as well.

Under these conditions, strong family ties will draw a large portion of our foreign labor back to their European homes where fathers, mothers, brothers, sisters and children are left alone without support. Such will be the demand for labor that government examinations and requirements will be less rigid in all lines of work and men holding minor positions in this country will be able to secure far better paying positions at home.

In addition to all this, mining is becoming more difficult each year and the foreign miner finds it hard to make his way without being taught at least some English and becoming familiar with the ways of this country. The question presented for solution is how to prevent most effectively such an exodus of foreign labor from this country as may be expected to take place.

On various occasions I have urged that what may be called "Continuation Schools" should be established by the state, offering free instruction, particularly to miners on mining subjects and to foreigners, teaching them to speak and read the English language. Trained teachers capable of giving instruction in scientific and practical subjects could be employed. Or, a system similar to what is known as the "Walking Schools of Norway" might be well adopted in this country. The plan is worthy of careful consideration by all interested in the labor problem.

This plan may be briefly described as follows: A man of broad scholarship, great aptness as a teacher and possessing particular fitness to win the sympathy and confidence of the working classes goes to a mining community, secures the largest room in the place and establishes a school for the miners. He remains in this place several weeks, assigning and hearing lessons, designating books that must be read and outlining work for future study. He then passes on to another town where he starts the same work in a similar manner. The teacher is selected and paid by the government, which furnishes the general material required in the school work, including all necessary books and papers for the students, besides providing and heating and lighting the rooms for holding the classes.

This plan could be modified in this country to the extent that the regular teacher, in his judgment, could appoint from among the older and better qualified students one to take charge in his absence, designating the time when he would return to the place. In this manner, one regular teacher could supervise the work in, say 10 or 12 different places, staying about two weeks or more in each place and returning two or three times during the year.

In closing, I thought it would be of interest to present the following figures showing the immigration into this country during the fiscal year of 1914. Out of a total number of 1,218,480 immigrants, there were 226,407 belonging to the laboring class. The distribution of this foreign immigration in several of our leading mining states for the same year was: Pennsylvania, 184,438; Illinois, 105,811; Ohio, 74,615; West Virginia, 12,399.

It is a matter of some significance in this state that Pennsylvania received more than 14 times the number of immigrants that reached West Virginia, and Illinois more than eight times the same number, while Ohio received more than six times that number. These figures seem to indicate that West Virginia is sadly neglecting her labor problem. Had the distribution between these states been in proportion to the output of coal, the figures would practically have been: Pennsylvania, 230,000; West Virginia, 60,000; Illinois, 57,000: Ohio, 30,000.

This is a matter that should receive the attention of all West Virginia coal operators. It is to be hoped that mining men in this state will realize the gravity of the labor problem in this country and especially in our own state and adopt some remedial measures before the question becomes a serious menace to the coal-mining industry.

KARL F. SCHOEW.

Huntington, W. Va.

* * *

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

Chemical Change, Reaction—Any interchange of atoms between two substances, or a combination of two unlike substances, by which one or more new substances are formed, is a chemical change and the process is called a "chemical reaction."

A Chemical Equation—It is a natural law that no matter is ever lost or destroyed. **Matter is indestructible.** As a result of chemical change both the form and nature of the matter may be altered—a solid may become a liquid or gas, or vice versa; but the weight of the resulting products is the same as that of the original substances that are involved in the reaction.

Since there is **no change** in the weight of matter before and after chemical reaction takes place, it is possible to express the reaction by an equation showing the equality of matter. This is called a **chemical equation.** It is formed by writing in the first member the chemical symbols of all the substances entering or involved in the reaction, connecting these together with a plus (+) sign. Likewise, in the second member of the equation, write the chemical symbols of the several products of the reaction, connecting them together, as before, with a plus (+) sign. Then complete the equation by writing the sign (=) of equality between the two members.

For reasons that will be better understood when discussing molecular volume, when writing a chemical equation each substance should be expressed by its molecular formula. This means that any elementary or simple substance as carbon (C), hydrogen (H), nitrogen (N), etc., should be expressed as a molecule; thus, C_2, H_2, N_2, etc.

Illustration—When carbon (C) is completely burned in a plentiful supply of oxygen (O) there is produced carbon dioxide (CO_2). The reaction is expressed by the equation

$$C_2 + 2O_2 = 2CO_2$$

The expression $2CO_2$ should be interpreted to mean two molecules of CO_2, each comprising one atom of carbon and two atoms of oxygen.

Observe there are the same number of atoms of carbon and the same number of oxygen on each side of the equation. **Not an atom is lost** in the reaction, although these are grouped differently. In this case the solid carbon unites with the oxygen (gas) and carbon dioxide (gas) is produced. Also, the weight of the carbon dioxide is equal to the sum of the weights of the carbon burned and the oxygen consumed. There is **no loss in weight.**

It is important to note that the **atoms** involved in any reaction represent the **weights** of the substances they form, while the **molecules** or molecular formulas of the several substances represent their respective **volumes.** Hence, when each substance is expressed by its molecular formula the chemical equation shows both the **relative weights** of all the substances and the **relative volumes** of the gases.

In the reaction represented by the above equation each atom of the carbon molecule (C_2) takes up two atoms of oxygen to form the molecule of carbon dioxide (CO_2), the valence of carbon being four and that of oxygen two. The reaction in this case is complete, the affinity of the carbon for oxygen being fully satisfied.

The Coal Age Pocket Book

Use of Chemical Equations—As previously stated, when properly written a chemical equation shows both the relative weights and relative gaseous volumes of each respective substance involved in a chemical reaction. The relative weights are indicated by the molecular weights of the substances as shown by the completed equation.

In estimating relative gaseous volumes, **the volume of a gaseous atom is taken as unity** and since, as previously explained, an elementary molecule is assumed to contain two atoms and all gaseous molecules at the same temperature and pressure are of equal size regardless of the number of atoms they contain, it follows that **the relative volume of all gaseous molecules is two.**

Application of the Law of Volumes—The law of molecular volume as just explained finds important application in calculating the volumes of gases that are involved in a chemical reaction. While there is never any change in the weight or amount of matter due to chemical reaction, there frequently results a **change in the volume** of the gases concerned in the reaction.

To illustrate such change of gaseous volume with the chemical equation representing the dissociation of ammonia gas (NH_3) by electrolysis, forming free nitrogen (N) and hydrogen (H) gases, placing below each molecular formula its relative or molecular volume; thus,

$$\begin{array}{lccccc} & 2NH_3 & = & N_2 & + & 3H_2 \\ \text{Mol. vol. ....} & 2 & & 1 & & 3 \end{array}$$

It is evident that two molecules of ammonia gas, in dissociation, yield one molecule of nitrogen and three molecules of hydrogen, making four volumes in all. In other words, two volumes become four. The volume of the gases resulting from the breaking up of the molecule of ammonia is double that of the original gas.

There is no chemical change of volume when methane or marsh gas (CH_4) is exploded in a plentiful supply of normal air, and the methane is completely burned, forming only carbon dioxide (CO_2) and water (H_2O). The nitrogen of the air being unchanged it may be omitted in writing the equation expressing this reaction, which is as follows:

$$\begin{array}{lccccccc} & CH_4 & + & 2O_2 & = & CO_2 & + & 2H_2O \\ \text{Mol. vol. ....} & 1 & & 2 & & 1 & & 2 \end{array}$$

The equation shows that the complete combustion of methane requires twice its volume of oxygen; and there is produced an equal volume of carbon dioxide and two volumes of aqueous vapor.

On the other hand, when carbon monoxide (CO) is burned in air, producing carbon dioxide (CO_2), there results a reduction in volume, as shown by the following equation:

$$\begin{array}{lccccccccc} & 2CO & + & O_2 & + & 4N_2 & = & 2CO_2 & + & 4N_2 \\ \text{Mol. Vol. ....} & 2 & & 1 & & 4 & & 2 & & 4 \end{array}$$

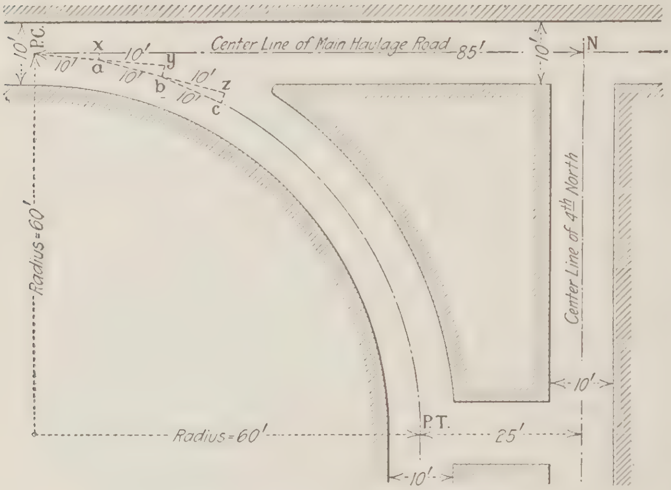
Normal air consists of practically one-fifth oxygen and four-fifths nitrogen. The equation shows that two volumes of carbon monoxide, in burning, consume five volumes of air, and there remain two volumes of carbon dioxide and four volumes of unchanged nitrogen. The seven volumes of the original gas and air are thus reduced to six volumes of burned gases.

Inquiries of General Interest

Laying in a Mine-Track Curve

I have had considerable trouble in laying track curves in our mines so that they will present a uniform curvature and meet the cross-entry at the proper point and tangent to its center line. Suppose, for example, the distance from the second-north to the fourth-north entry is 1200 ft., and I want to cut off the third-north to form a "blind" entry, by a curve extending from a certain point on the main-haulage road outby from the fourth-north and meeting the third-north at a point where the curve will be tangent to the center line of that entry and provide an entry pillar 15 ft. thick. All the entries are 10 ft. wide, which makes the distance, center to center, between the entries 25 ft.

The radius of the curve is to be 60 ft., and I want to find how far back from the center line of the fourth-north I must start the curve to meet the third-north as described. The north-entries are turned off at right angles to the main-haulage road.



Showing Cut-off to Blind Entry

OSTEL BULLOCK.

Cleaton, Ky.

Since the fourth-north entry is turned at right angles to the main-haulage road, the distance from the intersection of the center lines of these entries at *N*, in the accompanying figure, to the point of curve (*P.C.*) is equal to the radius of the curve plus the distance between the center lines of the two north entries, or 60 + 25 = 85 ft.

To lay out the curve, start from the P.C. point and measure a distance of 10 ft. to a point *a* on the curve, making the tangent deflection *ax* = 10 in. This tangent deflection is calculated by the formula

$$ax = \frac{c^2}{2R} = \frac{10^2}{2 \times 60} = \frac{100}{120} = 0.83 \; ft. \; or \; 10 \; in.$$

The distance *ax* is measured perpendicular to the center line of the main road, while the 10-ft. chord is measured along the curve.

Now measure another chord *ab* = 10 ft. and extend the previous chord, making *ay* = 10 ft. The distance *by* is a chord deflection, and its length is twice that of the tangent deflection *ax*, or 20 in. In the same manner extend the chord *ab*, making *bz* = 10 ft., and measure another chord *bc* of 10 ft., making the second chord deflection *cz* equal to 20 in. Great care is needed in extending each chord in order that the curve shall be tangent to the center line of the third-north at the P.T. point.

* * *

Theoretical Velocity Due to Water Gage

Some time since I remember seeing a formula given in COAL AGE for finding the theoretical velocity of air due to a given water gage. The formula was based on 1 in. of water gage as being equivalent to 68 ft. of air column. The formula given was

$$v = 8 \sqrt{68 \; w.g.}$$

A formula that is much used by fan engineers for obtaining the theoretical water gage (w.g.) due to a given peripheral velocity (*v*) of the fan, as expressed in feet per second, is

$$w.g. = \frac{v^2 \times 0.078}{32.16 \times 5.2}$$

I would much appreciate an explanation of the difference in these two formulas.

VENTILATING ENGINEER.

Wilkes-Barre, Penn.

The formula first quoted expresses the theoretical velocity (*v*) of free air, under a water gage (*w.g.*). This velocity is expressed in feet per second and the water gage in inches, as explained in COAL AGE, Vol. 5, p. 219. The formula is developed from the well-known basal formula

$$v^2 = 2gh \text{ or } v = 8\sqrt{h}$$

The second formula, quoted by correspondent as used by fan engineers, expresses more or less closely (depending on the conditions affecting the circulation of the air current) the water gage in inches, due to the peripheral speed of the fan in feet per second. This formula is the result of the experiments of M. Murgue, a French engineer who laid down the rule that "The theoretical depression or water gage due to the speed of the periphery is, in a perfect fan, equal to twice the height of column necessary to generate such velocity in a falling body."*

This rule makes the head, pressure, or water gage due to a given peripheral speed of a centrifugal fan equal to twice the head necessary to generate that velocity in a falling body. The two formulas have a different application and should not be confounded. The difference in their use is similar to the difference between the *stored energy* of a moving body as expressed by $mv^2/2$ and the force of impact as expressed by mv^2, which force of impact is double the stored or kinetic energy.

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*D. Murgue's "Theories and Practice of Centrifugal Ventilating Machines," p. v.

Examination Questions

Pennsylvania Anthracite Mine Inspectors' Examination, Held at Wilkes-Barre, Apr. 20-22, 1915

(*Selected Questions*)

Ques.—Briefly explain, in a general way, your knowledge of electricity and its usage in coal mines. What are the usual voltages employed in mines?

Ans.—In respect to its use in coal mining, electricity furnishes a means of transmitting power from a power plant on the surface, where the electric current is generated, to the innermost point of the mine workings, where it is applied for driving coal-cutting machines and drills and frequently employed for the purposes of lighting the mine and blasting the coal. The electric current is conveyed through electrical wire conductors that are installed in the mine passageways. The flow of electricity is similar to that of air or water, the *voltage* corresponding to the pressure, the *strength of current* or amount of current to the quantity of the flow and the *wattage* to the power transmitted.

In the use of the direct current for haulage, coal-cutting, drilling, etc., the common voltages employed in coal mining are 250 and 500 volts. In the use of an alternating current for transmitting power considerable distances, the common voltages employed are 110, 220 and 440 volts. The voltage at the generator is generally 20 or 25 volts higher, in each case, to allow for the necessary drop in transmitting the current from the generator or power plant on the surface to the working face in the mine where the power is to be used.

Ques.—A colliery operated by a slope 2263 ft. long, on a pitch of 45 deg., makes a maximum of 100,000,000 gal. and a minimum of 30,000,000 gal. of water per month; describe the pumping plant required, using simple direct-acting pumps. Assume 80-lb. steam pressure at the pumps and make the necessary calculations.

Ans.—It is necessary to estimate on the maximum flow of water, since otherwise the sump would be overflowed during the wet season. A flow of 100,000,000 gal. of water per month is 100,000,000 ÷ (30 × 24 × 60) = 2315 gal. per min. It will be safe, therefore, to base the estimate on a maximum flow of, say, 2400 gal. per min.

The size of column pipe required for this discharge is

$$d_c = 0.25\sqrt{2400} = 12.2,\ \textit{say}\ 12\ \textit{in.}$$

On a pitch of 45 deg., the head corresponding to a distance of 2263 ft. is 2263 × sin 45° = 2263 × 0.707 = 1600 ft. To this head must be added the friction head due to a flow of 2400 gal. per min. in a 12-in. pipe, say 2300 ft. long. The friction head is

$$h_f = \frac{2300 \times 2400^2}{800 \times 12^5} = 66+\ \textit{ft.}$$

For this size of column pipe the velocity head could be ignored as it is less than 1 ft. The total effective head under which the pump must operate is therefore 1600 + 66 = 1666 ft., to which must be added a few feet to allow for draining the sump and for discharging at the surface. It will be well, therefore, to estimate on a total effective head of, say 1700 ft.

Using a simple duplex double-acting pump, each cylinder must handle 2400 ÷ 2 = 1200 gal. of water per min., and assuming a piston speed of 100 ft. per min. for this pump, the diameter of the water-end is

$$d = 5.37\sqrt{\frac{1200}{100}} = 18.6\ \textit{in.}$$

For a steam pressure of 80 lb. per sq.in., the diameter of the steam-end of a pump required to deliver 1200 gal. of water per min. under a head of 1700 ft. is

$$D = 3.76\sqrt{\frac{1200 \times 1700}{100 \times 80}} = 60\ \textit{in.}$$

Therefore, since we have estimated generously, it will be sufficient to use a simple duplex double-acting pump, 60x18x60 in. The stroke of this pump being 60 in., or 5 ft., the pump will make 100 ÷ 5 = 20 strokes per min.

Ques.—A colliery that has been worked down two lifts on a north dip of 62 deg. is full of water. The slope is down 600 ft. From the mouth of the slope north a horizontal distance of 452 ft. a shaft has been sunk, cutting the seam at a depth of 840 ft. How far from the shaft level can the chambers be driven to leave a chain pillar under the slope gangway having a thickness equal to that required by the rule adopted by the mine inspectors and operators, the thickness of the seam being 10 ft.?

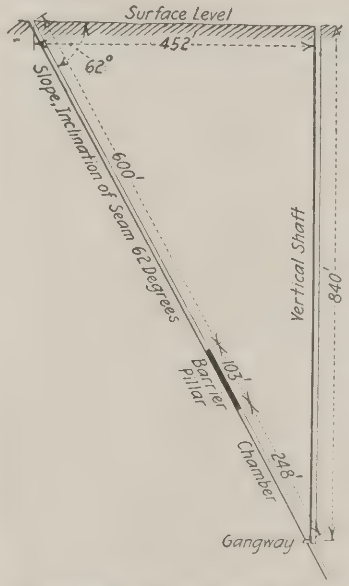


DIAGRAM SHOWING SLOPE AND SHAFT

Ans.—The vertical depth of the foot of the slope is 600 × sin 62° = 600 × 0.883 = 529.8 ft. The rule adopted for the thickness of barrier pillars in the Pennsylvania anthracite region is: Add 5 ft. to 1 per cent. of the depth below drainage level, and multiply this sum by the thickness of the seam, which gives in this case

$$t = 10\ (529.8 \times 0.01 + 5) = \textit{say}\ 103\ \textit{ft.}$$

The distance from the mouth of the slope to the bottom of the vertical shaft, as measured on the incline, is 840 ÷ sin 62° = 840 ÷ 0.883 = 951+ ft. The required length of the chambers is therefore 951 — (600 + 103) = 248 ft. In providing a safe thickness of barrier pillar in thick steep-pitching seams, as described in this question, an accurate survey is of the greatest importance.

Coal and Coke News

Harrisburg, Penn.

During the week the Governor took up several of the mining bills left for his consideration by the recent Legislature, approving some and vetoing others. The bills approved were the Crow bill providing that bituminous inspectors after having passed two examinations and serving 8 years shall be exempt from further examination, the other bill provides for new inspectors in the anthracite region: One bill vetoed was the McClure bill, providing that where clay mines are worked with bituminous coal mines, they shall come under the jurisdiction of the Department of Mines. The Governor in vetoing this bill said it was "indefinite and defective," as well as unconstitutional.

The approved bill pertaining to the bituminous inspectors is an amendment to Section 4, of Article 19, of the Act of June 9, 1911, and now reads: "The principal examination shall be in writing and each applicant shall undergo an oral examination pertaining to explosive gas, safety lamps, methods of ventilation and mine management. The questions and answers thereto in the oral examination shall be reported verbatim by an expert stenographer and typewritten fully to assist the Board in the work of rating the qualifications of the candidates; provided, that any person who has served as a mine inspector continuously for eight years and has passed two consecutive examinations for the office of mine inspector shall be exempt from taking any further examination and shall continue in said office without any further examination unless removed or suspended as provided by Article 21, of the act of June 9, 1911. Any applicant who shall make a general average of at least 90 per centum shall be deemed successful. . . ." About 17 inspectors will be benefited at once by the new law.

The bill providing for the four new inspectors in the anthracite region now reads, that "the qualified electors of the several inspection districts mentioned in this act shall elect respectively the following number of qualified persons to act as mine inspectors of this commonwealth, namely: First inspection district, 9; second district, 6; third inspection district, 1; fourth district, 4; fifth district, 2; sixth district, 1; seventh district, 1; and the eighth district, 1. Provided that the present mine inspectors in the several districts shall continue in office until the expiration of the terms for which they have been appointed or elected and the number of inspectors to be elected at the coming election shall be reduced by the number of inspectors now regularly appointed or elected and residing and serving in said district. When the terms of the present inspectors shall expire their successors shall be elected in accordance with the provisions of this act until each inspection district shall have its full quota of elected inspectors, under this act. . . ." Luzerne County will get three and Lackawanna County one new inspector.

Judge Ruppel, in deciding the appeal of Archibald Miller, of the Loyalhanna Coal Co., who was fined $100 and costs on a charge of polluting the waters at Dark Shade Creek in Somerset County, declared on June 3 that mine owners could not be held responsible for the pollution of streams by waters from the mines they own or control. In his opinion, Judge Ruppel says the complaint comes from the office of the department of the state created for the protection of the different species of fish. If it had been the purpose of the Legislature to strike a blow at the mining industry of the state, it ought to have declared its intention in unmistakable language. The act cannot be construed to cover more than what is expressly specified and the drainage of coal mines is mentioned in the act."

Some Bills Signed, Others Vetoed

The Dawson bill, including a 2½ per cent. ad valorem state tax on all anthracite coal mined or washed in Pennsylvania and prepared for market, was approved on June 7 by the Governor. One-half of the income is to be retained by the Commonwealth for highway purposes, and the other half goes to the municipalities from which the coal is taken. The Auditor General is charged with the collection of the tax. The act is to take the place of the 1913 act which is now in litigation, and is to be argued July 1 before the Supreme Court. The Auditor General is prepared to enforce the act at once and it is understood the approval is dated June 1.

In all probability steps will be taken in a short time to test the act. The bill contains a provision that it shall not effect the settlements made under the act of 1913.

The Governor also announced on the above date that he had approved the bills designed to bring the coal miners of the state under the workmen's compensation laws, and it is expected that they will be followed in a day or so by the approval of other measures. The bills announced as approved amend sections of the bituminous mine code of 1911 and portions of six acts relating to anthracite mining so as to permit the free selection of mine foremen. It was decided after conferences between legislators in charge and attorneys with the Attorney General that these acts should be signed before the workmen's compensation laws were acted upon. Both bills were settled upon in conference committees.

With the approval of the above bills, the Governor announced vetoes of the Beidleman Bill creating 21 assistant mine inspectors in the anthracite region and increasing the per diem payment of anthracite mine inspectors' examination boards from $6 to $10. This is the second time this session that he has vetoed this bill. On the first bill the Governor says the cost would be fully $100,000 and that the qualifications for the office are inadequate for the responsibility involved. The cost he said is prohibitive and the creating of offices without assurance of increased safety to the coal miners is manifestly unwise.

On the per diem bill the Governor says there is no assurance that the state would get the slightest advantage for the increased expense. He intimated that there was such a confused mass of legislation relating to the whole subject of mine inspectors, that it seemed wise not to add to a situation already unsatisfactory. The Governor thinks that the examination service should be cared for from the state-wide point of view. The method of creating examiners, their functions, their tenure, their powers, their compensation and also the method of appointing mine inspectors should be simplified, improved and unified. Until this is done, he says, it is unwise for the state to add by additional law to a situation wholly illogical and inequitable.

PENNSYLVANIA

Anthracite

Williamstown—An 8-ft. bed of hard Lykens Valley coal has been struck, and will be worked by a company of Scranton and Williamsport capitalists. In this same vicinity a bed of coal was worked about 7 years ago, but on a small scale. So far as can be ascertained, the coal just discovered contains both Nos. 1 and 2 grades of hard coal. A number of bore holes have been sunk on both Peters and Broad Mountains near here within the last 50 years. Coal has been struck at various depths and in different quantities in practically every instance, but the measures were not worked because of the lack of sufficient capital. About 20 years ago coal was struck on the top of Kittatinny Mountain, which was mined on a small scale for some years, then abandoned.

Mahanoy City—White damp overcame five miners at Park No. 1 colliery on June 5 and stretched them like dead along a gangway. Joseph Spikosky, the contractor, spread the alarm and all five were rescued alive. Fumes from heavy blasting in the Park Place strippings broke in upon them, causing the accident.

Hazleton—Men are working night and day turning the old No. 3 Lattimer breaker, now a washery, into a large coal-producing plant again, so as to handle the output from the No. 4 mine, where the breaker was destroyed by a fire at a loss of $100,000 recently. The Pardee Bros. & Co. expects to have the place fully equipped at an early date.

Bituminous

Indiana—A mine mule which served the Glenwood Coal Co. for more than 20 years, when taken out of the mine for a day of rest recently refused to return to work. David E. Williams, of Philadelphia, president of the company, ordered the animal sent to a farm near Philadelphia, where it will pass the remainder of its days in ease.

Elizabeth—The May report of business transacted at Lock No. 3 on the Monongahela River shows that during the month there passed through the lock both up and down 785 steamboats, 3082 coalboats, barges, etc., and 20,546,000 bu. of coal. The number of lockages totaled 882.

Uniontown—In ordering into blast within the last week 1009 coke ovens that have been idle for months the H. C. Frick Coke Co.'s plants are now operating to 71 per cent. of capacity. Announcement was made June 5 that 300 ovens were to be fired and on the following day orders were issued to fire an additional 200 ovens. The plants affected are: Brinkerton, Central, Collier, Colonial No. 1; Continental No. 1; Continental No. 2; Lambert, Edenborn, Leckrone, Leisenring No. 1, Leisenring No. 2; Mammoth, Marguerite, Phillips, Redstone, Ronco, Shoaf, Southwest No. 1, Trotter, York Run, Hostetter, Whitney, Buffington, Continental No. 3, Davidson, Dearth, Footedale, Leisenring No. 3, Leith and United.

There are 58 per cent. of the total number of ovens of all companies in the region in blast. Independent producers state that there is no particular activity but that there still continues a consistent demand for their product and they are anicipating an increase in orders within the next two months.

Three experts in coal-land values were appointed by Judge J. Q. Van Swearingen June 5 to appraise the coal holdings of J. V. Thompson. The men named are Julian Kennedy, of Pittsburgh; R. M. Hice, of Fairmont, W. Va., and R. C. Crawford, of McKeesport. A petition asking for the appraisers was presented to the court by counsel for Mr. Thompson's receivers.

Johnstown—Within the last few weeks the Valley Smokeless Coal Co., of Cambria County, has been cutting the timber on the hillsides about its mine openings as a means of preventing landslides. Officials of the company are removing the timber on the assumption that the winds sway the trees and thus loosen the earth and the rest is easy. The cut timber is being used about the mine for one purpose or another. It is also stated that the removal of the timber will not cause the earth to be washed down as the underbrush is sufficiently thick to retain the soil

Connellsville—The coke production of the Connellsville region recently assumed a new high record for the year with a production of 316,000 tons per week. About 8000 tons of this production represented shipments eastward due principally to export business from Baltimore and Philadelphia to South America and New Zealand.

Pittsburgh—Recent heavy rains on the water sheds of the Alleghany and Monongahela Rivers brought the water in the Ohio to a shipping stage, and the Monongahela River Consolidated Coal & Coke Co. started about 1,000,000 bu. of coal for the Southern market. The stage, however, soon receded and shipping was stopped. This was the third rise in less than two weeks during which time the coal companies along the rivers have sent between 11,000,000 and 11,500,000 bu. of coal from the Pittsburgh District, southward.

WEST VIRGINIA

Fayetteville—Kaymoor Mines Nos. 1 and 2 are undergoing repairs. It is said that both mines will resume operation on or about July 1.

State Mine Inspector John I. Absalom recently made a final inspection of the mine at Layland which was the scene of a disastrous explosion last March. It is reported as a result of this inspection that the mine is in better condition than ever before in its history, there having been made many improvements that will eliminate in large measure all possibility of a repetition of the disaster. It is not anticipated that it will be difficult to secure miners to work this operation, as many of the men formerly employed have expressed a preference for this mine.

Thacker—A disastrous fire occurred at the operation of the Thacker Coal & Coke Co. recently, destroying the homes of J. B. Gerald, L. D. Baker, and three or four other houses which were unoccupied but which belonged to the company. The loss entailed will amount to several thousand dollars which was covered largely by insurance. The origin of the fire was unknown.

Morgantown—The Preston County Coke Co. has been firing qute a number of ovens of late, and will shortly begin shipping several cars of coke daily. The plant has been practically idle for several months.

Moundsville—The working force of the Mound City Coal Co. is being daily increased. For some time past the management has been adding a few miners each day to the pay roll. It is stated that this operation has business enough ahead to keep it working to its capacity.

Gary—The United States Coal & Coke Co. recently held its semi-annual first aid contest. Ten teams, nine white and one colored, all composed of employees of the company took part in this contest. Five events were selected by the judges from a list of 20 in which the various teams were judged, all teams operating at the same time. The first prize was awarded to the team from No. 10 Works, while Works Nos. 3 and 11 tied for second place. This company maintains a first-aid and mine-rescue station in which classes are being trained daily.

Wheeling—The West Virginia Coal Mining Institute will hold its annual convention in Wheeling on June 16 and 17. It is proposed to make this an important gathering of the organization. The program as now arranged is such that business and pleasure may be combined, the one not interfering with the other. Many valuable papers will be presented, and an enjoyable time is anticipated.

Fairmont—The holdings of the Consolidated Coal Co. in this vicinity were inspected recently by a large group of Eastern capitalists. The party was particularly interested in the development of the Helen's Run field, where some of the biggest mines in this section are being opened up. The visitors left for the Elkhorn field after inspecting the mines in this section.

ALABAMA

Gadsden—Coal mines throughout the Gadsden district are being worked at full capacity. Extra operations at the mines at Altoona are under way. One heading is being driven there that will require several years to complete.

TENNESSEE

Petros—The Petros Coal Mining Co., of Petros, Tenn., was placed in the hands of a receiver by Judge Will D. Wright of the Chancery Court of Knoxville, Tenn., on June 1. A. H. Wood of Petros, president of the company, was appointed receiver.

KENTUCKY

Wheeler—The Ty Wheeler Coal Co. was placed in the hands of a receiver, June 5. John L. Boyd of the Proctor Coal Co., Knoxville, Tenn., who handled some of the coal, was named receiver. Mr. Boyd is also president and treasurer of the Bear Wallow Coal & Coke Co., and treasurer and general manager of the Prudential Coal Co., both operating in Tennessee.

Whitesburg—Some 200,000 acres of forest land in Letcher, Pike, Knott and Floyd Counties, as well as Dickenson and Wise Counties, Va., already have been pledged to the Eastern Kentucky Forest Fire Association, according to announcement made at the recent meeting here of that organization. J. E. Barton, state forester, presided at the meeting at which the plans of the association to carry out their ideas for protection of the timber were discussed.

A special train recently brought a considerable party of Consolidation Coal Co. officials, with a number of financiers and coal men. to Jenkins and vicinity, to inspect the mines in that district. It is said that the purpose of this visit is to make a number of increases and extensions in this field, and it is expected that considerable holdings in coal land will be developed in the near future. There is considerable activity in the eastern Kentucky coal field, especially in the Elkhorn District.

Hopkinsville—The Terry Coal & Coke Co. announces that contract for intended sale of its mines and property at Mannington, Ky., was made on Mar. 30, last, and the deal is to be closed by a cash payment before Aug. 10, next. The contract protects all stockholders for 20 years so they can buy their coal at the mines on the same terms that obtained with the Terry company. The purchasers have taken care of the property and the stockholders have approved the sale, which is to be at a price sufficient to pay the bondholders in full and effect a settlement with all creditors.

Frankfort—The Court of Appeals has reversed a judgment given by the Ohio County Circuit Court for $15,000 damages against the McHenry Coal Co. to Thomas Taylor, miner. Taylor was injured by falling slate and the jury in reaching its verdict was permitted to consider loss of time, which was not specially pleaded in the suit. Figured up to the time the suit was filed the time lost would have been $116.48 but the Court of Appeals held that there was no way of discovering how the jury may have computed it.

OHIO

Bellaire—The Pultney mine of the George M. Jones Coal Co. recently resumed operation. This mine has been closed since Apr. 1, 1914. Recently, however, a number of necessary repairs have been made and the mine is now in fairly good condition. It employs about 370 mine men when operating at full capacity, but this number will not be given work for some time.

Columbus—J. M. Roan, Ohio mine inspector and safety commissioner, has issued a bulletin which deals with records kept by operators of their employees. Mr. Roan announces that he finds after investigation that mine managements are very careless in regard to keeping records of the men who are working in the mines, permitting them to enter in the morning and leave in the evening, without any record having been kept. He further finds that persons have been permitted to enter mines who are not employed and without having secured a permit to do so. This is a dangerous practice and should be stopped. He holds that all employees entering in the morning should be checked in and out on leaving in the evening. This can be done without extra expense to the operator, and is to the operator's interest, as well as to that of the miner. This especially applies to shaft and gaseous mines. Mr. Roan holds that under no circumstances should a person be allowed to enter a mine who is not employed by the company until he has been given a permit to do so by the mine boss or superintendent and points out the danger of such a practice.

Coshocton—Trouble over the price of "dead work" at the Warwick mine, near Coshocton, recently resulted in the walking out of about 100 miners. A dispute arose over the price for handling the false roof.

Athens—Sunday Creek mine No. 211 was sealed by officials of the state mining department after a fight against a fire which is raging in the old workings of the mine. The fire broke out May 29 and nearly a score of men were overcome by the gas while the main shaft was being sealed. The mine must remain sealed for from three to six months and perhaps longer. Open-flame lamps are declared to be responsible for the fire.

St. Clairsville—The settlement of the eastern Ohio strike is causing a boom in the Belmont County marriage-license business. The 15 days from the settlement of the strike to June 1 show twice as many licenses issued as during the first half of the month.

INDIANA

Indianapolis—The Union Trust Co. has been appointed receiver for the Marion Coal Co. of this city. The assets are given as $15,000 and the liabilities at $18,000.

Terre Haute—Five hundred miners employed at the Speedwell and Lower Vein mines have been called out on strike. They allege that the superintendent has been forcing the men to pay $10 for jobs, discharging them and compelling them to pay it over again.

Three deeds transfering the coal rights of 376 acres of land in Fayette township in the northwest part of Vigo County have been filed for record here, although they bear date of 1910. The Bunsen Coal Co., an Illinois corporation, now holds the rights.

ILLINOIS

Herrin—By the closing down of two large mines here 765 miners have been thrown out of employment. Several hundred have been thrown out of work at Carterville by the closing of the big Burr mine there.

Belleville—The Superior coal mine, near here, has resumed after having been closed down a long time. Resumption was made possible by the closing of a contract with the East St. Louis Suburban Electric Ry. Co. for the disposal of the screenings. The mine employs about 100 men.

Springfield—Several mining properties in the Springfield district were temporarily disabled because of a terrific storm which swept over that section last week. As a result some of these mines will be idle for a week or 10 days until repairs can be made. The mines of the Peabody Coal Co. at Sherman and Pawnee resumed operations for one day recently in order to furnish sample shipments of coal for the Union Pacific Ry., which is about to award a contract for coal to be supplied through the Kansas City Terminal amounting to 30,000 tons per month.

FOREIGN NEWS

Fairbanks, Alaska—George A. Estabrook, owner of a placer claim on Chicken Creek in the Forty-mile district on the upper Yukon, has been granted the first permit to mine coal in the interior under the new Federal leasing law.

Toronto, Can.—The Crows Nest Pass Coal Co. of Fernie, B. C., is about to install a complete system for the treatment of byproducts, which have so far received little attention. President Elias Rogers has been in Europe securing plans for the necessary machinery. The company will produce ammonia, ammoniacal liquor and benzol ready for marketing, but for the production of tar an additional plant will be required.

PERSONALS

Michael Scollard of Brazil, Ind., has been appointed Indiana state inspector of mines.

Stephen H. Payne has been placed in charge of the newly established New York office of the Hirsch Electric Mine Lamp Co. at 30 Church St., New York.

E. L. Douglas, of Hazard, Ky., general superintendent of the Harvey Coal Co., developing a coal lease at the head of First Creek in Perry County, Ky., on the First Creek Branch of the Lexington & Eastern division of the Louisville & Nashville R.R., will shortly change his address to Typo, Perry County, Ky.

Kieran Donahue, of Girardville, Schuylkill County, Penn., has been notified that he has passed the examination for mine inspector, and it is likely that he will be appointed to succeed John Curran, inspector of the 18th anthracite district, who recently died. Thus far none of the new applicants except Donahue have been notified of success.

Chief Earl Henry was recently named by the Governor of West Virginia to succeed himself as inspector of the Bureau of Mines. Mr. Henry then announced the appointment of three mine inspectors as provided for by the enactment of the new mining code. These men were J. G. Vaughn of Charleston, Clarence N. Orr, of Kingwood, Jackson County, and Samuel McMahan, of Wellsburg, Brooke County. It is said that Mr. Henry had 400 qualified applicants for the three positions.

OBITUARY

The body of William Woods, fireboss at the Blackwood colliery near Pottsville, Penn., was found on June 5 in the sump at the foot of the slope. It is believed he was examining the pumps when he fell into the water.

William Spence, who was known as the oldest and was at one time the best known coal dealer in Brooklyn, died at his home in that borough recently. Mr. Spence was 87 years old and had been a resident of Brooklyn for about 80 years. His father, William Spence, opened the first coal yard in Brooklyn, at the corner of Flatbush Ave. and Livingston St., then well outside of the built-up district. The yard is now out of existence but the business is being continued under the name of William Spence & Son, with realty as an added department.

John W. Reid, aged 57 years, superintendent of the Old Forge district of the Pennsylvania Coal Co., died on June 5 at Dr. Reed Burns' private hospital at Scranton, where he was under preparatory treatment for an operation for obstruction of the bowels. He had been ill for several weeks. He was a native of England, but came to Pittston when a boy and began work for the Pennsylvania Coal Co. as a door tender. He had worked 44 years continuously for this firm and had risen by faithful application from the lowest position to that of district superintendent, which he had held for 5 years. He was a resident of Moosic.

INDUSTRIAL NEWS

St. Louis, Mo.—The offices of the Missouri & Illinois Coal Co. at St. Louis have been moved from 815 Mermod & Jaccard Building to 1823, 1824 and 1825 Railway Exchange Building.

Buffalo, N. Y.—It has been planned to hold the annual meeting of the Allegheny Valley Operators' Association in Buffalo at the time of the Roberts coal picnic, which occurs on July 17.

Columbus, Ohio—Gross earnings of the Toledo & Ohio Central R.R. for April were $340,000 as against $325,691 for April, 1914. The gross for the first four months of the year was $1,314,629, a decline of $246,175 from the first quarter of last year.

Knoxville, Tenn.—The J. D. Fate Co., Plymouth, Ohio, manufacturer of the "Plymouth" gasoline industrial locomotive, has established an agency at Knoxville, Tenn., 922 Holston Bank Building, in charge of C. S. Oldroyd, formerly with the Goodman Manufacturing Co.

Kansas City, Mo.—The Kansas City Terminal R.R. was recently granted a permit by the city for the construction of a new coal station. The station is to be built of reinforced concrete with a concrete roof. The building will cost $20,000 and is to be completed by Aug. 1.

Birmingham, Ala.—The Sloss-Sheffield Steel & Iron Co. has received a contract for 200,000 tons of coal for the Seaboard Air Line for delivery within 12 months. This company also recently closed a contract to furnish 14,000 tons to the New Orleans Street Ry. Co., New Orleans, La.

Terre Haute, Ind.—It was reported some time ago in "Coal Age" that the properties of the J. K. Dering Coal Co. in Sullivan, Vigo and Vermilion Counties had been sold. This was erroneous as the properties in question belonged to the Dering Coal Co. of Delaware, the J. K. Dering Co. of Chicago having no interest in them whatever.

Somerset, Penn.—It has been announced that the Quemahoning Coal Co. has been awarded the contract by the U. S. Government for the furnishing of fuel for the United States navy at Annapolis, Baltimore and Philadelphia. The mines of the company at Ralphton and Husband will be worked 24 hr. a day in order to fulfill the requirements of the contract.

Bluefield, W. Va.—The Crozer-Pocahontas Co. has been awarded a contract for 400,000 tons of coal to be delivered during 12 months beginning July 1, to the Navy Department at Lamberts Point. Coal under this contract had heretofore been furnished largely from Pennsylvania fields, and this contract in large measure means a clear increase in the business of the Pocahontas region.

Moundsville, W. Va.—The work of enlarging the shaft of the Mound City Coal Co. which was recently begun, is progressing rapidly. This shaft will be made wider and larger, and will be concreted from the rock to the surface. The contract for the cement work was recently awarded to the Crystal Sand & Cement Co. of Moundsville. It is anticipated that the work will be completed in about three weeks.

Coalfield, Tenn.—The Harriman & Northeastern Coal Co., a new firm, has leased a large body of coal land near here and has completed surveys for a side track and tramways. Felton Hatfield, president, is an experienced operator, being connected with the Brushy Mountain prison mines. It is stated that W. E. Brinkerhoff, former superintendent of the Coalfield Coal Co., will superintend the new operations.

Philadelphia, Penn.—For the first time in history the New York Central R.R. has representation on the board of one of the important anthracite roads. At the meeting of the board of directors of the Reading company on June 1, Alfred H. Smith, president of the New York Central, was elected to take the place of Charles C. Harrison, resigned. Mr. Smith was no doubt chosen to represent the Lake Shore interests in the Philadelphia & Reading Ry.

Pittsburgh, Penn.—The assumpsit suit of James A. Paisley, of Cleveland, Ohio, against the Rail & River Coal Co. in the District Court of Pittsburgh resulted in the award by a jury of a verdict for $403,523. This amount includes the verdict of $339,000 with interest at 6 per cent. from Apr. 1, 1912, to June 3, 1915. The suit arose over a 10 per cent. commission on the sale of coal mines and properties to the Grand Trunk Development Co. of Canada through Charles W. Hayes, of Toronto.

Philadelphia, Penn.—The increase of bituminous coal exports from this port continues. Recently several ships took on cargoes of coal for the Italian Government. The British Government has placed an embargo on all shipments of native coal to other than British possessions. As a consequence English contractors are making heavy purchases in the United States to fill their foreign contracts. The great difficulty is to secure sufficient bottoms and when the vessels are available the rates are quite stiff.

Huntington, W. Va.—Referee T. R. Shepherd recently held a deed of trust for $14,813, on the property of the Mingo Washed Coal Co. of Matewan to be valid. After the Mingo company had filed a petition in bankruptcy, the creditors made an effort to have the deed of trust held by the Merchants' Bank of Pittsburgh thrown out. Following several hearings Referee Shepherd announced his decision. About $30,000 in claims has been filed against the property of the Matewan concern, the property of which has been appraised at $23,389.

Uniontown, Penn.—It is understood here that the sale of some 76 acres of J. V. Thompson coal land located at Revere recently at the rather high price of $2000 an acre to the Rainey interests is but the forerunner of some large transactions which will clear the commercial horizon of this and nearby counties. No sooner was the sale confirmed by the New York court than negotiations were begun looking toward acquiring a large portion of Fayette and Greene Counties by a syndicate representing the most powerful coking interests of the country. Definite announcement of the result of these negotiations is anticipated within a short time.

Cincinnati, Ohio—The famous case of McKell against the Chesapeake & Ohio Ry. Co., the third trial of which resulted some time ago in a verdict of $125,000 in favor of the plaintiff, and which was affirmed by the United States Circuit Court of Appeals, has virtually been ended by the action of the United States Supreme Court in denying the defendant's application for a writ of certiorari. This means that the judgment, with interest and costs, must be paid, the total amount due being about $135,000. The case has been pending since October, 1902, and has excited much interest.

Toledo, Ohio—The steamer "Viking" was sunk, with more than 2000 tons of hard coal aboard, about a week ago. The steamer arrived here from Buffalo with her cargo and the steam was blown from her boilers one night for the purpose of renewing her funnel. The deck siphons were in some manner overlooked and being left open and under water, the vessel filled during the night and sank in 25 ft. of water at the docks of the Ironville Dock & Coal Co. After four days of hard work including the building of a cofferdam around the vessel it was successfully floated.

Philadelphia, Penn.—Another of the large mining companies recently announced that, in accordance with the recommendation of the Bureau of Mines, it has discarded the use of fuses for exploding blasts and substituted in their stead electric batteries. This, of course, is brought about on the score of safety to the miners. However, another important reason may have actuated the change, although not probably so well known. Miners have been at times so careless in handling fuses that the latter have found their way into coal prepared for market, which has resulted in several instances in claims being presented for damages due to exploding furnaces and stoves.

Baltimore, Md.—The business of the Wells Light Manufacturing Co., Jersey City, N. J., has been acquired by the Alexander Milburn Co., of Baltimore, Md. Repair parts for outstanding Wells lights will be manufactured and supplied in the future by the Alexander Milburn Co. from its Baltimore factory, and complete Wells oil lights will also be furnished where desired, in conjunction with the standard Milburn acetylene lights. The manufacture of Wells oil preheating burner outfits will be continued by the Milburn company and sold in connection with Milburn oxy-acetylene apparatus. The Wells lights and Wells preheating devices have been on the market for about 20 years, and have occupied a leading place among oil-burning equipment of their kind.

Birmingham, Ala.—Walter Moore, of Birmingham, and Eastern associates have just purchased from Steiner Brothers and Frank Nelson the Empire Coal Co., whose holdings consist of 17,000 acres of coal lands valued at one and a half million dollars. The land is some of the most valuable in the state. It is 22 miles from Birmingham on the Frisco railroad near the Southern, also the Warrior River. The name of the company will remain the same. The new owners own the Panama Coal Co. with 27,000 acres of coal lands adjoining their new possessions. The output from the combined properties is 1500 tons per day, and the present intention is to increase the tonnage to 2500 tons per day. Walter Moore is president and general manager. W. C. Hamilton, secretary and treasurer.

New York, N. Y.—The Mashek Engineering Co. of No. 90 West St., New York, manufacturer of metallurgical, coal-mining and briquetting machinery, reports that it has completed and recently shipped a complete briquette-plant equipment, capacity 20 tons an hour of small size domestic fuel, to the Delparen Anthracite Briquet Co. of Parrott, Va., and another plant equipment of the same size to the Stott Briquet Co. of Superior, Wis. It has recently secured orders for complete briquetting plants from the Gamble Fuel Briquet Co. of Harrisburg, Penn., and from the New Jersey Coal Mfg. Co. of Camden, N. J. It also reports an increasing number of inquiries on briquetting machinery from prominent coal producers. The business prospects appear brighter now than they have at any time during the last four years.

Bluefield, W. Va.—The shipments of coal from Hampton Roads during May proved to be the greatest for any one month on record, amounting to a grand total of 1,307,747 tons. Of this amount the Norfolk & Western piers dumped 716,002 tons, the Chesapeake & Ohio piers 372,472 tons, and the Virginian piers 219,173 tons. The May shipments were at the rate of approximately 16½ million tons per year, while their value during May reached approximately $4,000,000. Steady increases in coal shipments from Hampton Roads have taken place for several months past, and it is predicted that these will increase for some time to come. Many countries which formerly depended on England for their fuel supply, are now obliged to come to the United States for coal. During May in addition to the marked increase in the export of coal to Europe, cargoes for South America were noticeable in increasing numbers.

Coal Trade Reviews

General Review

May anthracite tonnage suffers a sharp decline and prices are weak. Bituminous exports approximately doubled but situation still unsatisfactory. Outlook more encouraging but hesitating over the crisis in diplomatic circles.

With the strongest sizes of anthracite selling well down to the April circular and supplemented by additional inducements in the shape of long-term credits to the buyer, there is little of an encouraging nature in the hard-coal situation. It is probable that the unseasonably cool weather, which induced some buying, has prevented a more or less general demoralization; as it is the trade is about as dull as it well could be. The steam sizes are subjected to the same pressure that marks the bituminous trade except in the rare instances, where manufacturers are crowding operations on rush war orders. Contrasted with the heavy shipments of April, the May tonnage showed a decline, pulling the gross shipments for the year down to half a million tons less than last year. Tangible evidence of the strained conditions in diplomatic circles is adversely affecting the situation still further.

A general smashing of all previous high records at the chief exporting points occurred last month, but it is clear that this off-shore business cannot attain to sufficient volume to relieve the pressure on the bituminous market. On the other hand it is believed that some effects of the long talked of improvement in industrial conditions are beginning to be felt, particularly in New England. There are well defined evidences of an advancing tendency, although consumers as a rule are well stocked up, and it will take a sustained movement for some time to clean up the surpluses, and create any activity. In the meantime the coal trade is marking time with the agencies watching developments closely and competing aggressively for any new business that appears. The Pittsburgh district is again experiencing beneficial results from the export trade and there is a better feeling in steel circles, which is affecting the coal market.

The stronger position of the West Virginia operators because of the heavy demand at Tidewater is having a steadying effect upon the Ohio situation, which is being further supplemented by an exceptionally favorable crop outlook in all directions. There does not seem to be a large volume of coal emanating from the districts where the labor situation has been cleared up and prices are generally maintained at the circular, although this is at a low level.

There is a barely perceptible improvement in the Middle West. Consumers are absorbing slightly more coal, while requisitions on contracts are a trifle heavier. Railroad buying as a rule, continues at a minimum, although one important system has just placed a large storage order and a considerable tonnage will be required by the middle of next month when crops begin moving. Additional manufacturing plants are beginning to resume operations on a curtailed basis, while others are increasing their working schedules, although none of the improvements are of large proportions as yet. It is generally felt that the market has finally turned the corner, and although the improvement may be subject to future developments, it will be well maintained and along conservative lines.

A Year Ago—Anthracite storage bins glutted with steam sizes and initial curtailment in operations inaugurated. Further shrinkage in bituminous demand and trade continues under heavy stress. Improvement in Lake shipping creates a more hopeful undertone.

BUSINESS OPINIONS

BUSINESS CONDITIONS

Situation hinging entirely on developments in the international situation. Highly favorable crop report. Steel operations show further expansion.

Dun's—A waiting policy always hinders business to some extent, and the hesitancy engendered by the foreign complications tends to arrest the progress warranted by the intrinsic soundness of underlying conditions. Even though the weather has proved an added drawback in many sections, the forward movement has not been wholly checked.

Boston News Bureau—The situation continues to be dominated by the pending diplomatic negotiations with Germany. But in the meantime the country is gradually pushing forward. War orders remain at their maximum, and general trade is increasing all the time in volume. Some of the closest students of conditions are becoming confident that we are facing a period of inflation. This would not only mean higher prices for commodities but increased values for securities.

Bradstreet's—Final distribution, checked in the East by unseasonable weather, has been revived in the West by sunshine and warmth; speeding up is the rule in industrial lines, and war orders, taken on close to a cash basis, tax the capacity of many plants, spread activity to other lines, make for competitive bidding for skilled labor and hence unemployment is steadily decreasing.

The Crop Report—Winter wheat shows a slight deterioration but the wheat area planted is 59,417,000 acres as compared with 53,377,000 a year ago, and the indicated crop is 950,000,000 bushels as against 900,000,000 a year ago. The estimated oat crop is 1,288,000,000 bushels compared with 1,216,000,000 for the same period a year ago.

Marshall Field & Co.—Sales and current shipments for the week show a very satisfactory comparison with those of the same period a year ago. More customers have visited the market than during the same week last year.

Coke—Increased steel operations have precipitated a sudden large inquiry for second-half furnace coke. Higher prices are expected soon and a labor shortage is anticipated after a moderate increase in production. (For complete details see p. 1046.)

Am. Wool and Cotton Reporter—The wool situation is decidedly better. Wool is plentiful, but very firm and advancing. Big sales took place all through the week; as for some time, sales were chiefly confined to foreign wools. The dye stuffs situation is still serious. The interest in war contracts seems to have declined to a certain extent. In the cotton goods market sales have been slightly larger than a week ago. Distributing is pretty regular. There is a tendency to postpone placing contracts for future delivery and an increase in spot business.

Engineering News—For the first time this year the contemplated building operations from plans filed aggregate a larger total than in the corresponding month last year. In 69 cities, all over the United States, the cost, from plans filed in May, amounts to $69,326,000, compared with $67,477,000 in the same month last year.

Iron and Steel—The decision that the United States Steel Corporation was not a monopoly under the terms of the Sherman law was the most welcome piece of news brought forward in many months. The placing of the Pennsylvania order for 165,000 tons of rails on Wednesday clears up a matter of long standing. This is one of the very large orders for rails placed in recent years. The production of iron in May amounted to 2,263,470 tons according to "The Iron Age." This is the largest output in any single month since April, 1914.

A change for the better, as far as increasing the capacity of steel plants is concerned, may now be expected and operations are already increased to about 80% capacity. It is recognized that the capacity of the steel companies has not kept pace with the growth of the country. Sellers of pig iron are more cheerful but there have been few sales. The market for finished products is much stronger particularly small rounds and materials for shipment abroad.

ATLANTIC SEABOARD

BOSTON

Hampton Roads shippers disposed to make competitive prices and in close touch with buyers. Export demand sags a little. Industrial situation shows slight improvement. Georges Creek still coming forward slowly. Pennsylvania grades and anthracite unchanged.

Bituminous—The present market on Pocahontas and New River can be described as marking time. The recent successful bid of one of the Pocahontas factors for furnishing naval colliers shows that West Virginia operators intend to remain in the market on a competitive basis. A large share of this contract last year was let on coal from central Pennsylvania, and it was expected the same thing would occur this year. Buyers in this territory are closely following all such developments, but while they are still tempering the market, no sales of any consequence can be reported. The fact that the export business is getting spasmodic again on account of the shortage of steamers keeps sales agents in close touch with buyers here. Aside from scattering instances, however, the price level f.o.b. Hampton Roads remains about the same as a week ago.

Not only is the New England industrial situation somewhat improved in special lines, but there is increasing evidence of more confidence in the outlook for fall and winter. Several lines of textiles report a better demand for goods, and if that is sustained for a few months it will give a much different tone to the coal situation than has prevailed the past year or so. For the present not much effect is expected because stocks of coal are large and every manufacturing plant having a contract has been crowded to accept deliveries.

On cars, for inland delivery, the demand is light. There is less coal offering, however, and prices continue as when last reported.

The heaviest volume of Georges Creek is still being routed to Baltimore for export, only small amounts coming through via Philadelphia and New York. New England buyers are now obliged to be forehanded about arranging for shipments of this grade.

The quality grades from Pennsylvania districts are coming forward fairly consistently. There is no snap to the demand, but the aggregate tonnage is considerable. The grades that sell at less prices are druggy in every direction. The strengthening in Hampton Roads prices has not progressed far enough to cause any extra demand for the steam coal shipped via Philadelphia and New York.

Water Freights are about stagnant and reflect the dullness of the trade; 40c. is now the top rate out of New York for Long Island Sound ports.

Anthracite—Slow loading is general with the larger shippers, but more because of light mining than for any other reason. If output continues on the same basis most of the companies will have business enough for the whole of June. The cool weather is having a favorable effect on retail trade.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.75@2.85
Boston†	....	....	....	3.70@3.78
Providence†	....	....	....	3.60@3.73

* F.o.b. †On cars.

PHILADELPHIA

Only continued cold and rainy weather has prevented utter stagnation. Despite offerings at low prices there is practically no response from buyers. No marked change in bituminous.

Anthracite—If anything the collieries as a general thing are on shorter time than last week. The unusual weather, cold and rain, have had a slight effect on business which would otherwise be almost at a standstill under normal conditions.

Of the domestic sizes stove, as usual, is well taken care of under restricted mining, although a few offers of this size are noted at the April circular with long-term credit. Even with these inducements there do not seem to be many takers.

About $2 continues to be the ruling price of pea coal, with offers right along of somewhat less than that figure, although $1.75 seems to be about the minimum. The continued low price of pea coal has tended to curtail the movement of the family grades; many retail dealers are offering this size at a price which shows a wide gap between it and egg, stove or nut. There are many who believe that the $2 price will continue until the first of the year, when the expiration of the agreement with the miners at the end of March will result in the storing of coal for reserve and thus cause a stiffening of the entire market.

The steam sizes still lag, due to the fact that many of the factories are still on reduced time, the only plants working to capacity being those affected by the war.

Bituminous—There is no particular action, but operators are becoming more hopeful. War orders and the recent decision in favor of the Steel Corporation have had the effect of putting courage into the business and an increased tonnage is naturally looked for. Tidewater movement shows a tendency to increase, especially since Italy's entrance into the war, which is calling for the exportation of considerable tonnage to that nation.

The standard prices rule as follows, with individual offerings of from 10c. to 30c. from those quoted:

	Line	Tide
Broken	$3.20	$4.45
Egg	3.45	4.70
Stove	3.70	4.70
Chestnut	3.85	4.95

NEW YORK

Outputs closely regulated and little spot bituminous is being offered. Anthracite fails to show any improvement. Stocks plentiful and mine operations curtailed.

Bituminous—Shippers are waiting for better conditions and have about decided that they will not be realized until fall. Operators are endeavoring to prevent overstocking the market. Those in the upper fields are working about half time while the mines in the Pocahontas, George's Creek and New River regions are doing a trifle better, due to the increased export demand.

Operators in southern West Virginia and Kentucky continue to have labor troubles. The matter of car shortage is not one of moment at this time. There has been some good bunker business. Gas coal is in good demand but prices are low.

The local docks continue to be well supplied, but there is no surplus to cause any trouble. Contract holders continue to take more than their contracts call for. Shipments to Long Island Sound and New England points continue normal. Demurrage coal is scarce and the spot market remains quiet. Quick buyers are able to pick up a few cargoes at low prices.

The export situation continues to be the feature of the market. Shippers are optimistic and look for a still heavier call. Bottoms are not more plentiful than last week and rates remain about the same. New inquiries continue to be received.

Prices on the various grades of bituminous coal have not changed materially from last week which we continue as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.30@3.40	$3.30@3.40	$3.30@3.40	$1.75@1.85
Georges Creek Tyson	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.55@2.65	....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	....	....	1.35@1.50
Nanty Glo	2.75@2.80	....	....	1.20@1.25
Barnesboro	2.65@2.70	....	....	1.10@1.15
Somerset County:				
Quemahoning	....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe	2.45@2.55	....	....	0.90@1.00
Greensburg	2.75@2.80	....	....	1.10@1.15
Westmoreland	2.95@3.20	....	....	1.15@1.40
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	0.70@0.80
Steam		2.45@2.50	2.45@2.50	0.90@0.95
Western Maryland		2.35@2.45	2.35@2.45	0.80@0.90

Anthracite—It is difficult to find any signs of improvement in the anthracite coal market. Indeed, some shippers believe the situation, especially at Tidewater, is duller than a week ago. Some inland dealers complain that shipments are not as prompt as they might be. Salesmen report a better demand inland than locally.

Most of the companies are endeavoring to work their mines on an average of about four days a week, while many of the individuals are not doing as well. Efforts are being made by all to prevent a slump in the market. The outlook for the balance of the month is not promising. In some instances coal has been quoted by individuals at April circular but these are scarce.

The curtailed operations do not seem to diminish the stock of steam sizes. Pea coal is selling at considerable below the companies' circular. The buckwheat sizes are much in evidence and a quick buyer can supply his immediate requirements at almost his own figures.

Quotations are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.75		$4.80	
Egg	5.00	$4.80	5.05	$4.85
Stove	5.00	4.80	5.05	4.85
Chestnut	5.25	5.00	5.30	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	1.95@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

ANTHRACITE OPERATIONS

The "Philadelphia News Bureau" reports mine operations at the anthracite collieries as follows:

Philadelphia & Reading Coal & Iron Co.—This company operated three days during last week.

Susquehanna Coal Co.—This company operated three days during last week.

Lehigh Valley Coal Co.—The mines of this company were closed on Monday and Tuesday of this week and it is the present intention to run about half time during the balance of the month.

HAMPTON ROADS

Dumpings for May break all previous records. Movement heaviest to Italy.

Dumpings at tidewater for the week, while heavy, have hardly come up to tonnage anticipated. As has been the case for some time Italy has taken the largest percentage of the movement although shipments for the Canal Zone come a close second. The "Achilles," a new vessel and a sister ship of the "Ulysses" which recently loaded a cargo of over 12,000 tons for the Canal Zone, has loaded for her trial trip. The movement coastwise has been chiefly to Boston, Providence, and Portland, although of course smaller cargoes have gone to the other New England ports as far north as Bangor. The shipments to New England have consisted of New River and Pocahontas mine-run, nut and slack and also a small amount of the high volatile coals. Prices at tidewater are practically stationary and there is still somewhat above the normal accumulation on hand.

During the month of May all records for heavy dumpings were broken, 1,307,747 tons being moved over the Hampton Roads piers. Of this quantity the Norfolk & Western dumped 716,002 tons, the Chesapeake & Ohio 372,472 tons and the Virginian 219,273 tons. Of the total movement over 440,000 tons went foreign, Italy being the heaviest buyer.

The following vessels have cleared from Hampton Roads during the past week:

Norfolk			Norfolk		
Vessel	Destination	Tons	Vessel	Destination	Tons
Oceano[1]	Genoa	6350	Clara Donnell	Teneriffe	1547
Thelma[2]	Cardenas	1880	Romford	St. Lucia	5400
Kintail	St. Vincent	5417	Newport News		
Fairmount	Rio de Janeiro	3000	Baker Palmer	Rio de Janeiro	3800
West Lands	Havana	4700	Maasdijk	Rio de Janeiro	7300
Pietro	Spezia	5462	Sif	Fort de France	4641
Tarrington	Naples	7760	Justin	Para	597
St. Theodore	Genoa	7600			
Negadisk	Canal Zone	6500			
Tancred	Canal Zone	5500			
Alicia B. Crosky	Para	1649			

[1] Pocahontas Fuel Co. [2] Baker-Whiteley Coal Co.

Railroad Tonnages—Dumpings over the local piers for the past several weeks compare as follows:

	Week Ending				
Railroad	May 8	May 15	May 22	May 29	June 5
Norfolk & Western	208,179	151,113	162,021	146,462	156,011
Chesapeake & Ohio	88,609[1]	80,045	84,286	83,678	44,702
Virginian	45,116	57,903	39,431	61,688	38,372
	341,904	289,061	286,638	291,828	239,085

[1] Nine days.

OCEAN FREIGHTS

During the past week freight rates were slightly easier on large steamers, both to the Plate and to the Mediterranean, principally owing to the scarcity of large orders; on the other hand rates on small boats to South American ports were firm. Freights to other destinations are unchanged.

To	Rate	To	Rate
Havana	$2.00@2.25	Bermuda	$3.50@3.75
Cardenas or Sagua	3.00@3.25	Vera Cruz	**3.50**
Cienfuegos	2.50@3.00	Tampico	**3.50**
Port au Spain, Trinidad	3.75@4.00	Rio	8.64@8.76
St. Lucia	3.50@3.75	Santos*	8.88@9.12
St. Thomas	**3.25**	Montevideo	7.44@7.92
Barbados	3.75@4.00	Buenos Aires or La Plata	7.68@8.16
Kingston	2.75@3.00	Rosario	8.40@8.64
Curacao	3.75@4.00	West Coast of Italy	10.56@10.80
Santiago	2.75@3.00	Spain**	9.60@10.08
Guantanamo	2.75@3.00	Valparaiso or Callao	**7.20**
Demerara	5.00@5.50	Marseilles	9.60@10.68

Note—Rates noted in **bold face** type are only approximate.
* Consignees paying dockage dues. **Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

BALTIMORE

Trade is full of conflicting reports, largely because of the large export business which is breaking all records. Home trade undoubtedly dull.

The companies figuring in export trade are undoubtedly handling much coal, while those relying entirely on the home market are for the most part dull. This includes a large number of companies that sell to the trans-Atlantic liners which are now running very irregularly. The May report of the Consolidation Coal Co., one of the heaviest shippers in the foreign trade, shows that it broke the previous production record by nearly 100,000 net tons.

May exports from Baltimore broke all records. A total of 232,866 tons was sent to foreign account. Italy took the largest amount, 89,105 tons. Argentina was second with 80,590 tons.

The domestic market is very flat and little new business is developing. Low-grade West Virginia and western Maryland coals are still offering very cheap to the trade at the mines. Pennsylvania line coals are a little stronger.

The following charters were announced the past week:

Vessel	To	Rate	Vessel	To	Rate
Terschelling	Plate		Germania	Piraeus	
Ashmore	Plate		Ashmore	Plate	$8.28
Ubbergen	Barrios		Astoria	Plate	8.28
Lennox	Plate		Gleneden	Naples	10.56
Llongiven	Plate		Lejre	Italy[1]	10.80
Nordland	Guantanamo		Styliani Bebis	Italy[1]	10.80
Georgias	Italy[1]	$10.80	Ontaneda	Montevideo	8.28
Tjisondari	Italy[1]	10.80	Aldgate	Rio	8.88
Samarnda	Alexandria		Dunachton	Montevideo	8.28
Meracka	Alexandria				
Mar Mediterraneo	Algiers				

[1] West Coast.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Lennox	British	Baltimore	River Plate	2361	
Llongwen	British	Baltimore	River Plate	3013	
Eliopila	Italian	Philadelphia	West Coast, Italy	2283	$10.80
Ubbergen	Dutch	Baltimore	Puerto Barrios	1150	
Nordland	Danish	Baltimore	Guantanamo	1042	
Sif	Norwegian	Baltimore	Martinique	1959	
Marosa (ship)	Norwegian	Hampton Roads	Rio Janeiro	1882	7.75
William E. Downes		Newport News	San Juan, P. R.	639	2.70
Emma F. Angel		Baltimore	Calais	819	
Atlantic		Baltimore	Buenos Ayres	3348	7.68
Astoria	British	Baltimore	River Plate	2743	10.44
Orion	Swedish	Philadelphia	Rosario	2158	
Margam Abbey	British	Virginia	Rio Janeiro	2778	8.76
Geo. E. Klinck		Philadelphia	Halifax	460	1.75
Mary A. Hall		Philadelphia	St. John, N. B.	341	
Harry W. Haynes		Philadelphia	Stockton Springs	256	
Ashmore	British	Baltimore	River Plate	1574	8.28
Terschelling	Dutch	Baltimore	River Plate	1872	
Samarinda	Dutch	Baltimore	Alexandria	4423	
Merauke	Dutch	Baltimore	Alexandria	4298	
Germanic	British	Baltimore	Piraeus	2171	
Marmediterraneo (new)	Spanish	Baltimore	Algiers		
Glen Eden	British	Baltimore	Naples	3018	10.50
Lejre	Danish	Baltimore or Virginia	West Coast Italy	1854	10.80
Georgios	Greek	Baltimore or Virginia	West Coast Italy	2077	
Tjisondari	Dutch	Baltimore or Virginia	West Coast Italy	8039	
Dionysios Stathatos	Greek	Norfolk	Bilbao	2296	9.54

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

PITTSBURGH

Considerably increased inquiry for export purposes, chiefly to Italy. Manufacturing demand slightly improved. Lake shipments light. Operations at about 60 per cent., with no shortage of men or cars.

Pittsburgh district shippers, particularly those in the Connellsville region, have been finding a much heavier demand for export coal, doubtless arising chiefly from the entrance of Italy into the war, with the consequent stoppage of coal shipments from Germany to that country. There are decidedly cheaper markets for Tidewater shipment, of course, but some of the export requirements can be met by only a few districts.

There is a slight improvement in coal demand from manufacturers, and particularly the steel industry, as after a short halt the improvement in steel is now proceeding apace.

Shipments in the Lake trade continue light and while they are increasing somewhat it seems probable that anything like full shipments will hardly be reached before about Aug. 1, early prognostications having been that the normal rate would be attained by about July 1.

Mine operations are at a slightly better rate, probably averaging close to 60% of capacity. There is no shortage of labor, of course, with such operations. Car supply is fair but does not seem to be excessive.

No interest has been revived in the contract market, prices for free coal being so much below contract-asking prices, which remain about $1.15 for mine-run to Apr. 1 and about $1.15 for ¾-in. coal for the Lake season. Free coal continues to be quotable about as follows: Slack, 55@60c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Agencies pushing hard for business and orders difficult to obtain. Anthracite also heavy and Lake trade is slowing up.

Bituminous—The general report is not satisfactory. Business is difficult to obtain and very little comes in unsolicited. Agencies are pushing hard for business and prices are so badly cut that profits are small. Former predictions of a revival in buying after the end of June are no longer heard and not much is anticipated now before the fall. As a rule the bituminous mines are running half time or less and in some instances it is hard to give the miners enough work to support them.

There is some coal that brings the full circular price, but it must be of the highest quality and in the hands of capable salesmen. Quotations are based on $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack. Allegheny Valley sizes are about 25c. lower than Pittsburgh. The light demand for coal in the Lake trade at ports west of here throws a large amount of it on this market that would otherwise not come here.

Anthracite—Everything in the trade is about as dull as it can be. There was a little improvement at the end of May on the part of a few jobbers who wanted to take advantage of the ten-cent difference in price, but that promptly subsided when June came in.

The activity in Lake shipping is not quite what it was, though the week's total is only a trifle under 100,000 tons. For the month of May the shipments amounted to 548,437 tons and for the season, 802,142 tons, as against 603,446 tons to June last season. Some of the shippers have about stopped forwarding anthracite to the Upper Lake docks, as it is piling up fast there. Within the last few days it has come in more slowly from the mines, either on account of mining suspension or demand eastward.

TORONTO, CAN.

Market continues well stocked and prices remain at a low level.

The yards continue well stocked in all lines and supplies are coming forward freely both by rail and water. The water in the harbor is 18 in. lower than usual at this season and on 3rd inst. the collier "Veronica," from Oswego, ran aground at the entrance at Eastern gap in about 12 ft. of water. The only change in prices is an advance of 50c. for cannel coal. Quotations for best grade are as follows: Retail, anthracite, egg, stove and nut, $7.50; grate, $7.25; pea, $6. Bituminous, steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $8; wholesale f.o.b. cars three-quarter lump, $3.56; screenings, $2.90.

TOLEDO

Both ore and coal movements light. Dealers anxiously watching for railroad contracts.

Toledo is still a quiet market and this condition is likely to prevail until the Lake coal starts moving more freely. The domestic market is slow but Kentucky and West Virginia coals are in some demand for threshing purposes; the large crops would indicate that this trade will be heavy when fully under way. Steam trade continues quiet. Prices on practically all grades are running close to the list in actual sales although the listed quotations are low.

Lake coal passing through here this season amounted to 1,108,725 tons and the Canadian shipments amounted to 92,487 tons. These figures show considerably less than a normal movement. Occasional small contracts are coming in from private individuals for summer coal and small institutions which are placing fair orders. Larger contracts will not be let until later in the summer although dealers are expecting some railroad orders of considerable size to come in at any time.

COLUMBUS

A slight improvement reported from most districts. Prices steadier and the tone of the trade is better. Some stocking reported.

The trade reports a better feeling in the market with prospects for the future looming up brighter. This is due primarily to the disposition on the part of West Virginia operators to hold their coal for higher quotations and not sacrifice it in Ohio markets. For the past few months there has been much cheap coal in Ohio and prices have been cut ruthlessly. But operators are now going slower and as a result a greater steadiness is noted on all sides.

The steam trade is still rather slow as manufacturing is improving very slowly. It is true that factories making war munitions have all they can do but other lines of manufacturing are slow. Buying off the open market still prevails. In many cases where contracts have been renewed a concession in price is required. Railroads are taking a fair amount of fuel.

In domestic lines there is not much activity noted. Some stocking of the fancy grades such as Pocahontas, splints and white ash is reported but the movement is not yet general. There is practically no stocking of Hocking, though some Pomeroy coal is being bought for stocking purposes. The retail trade is slow although prices are generally maintained at former levels. Dealers are not inclined to sell at low figures, being content to wait for better conditions. Retail stocks are only fair.

Lake trade is showing some increase although some of the large companies will not start shipments until after July 1. Docks in the Northwest are still congested and the interior movement is limited. Many operators are loath to invest money in Lake shipments without brighter prospects. Chartering of boats is not very active.

Mines have been working at about the following percentages of full capacity.

	Week Ended			
District	May 15	May 22	May 29	June 5
Hocking Valley...	25	25	30	30
Jackson....	25	25	20	20
Pomeroy Bend....	50	50	45	50
Crooksville.	25	30	35	35
Cambridge.	35	30	35	35
Massillon...	40	35	35	35
Eastern O.	..	5	15	25

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump..............	$1.45	$1.50	.....
Inch and a quarter............	1.30	1.35	$1.30
Three-quarter inch............	1.25	1.30	1.25
Nut..........................	1.15	1.25	1.15
Mine-run...	1.05	1.10	1.05
Nut, pea and slack............	.70	.75	.65
Coarse slack..................	.60	.70	.55

CLEVELAND

Lack of Lake orders has curtailed the shipment of fine coal, but not sufficient to have a marked effect on current prices. Lake shipments falling behind.

Eastern Ohio mines are shipping a little coal into this market. Slack is selling at $1.50 to $1.55, mine-run at $1.85 to $1.90 and three-quarter at $1.95 to $2. These are current spot prices from local operators, and except on mine-run and three-quarter would not hold good for shipment. It would be impossible to place an order for five to ten cars a day of No. 8 fine coal at anything like these prices and probably such an order would be very hard to place as the operators have no outlet for their coarse coal.

The ruling prices on fine coal this week are $1.55 to $1.60. Youghiogheny operators have had Lake shipments curtailed and are holding their prices a little more firmly. Fairmont is comparatively easy.

Lake shipments fell off during May as compared with a year ago. Lake Superior shipments in May 1915 totaled 248,110 tons of anthracite and 1,248,447 tons of bituminous as compared with 248,694 tons of anthracite and 1,903,425 tons of bituminous last year. All of the larger shippers took very much less coal to June 1 than a year ago. A few of the shippers ran ahead of last year, but their docks are filled now and they are putting in stop orders.

In domestic coals there is plenty of smokeless mine-run, but a shortage of prepared sizes. The operators cannot take care of the fine coal. The Lakes are not furnishing the outlet this year and are not likely to until about Aug. 1.

Prices for shipments are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump..........	$3.10	......	.....	....	......
Lump, $\frac{3}{4}$ in.....	.....	$2.20	$2.00	$1.85@1.90	$1.95
Egg...........	3.10	......	......	....	......
Mine run.......	2.65@2.70	2.10	1.85	1.80@1.85	1.85@1.90
Slack..........	......	1.65	1.60	1.60@1.65	1.50@1.55

CINCINNATI

Sluggishness in all quarters. Steam contracting has not improved.

Even smokeless coals are beginning to feel the depression despite the relatively small supply and the active demand which nearly always keeps these in first-class shape. The tendency toward economy among consumers has also had its effect upon smokeless coal and there is a disposition to substitute a cheaper coal. Splint is dragging, as are all other bituminous coals, simply because demand is lacking. The Lake movement is very sluggish. A better feeling in the steel industry, caused by the consumption of plants handling war orders, is the most encouraging feature of the current situation.

LOUISVILLE

Mines continue on short time and steam market is softer. Heavy river shipments.

The mines generally are running on short time and are expected to continue so until July, when it is hoped that the domestic stocking movement will increase the demand. The steam coal market is softer, due to the supplies of slack resulting from increased operations to supply the Lake trade. There is a considerable accumulation of steam sizes in the larger towns.

Sales of the last ten days have been on the basis of from $1.40 to $1.85 for block coals of best grades; $1.10 to $1.35 for egg coals; 60 to 75c. and 40 to 50c. for nut and slack, all prices f.o.b. mines.

Large tows of coal from Pittsburgh are reaching here on the Ohio River bound for New Orleans. The boats have had some trouble due to heavy fogs and have found it necessary to tie up over night on some occasions. The "Sprague," with 1,250,000 bu in 52 barges, has passed into the Mississippi River being attended by the harbor boat "Wash Gray."

BIRMINGHAM

Steam business improved. Many large contracts made. Lump coal shows some betterment. Operators optimistic.

With the closing of contracts aggregating over one million tons of steam coal during the past week, business in this district has taken a decided boost on this grade. While some of this tonnage is simply on a "re-contract" basis, about 100,000 tons of it is new business for the district, or at least these mines have not had it for over seven years.

Operators are planning to increase their tonnage, and improvements over the entire district are being made preparatory to doing a large business. New mines are being opened up, while those that have been closed are cleaning up and some have already resumed operations. Lump coal shows an improvement over last week, and if the volume of business during the balance of the month is on the same basis as the first five days, the tonnage will far surpass that of May. Prices, however, are remaining stationary, and no change is looked for, for some time. Blacksmith coal is in a satisfactory condition.

COKE

CONNELLSVILLE

Large inquiry suddenly appeared for second-half furnace coke. Higher prices expected shortly. Labor shortage anticipated after moderate increase in production.

Inquiry has suddenly appeared in volume for furnace coke for the second half of the year. There is definite inquiry for about 40,000 tons a month, and tentative inquiry for about half as much more. About two-thirds of the tonnage in prospect is for furnaces now idle but which are expected to get into blast by about July 1. There is no rush about getting idle furnaces in blast, the interest of furnacemen in the coke market being rather premature because there are signs that prices will advance after a little more coke has been disposed of. Production and shipments in the Connellsville region, about 315,000 tons at last report, show a gain of over 50% over the December average, and well posted men assert that the limit is 350,000 or possibly 375,000 tons, before a labor shortage is encountered. We quote furnace coke at $1.50 for spot, $1.60 for June and $1.75 for second half, and foundry at $2@2.40 for prompt and $2.20@2.40 for twelvemonth contracts, depending on grade, all per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 29 at 316,890 tons, an increase of 10,199 tons, and shipments at 315,523 tons, an increase of 10,476 tons.

Buffalo—The trade in coke has not changed of late and it could not well be more dull. Some of the more active coal salesmen are saying that the tone is better than it was, and they are looking for a material improvement shortly. Everybody is hopeful, but confidence is confined to the few. The price of coke remains on the basis of $4.15 for best 72-hr. Connellsville foundry and $3.15 for stock coke.

Chicago—The market on domestic sizes has been weak, but the foundry coke trade seems to be looking up somewhat. Prices have been steady for furnace and foundry use as follows: Byproduct, $4.55@4.75; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.65@3.75; furnace, $4.50@4.75.

St. Louis—There is considerable speculation as to the factor that the St. Louis Elkhorn Byproduct Coke Co. is going to be in the market. The $2,000,000 plant of the M. W. Warren Coke Co. at Carondelet has been completed and put in blast. The company is exploiting its product extensively and urging its cheapness, efficiency and smokelessness. The daily capacity of the plant is to be 750 tons.

MIDDLE WESTERN

GENERAL REVIEW

Sluggishness still prevails but the undertone is stronger. Screenings slightly easier. Anthracite still moving slowly.

General quietness still continues, although cooler weather has had the effect of stimulating increased orders for domestic sizes. The feeling prevails that the uncertainties of the past three months are about over and that an upturn has begun which will gain considerable headway by the end of the current month. There is more of a disposition on the part of retailers and manufacturing enterprises to take larger tonnages and some standing orders on the coarse sizes have been increased.

Screenings have been softer showing an average decline of 10c. per ton but this condition is only temporary, as several large producers have no fine coal to offer on the open market. One of the more important public service corporations has just recently made inquiries for prices covering screenings to be shipped during the next two weeks, which should have the effect of stiffening quotations. The railroads continue to give minimum weekly orders for current needs, but the Chicago, Burlington & Quincy R.R. placed a large storage order with the Franklin and Williamson County operators this week at $1.15 for lump and egg.

INDIANAPOLIS

The dull period of the year is at hand and market is unusually quiet. Better railroad consumption anticipated next month.

Prices are again about as low as they ever have been in this state. This is the season when they are at the bottom every year, but the prolonged restrictions of industrial and commercial activities have kept the demand unusually low. Keen competition adds further complications but the general tone of the market is steady. Screenings can still be sold at the relatively good price of 85 to 90c. and mine-run at $1.10 to $1.20, but prices are made under these. Some mines having screenings contracts to fill are making concessions on lump coal and vice versa.

The month of May was unusually cold in Indiana and the demand for domestic lump lasted much longer than usual, but June will be so warm that the consumption of domestic grades will be at the minimum. The coal industry will not feel the benefits from the increased railroad traffic caused by the marketing of wheat and oats until about the middle of July. The demand from factories is about at the same level.

ST. LOUIS

Price cutting has demoralized the market but there is a slightly heavier demand and the outlook is more encouraging.

Although the price-war continues among the Standard operators of the inner group and the cutting is reported to have been worse during the past week than at any time since the fight began, it is understood that new prices will be announced next week and a start made toward a return to normal. The quoted prices continue unchanged, 77½c. for 2-in. and 90c. for 6-in. on the Illinois Central and 77½c. for all sizes on the Louisville & Nashville, but some sales were made for 75c. on contracts of considerable size. It is reported that a few sales were made as low as 70c., but this is doubted. The Carterville operators have kept out of the trouble and are holding up their prices.

In spite of the demoralization resulting from this price war, there is a perceptible improvement in the general tone of the market. The demand was larger for all grades the last half of May than in the six weeks preceding, due to a gradual improvement in the industrial situation. The increase has not been great but it has been sufficient to encourage the operators and dealers.

CHICAGO

Mining operations continue much restricted. Prices are not satisfactory, particularly on Kentucky grades.

Franklin County operations have been averaging a little over two days' working time per week. Screenings have been stronger from this district and have been selling as high as $1.10 per ton. Colder weather caused an increase of orders for domestic sizes, but this demand was only of a temporary nature. The Williamson County operators are in the same condition as their neighbors, and are closing down the mines or diverting their tonnage entirely to the steam trade. The producers in Franklin and Williamson County fields are still adhering closely to their organized effort to maintain prices notwithstanding market demands do not improve as fast as anticipated.

There is no demand for domestic sizes from the Harrisburg district, but screenings and steam lump for railroad use have shown increased activity.

The market for Springfield coal has been without any appreciable change during the last week. Screenings from this district have been slightly softer.

The Indiana situation has not undergone any marked change recently. The demand still continues at a low stage, and it is noticeable that shipments are now falling behind last year. Dealers are contracting for very little tonnage, and the building trade strikes in Chicago have helped to reduce shipments.

Prices on Kentucky grades are uneven, and mostly at an extremely low level. A few cars of consignment coal have again been sacrificed at disturbing prices. Demurrage coal is sold as much as 60c. per ton below list prices.

Anthracite trade is very dull, and few orders have been thus far placed for June shipment. It is evident that anthracite buying in the West this year is going to be delayed until mid-summer or later.

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump......	$1.25@1.35	$1.25	$1.35@1.40	$1.40@1.50	$1.25@1.35
Steam lump	1.25	1.15@1.25	1.25	1.10@1.25	1.15@1.25
2½-in. lump.	....	....	1.20@1.30	1.15@1.30	....
1¼-in. lump.	...	....	1.10@1.25	1.10@1.25	....
Mine-run...	1.10@1.25	1.00@1.10	.95@1.10	.80@1.10	.85@1.10
Egg........	1.25@1.35	1.15@1.25	1.15@1.25	1.15@1.25	1.05@1.15
No.1washed	1.40	....	1.50	....	....
No.2washed	1.25@1.35	....	1.60	....	....
Nut	....	1.00@1.05	.95@1.15	.90@1.10	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.15@1.35	....	....	....	....
Screenings..	.80@ .90	.80@ .85	.75@ .80	.75@ .85	.75@ .80

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump......	$1.25@1.35	$1.15@1.35	$1.70@1.90	$1.50@1.60	$1.35@1.50
1¼-in. lump.	1.25	1.15@1.25	....	....	....
Mine-run...	1.00@1.15	....	1.00@1.25	1.15@1.25	....
Egg........	1.15@1.25	.95@1.10	1.60@1.70	1.50	1.25@1.40
No. 1 nut..	1.25@1.40	....	....	....	1.15@1.25
No. 2 nut..	1.25@1.35	....	....	....	....
Screenings..	.80@ .90	....	....		..

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for May and the first five months of 1914-15 were as follows:

	May		5 Months	
	1915	1914	1915	1914
Phila. & Reading........	962,986	1,202,679	4,560,860	5,086,832
Lehigh Valley..........	1,273,106	1,249,218	5,311,595	4,829,093
Cent. R.R. N.J.	749,820	782,889	3,189,722	3,549,573
Del. Lack. & West.......	851,545	901,596	3,680,209	3,656,638
Del. & Hudson..........	677,108	663,648	3,105,898	2,754,627
Pennsylvania	508,272	579,869	2,523,264	2,746,436
Erie..................	610,305	702,892	3,053 993	3,251,852
Ont. & Western.........	164,819	198,762	853,661	940,552
Total..............	5,797,961	6,281,553	26,279,202	26,815,603

Stocks at Tidewater May 31 were 751,617 tons.

EXPORTS BY DISTRICTS

May exports by districts and states were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire..........	48	22	......
Maryland..........................	643	193,293	418
New York..........................	19,364	2,966	40
Philadelphia......................	6,169	60,207	......
Porto Rico........................	......	200	......
Virginia..........................	......	448,329	994
Mobile............................	......	461	......
New Orleans.......................	15	861	5
Arizona...........................	......	4,004	18
El Paso...........................	......	20,247	9,312
Laredo............................	......	859	......
Alaska............................	......	10	......
San Francisco.....................	1	......	16
Southern California...............	2	18	....
Washington........................	......	1,175	2,093
Buffalo...........................	249,196	156,539	35,908
Dakota............................	271	2,770	164
Duluth and Superior...............	53	2,705	60
Michigan..........................	......	34,506	5,025
Ohio..............................	10,500	139,484	169
Rochester.........................	51,786	18,718	357
St. Lawrence......................	114,413	25,080	1,434
Vermont...........................	1,066	214	100
Total.........................	453,527	1,112,668	56,113

Bunker Coal

Customs Districts	April	May
New York..........................	267,104	266,826
Philadelphia......................	32,948	34,600
Maryland (Baltimore)..............	35,265	60,783
Virginia..........................	120,357	172,012

RATE DECISIONS

I. C. C. Nos. 6381, 6504, 6570, 6573, 6603, 6615, 6616, 6624, 6631, 6765, 6874. Lake line applications under Panama Canal Act.

Upon applications of certain railroads under the Panama Canal act for an extension of time during which their interest in the operation of certain boat lines plying on the Great Lakes might be continued; **Held:**

1. That the physical fact of ports of call being served in common by the boats and the paralleling rails of the owning railroad establishes a case of competition existing between the owning railroad and its boat line.

2. That the case is the same where the railroad entity which owns the boat line also owns, through stock control, another railroad entity, or is an integral part of a system of railroad whose paralleling rails serve ports of call in common with the boats.

3. That where an owning railroad is a party to through all-rail routes or a member of "fast freight lines" or an association of railroads owning boat lines whose function is to keep the operation of their boat lines from interfering with the rail operations, the interest it thus maintains in common with the rail carriers whose rails do compete with its boat line is such an interest as the act provides against, and that it is possible for such an owning railroad to compete with its boat line for traffic, within the meaning of the act.

4. That the purpose of the Panama Canal act was to preserve to the common interest of the people, free and unfettered, the "water roadbed" via the Panama Canal. Also to restore all the water routes of the country to the same condition of freedom from domination that would reduce their usefulness as a natural means of transportation.

5. That Congress has decreed that there shall be a restoration of conditions which prevailed when railroads had no interest in and exercised no control over the boat lines plying upon the country's water routes. The inquiry in these cases is, Is the joint operation of these boat lines such as to make of them an exception?

6. That upon the respective records herein concerned, none of the several existing specified services by water is being operated in the interest of the public or is of advantage to the convenience or commerce of the people within the meaning of the act, and that an extension of the respective interests of the petitioners therein will prevent, exclude, and reduce competition on the great lakes. The application of each of the petitioners herein is therefore denied, effective Dec. 1, 1915.

FOREIGN MARKETS

GREAT BRITAIN

Market quiet. Italian business stimulates the trade. Great uncertainty prevails regarding licenses for export shipments.

There is at present a rather quiet tone in most markets, owing to various causes, including the decline in demand for house descriptions, holiday influences, and the restrictive effects of the export regulations. The intervention of Italy in the war has afforded some stimulus in certain quarters, for the license order will no longer apply to Italian shipments, and her requirements are well known to be large. In other directions the effects of the export order have been distinctly weakening to the market. The principle on which the licenses are granted is no nearer being known than at the outset, and is the subject of much criticism. A good deal of confusion arises from the fact that licenses are granted very readily in some instances, while in others, although the coal may be of the same quality and for substantially the same destination, permission to ship is refused. The awkwardness of the situation is self-evident.—"The Iron and Coal Trades Review."

May 28—There is a good demand but supplies are scarce and prices are rising. Quotations are approximately as follows:

Best Welsh steam.......	Nominal	Best Monmouthshires....	$7.92@8.04
Best seconds...........	Nominal	Seconds................	7.80@7.92
Seconds................	$8.40@8.64	Best Cardiff smalls.....	5.16@5.40
Best dry coals.........	8.40@8.88	Cargo smalls...........	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Outward chartering is more active but restricted by the difficulty in obtaining adequate coal supplies. Rates are approximately as follows:

Gibraltar.........	$4.08	Naples	$7.56	St. Vincent.......	$4.56
Marseilles........	4.83	Alexandria.......	6.00	Rio de Janeiro....	6.60
Algiers...........	3.81	Port Said........	5.28	Monte Video.....	6.00
Genoa............	7.44	Las Palmas......	4.32	River Plate......	6.24

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let Section on Page 18.

+Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
541	Dept. of Public Wks.	Toronto	Ont.		1004
689	H. W. Caldwell & Son Co.	Chicago,	Ill.	250[2]b	877
695	Brand Brewing Co.	Chicago	Ill.	8[1]b	877
697	Rosenbaum Bros.	Chicago	Ill.	150b	877
758	Hospital Bd.	Springfield	Ohio		955
765	Board of Education	Martinsburg	W. Va.	7	956
768	Government	Washington	D. C.	4000b	956
782	Bd. of Water Comrs.	White Plains	N. Y.	1000b	1005
787	Bd. of Hospitals	Springfield	Ohio		1005
807	Michigan Agricultural College	East Lansing	Mich.	9000b	1006

a Indicates anthracite coal. b Indicates bituminous. [1] Cars per month. [2] Per week.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

+No. 432—Minneapolis, Minn.—Bids on this contract (pp. 626, 707), which provides for furnishing the Board of Education with coal during the ensuing year, will be received until 2 p.m., June 15. All bids must be accompanied by certified checks for $1000. Specifications may be viewed at the office of the Business Superintendent. Address Business Supt. Geo. F. Womrath, 301 City Hall, Minneapolis, Minn.

+No. 672—Charleston, S. C.—Bids on this contract (p. 836), which provides for furnishing the Lighthouse Department with coal, have been received as follows:

		Consumers Coal Co.				Wm. Johnson & Co.			
Item	Tonnage	Coal	Ton	Gross	Cents*	Ton	Gross	Cents*	Coal
1........	2500	Clinchfield	$3.90	$9,750.00†	12.7	$3.98	$9,950.00	12.9	Stonega
1A.......	2500	Pocahontas	4.75	11,875.00†	14.6	4.81	12,025.00	14.6	Pocahontas
2........	1000	Clinchfield	4.10	4,100.00†	13.3	4.16	4,160.00	13.5	Stonega
2A.......	1000	Pocahontas	4.95	4,950.00†	15.2	5.05	5,050.00	15.3	Pocahontas
3........	175	Stove	7.75	1,356.25	....	7.85	1,373.75	....	Stove

* Cents per 1,000,000 B.t.u. †Bids indicated thus have been recommended to be accepted.

+No. 678—New Brunswick, N. J.—Bids on this contract (p. 876), which provides for furnishing the local Board of Education with its coal requirements during the ensuing year, were received until 8 p.m. June 4. Bids were requested on 300 tons of egg coal, 100 tons of stove, 200 tons of pea or buckwheat and 300 tons of bituminous. Address William H. Benedict, Supply Committee, Bd. of Edu., New Brunswick, N. J.

+No. 693—Madison, Wis.—About 40 separate proposals from 17 different coal companies have been submitted on this contract (p. 877), which provides for furnishing the University with its fuel requirements during the ensuing year. Tests of the various coals are now being conducted, and if these prove satisfactory, the contract will be awarded to D. E. McMillan & Bros., of Chicago. The tonnage involved aggregates 4000 tons of Nos. 2 and 3 screened coal at $2.70 per ton and 1600 tons of ¾-in. screenings at $2.20 per ton. Address Bus. Mgr. H. J. Thorrkelson, University of Wisconsin, Madison, Wis.

+No. 706—New York—Bids on this contract (pp. 877, 915, 955, 1004), were reopened at noon, June 11. There were nearly 25 changes made in the original tonnages of the first specifications, aggregating 8834 tons. The total number of tons bid on was 233,359 instead of 242,193. The principal changes were: Zone 1—2236 tons of egg coal instead of 3038 tons. Zone 3—1041 tons of egg instead of 1191 tons; 390 tons of broken instead of 500 tons, and 285 tons of buckwheat No. 2 instead of 450 tons. Zone 5—12,000 tons of buckwheat No. 3 instead of 11,100 tons. Zone 18—1390 tons of stove instead of 1290 and 1760 tons of pea instead of 1560 tons. Zone 20—2100 tons of mine-run instead of 2900 tons. Address Secy. F. R. Leach, Central Purchasing Committee, Room 1126 Municipal Bldg., New York City.

+No. 720—Baltimore, Md.—This contract (p. 916), which provides for furnishing the local Lighthouse Inspector with coal during the fiscal year ending June 30, 1916, has been recommended for award as follows: Nottingham & Wrenn, Inc., item 1, $885; item 2, $1180; item 8, $3100; item 10, $758; total, $5923. Norfolk Coal & Ice Co., item 3, $110.50; item 7, $1120; total, $1230.50. Henry T. Hidden, item 4, $1982.50; item 5, $464.10; total, $2446.60. O. W. Guy Co., item 6, $8505. B. Nicoll & Co., item 9. $7504. The gross amount involved in the contract is $25,609.10. Address Lighthouse Inspector, Baltimore, Md.

+No. 752—Washington, D. C.—Bids on this contract (p. 917), which provides for furnishing the United States with coke under Schedule 8287, were as follows:

Tons..........	100		250	4000[1]	120	500	1000	800	450[2]
Debevoise, Anderson Co..........	$5.84	$2.49	$5.60	....	....	$4.00	$4.44[3]	$4.70	....
Ernest Law & Co.	....	....	....	....	....	....	5.30	7.40[4]	....
Lynah & Read....	....	....	....	....	....	....	4.44	6.40	....
Cowden Coke Co..	....	....	....	....	....	....	3.95	....	....
Marshall-Matlack Co..........	5.90	4.56	6.00	....	$4.09	4.29	4.20	4.89	$5.80
Moreland Coke Co.	6.50	6.50	6.00	....	4.65	4.55	4.65	....	....
Benj. Nicoll......	6.30	6.35	6.00	....	4.30	4.30	4.40	....	....
Pocahontas Coke Co..........	....	....	....	....	....	....	....	4.75	....
Jas. Pierpoint & S. Co..........	6.30	6.40	6.25	....	4.50	4.60	4.60	....	....
Parkinson C. & C. Co..........	....	....	....	10¾c.	....	....	....	....	....
E. B. Townsend C. Co..........	5.18	....	5.78	....	....	....	....	....	....
John Wills......	....	....	....	....	4.60	4.60	4.90	6.60	....

[1] Bushels. [2] Cupola coal. [3] Also $4 05. [4] Also $7.50.

Address Paymaster-Gen. of the Navy Samuel McGowan, Washington, D. C.

+No. 753—Irvington, N. J.—All of the five bids submitted on this contract (p. 917), which provides for furnishing the local schools with coal, were exactly the same, being $6 per ton for stove and $4.40 for pea. Address Secy. William A. Sherman, Board of Education, Irvington, N. J.

New Business

+No. 816—Steubenville, Ohio—Sealed bids will be received until noon June 14 for furnishing the local Water-Works Department with coal during the fiscal year beginning on that day. The coal must be clean and free from slate, and price quoted should be f.o.b. Alikanna Station, on the Cleveland & Pittsburgh R.R. All bids must be accompanied by a certified check for $200. Address Dir. of Pub. Service James P. Garvin, Steubenville, Ohio.

No. 817—Chicago, Ill.—The Barrett Varnish Co. will be in the market about July 15 for three cars of Pocahontas mine-run. Address Purchasing Agent, Barrett Varnish Co., Chicago, Ill.

+No. 818—Moline, Ill.—The Board of Education at this place will contract some time in July for about 2500 tons of lump coal. The business is let on competitive bids, and the present contract is being filled at $3.40 per ton. Address Chn. Supply Com. H. S. Bennett, Reliance Bldg., Moline, Ill.

+No. 819—Austin, Tex.—Sealed bids will be received until 10 a.m. June 21 for furnishing the state charitable institutions with a three to twelve months' supply of coal beginning Sept. 1. Address State Pur. Agt. George Leavy, Austin, Tex.

+No. 820—Indianapolis, Ind.—The State Government will receive sealed bids until 11 a.m., June 12, for furnishing the State House with coal during the ensuing year. Specifications can be inspected on application. Address State Engineer, State House, Indianapolis, Ind.

+No. 821—Cranston, R. I.—The Board of Contract and Purchase will receive bids until 8:15 p.m., June 14, for furnishing approximately 1000 tons of coal required by the various city departments. Complete details and specifications may be obtained on application. Address Clk. Daniel D. Waterman, Bd. of Contract and Purchase, City Hall, Cranston, R. I.

+No. 822—Providence, R. I.—Sealed proposals will be received until 2:15 p.m., June 14, for furnishing the coal requirements of the various city departments. Complete details, including specifications may be obtained on application. Address Clk. Wm. C. Pelkey, City Hall, Providence, R. I.

+No. 823—Toronto, Can.—Sealed proposals will be received by the Canadian Government until June 12 for supplying the coal requirements at the Government buildings at Brockville, Cobourg, Hamilton, Kingston, London, Uimico, Penetanguishene, Toronto, Whitley Hospital for the Insane, the Orillia Hospital for Feeble Minded, Woodstock Hospital for Epileptics, Mercer Reformatory, Toronto, Ontario Reformatory, Guelph, and Provincial Brick Plant, Uimico. Complete specifications may be had on application to the bursars of the respective institutions, or address the Provincial Secretary, Parliament Bldg., Toronto, Can.

No. 824—Detroit, Mich.—The Board of Health will receive sealed proposals until June 12 for furnishing anthracite, egg, stove, and chestnut coal to the Tuberculosis Pavilion, Herman Kiefer Hospital, and such quantities of bituminous coal at the Administration Building, and the Board of Health Building as may be required during the fiscal year ending June 30, 1916. Address Secy. John F. McKinlay, Bd. of Health, 223 St. Antoine St., Detroit, Mich.

+No. 825—West Newton, Mass.—Sealed proposals will be received until 2:30 p.m., June 14, for furnishing the coal required by the School, Street, Fire, Police, Charity and Library Departments of the city. Proposals may cover the entire supply, or be only for certain wards. All bids must be accompanied by a certified check for $200, and a bond for $2000 will be required. Bids must be submitted on forms which can be obtained on application. Address Pub. Bldg. Comr. Walter R. Forbush, City Hall, West Newton, Mass.

+No. 826—Detroit, Mich.—The fire commission at this place will receive bids until 2:30 p.m., June 14, for furnishing their coal requirements during the fiscal year beginning June 30. Specifications are on file at the office of the Secretary. Address Secy. George J. Finn, Detroit Fire Dept., Detroit, Mich.

No. 827—Winnipeg, Manitoba, Can.—The Winnipeg Electric Ry. Co. will receive bids until noon, June 17, for supplying the company's fuel requirements during the ensuing year. Complete details may be had on application. Address Purchasing Agent, Winnipeg Electric Ry. Co., Winnipeg, Manitoba, Can.

+No. 828—Grand Forks, N. D.—Sealed bids will be received at the University of North Dakota for furnishing approximately 3000 tons of Youghiogheny, Hocking, Illinois or other screenings during the fiscal year, beginning July 1. Bids will be received until 10 a.m., June 12, and should be submitted on both the B.t.u. and the per ton basis. Specifications and proposal forms may be had on application. A certified check for $350 must accompany each proposal. Address Secy. J. W. Wilkerson, University of North Dakota, Grand Forks, N. D.

+No. 829—Ann Arbor, Mich.—Bids will be received by the University of Michigan until noon, June 17, for furnishing approximately 18,500 tons of coal to be delivered during the year, beginning July 1. Complete specifications may be obtained on application. Address Secy. Shirley W. Smith, University of Michigan, Ann Arbor, Mich.

No. 830—Lebanon, Ind.—The common council will receive bids up to 7:30 p.m., June 14, for furnishing coal for the Lebanon waterworks for one year. Address City Clk. Wm. F. Smith, Lebanon, Ind.

+No. 831—Portsmouth, Ohio—The Board of Education here will receive bids until noon, June 23, for furnishing coal approximately as follows: Smokeless or Pocahontas, 260 tons; mine-run, 1100 tons; lump, 20 tons. Bids are to cover cost of delivery to the several school buildings, delivery to be completed by Aug. 14. All bids must be accompanied by a certified check for 10% of the amount of the bid, and the successful bidder must give a bond of 50% of the amount of the contract. Address Clk. William C. Hazlebeck, Bd. of Edu., Portsmouth, Ohio.

+No. 832—Johnstown, Penn.—Bids will be received some time in July for furnishing the local Board of Education with approximately 3000 tons of the best quality mine-run coal, deliveries to be made as ordered by the janitor. On last year's contract, the First and Second Districts were supplied at $1.38 per ton and the Third District at $1.53. The call for bids is advertised. Address Secretary, Board of Directors, 601 Swank Bldg., Johnstown, Penn.

+No. 833—Jasper, Ind.—The Light and Water Department at this place will be in the market some time in July for 1800 tons of bituminous coal, which is usually bought at $1.70 per ton delivered in the bins. The business is let on competitive bids. Address Supt. Joseph P. Kunkel, Jasper Electric Light & Water-Works, Jasper, Ind.

+No. 834—Albany, N. Y.—Bids will be received until 10 a.m., June 14, for furnishing the State Armory with 225 tons of egg and 5 tons of chestnut coal. Address County Treas. Isaac La Grange, Albany, N. Y.

+No. 835—Muskegon, Mich.—The Board of Education will be in the market some time in July for approximately 3000 tons of various grades of coal. The call for bids is advertised and the business usually let to local dealers. Address Board of Education, Muskegon, Mich.

+No. 836—Trenton, N. J.—The State Board of Education will receive bids until 10:30 a.m., June 12, for furnishing coal as follows: 250 tons buckwheat, 10 tons pea, 150 tons egg, 50 tons stove, 10 tons bituminous. Specifications may be obtained on application. Address Department of Public Instruction, State Board of Education, Trenton, N. J.

No. 837—Fulton, Mo.—The Water, Light and Power Plant at this place will be in the market some time during July for approximately 4000 tons of bituminous coal. The business is let on a competitive basis and is usually concluded at $2.60 per ton. Address Supt. W. J. McCarrel, Municipal Water, Light & Power Plant, Fulton, Mo.

+No. 838—Joplin, Mo.—The Board of Education here will be in the market probably in July for 1000 to 1200 tons of a good grade of lump coal. The coal has usually been bought in the past from mining companies in carload lots, but will probably be purchased from local dealers during this year. From $2.90 to $3 per ton is the ruling price. The call for bids is advertised. Address Secretary, Board of Education, 301 Miners Bank Bldg., Joplin, Mo.

+No. 839—Hoboken, N. J.—The Board of Education received bids until 8 p.m., June 7, for furnishing about 5000 tons of egg, nut, stove and pea coal each. Referring to the announcement in our contract No. 676 (Vol. 7, p. 876) to the effect that all the future requirements of Hoboken would be purchased through a central committee, it appears that the commissioners who determined upon this course have exceeded their authority under the Walsh act, and that school contracts may not be included in this. Address Business Mgr. R. A. Marnell, Bd. of Edu., Hoboken, N. J.

+No. 840—Newark, N. J.—The Board of Education at this place will receive bids until 3:15 p.m., June 17, for furnishing coal requirements during the ensuing year. Specifications may be had on application. Address Secy. R. D. Argue, Dept. of Supplies, Third Floor, City Hall, Newark, N. J.

+No. 841—Chester, Penn.—The City Property Committee at this place will be in the market some time in July for approximately 1200 tons of Lehigh coal. The call for bids is advertised and the contract made usually at about $6.20 per ton. Address Chn. of Property Com. W. L. Booth, 1013 Edgmont Ave., Chester, Penn.

+No. 842—Columbus, Ga.—Bids will be received until June 15 to furnish 400 tons of coal suitable for use in school furnaces, f.o.b. cars Columbus, Ga.; 300 tons are to be delivered before Sept. 1 and 100 tons to be delivered during the month of January, 1916. Prices are desired on both mine-run and nut coal. Address Supt. R. B. Daniel, Public Schools, Columbus, Ga.

+No. 843—Columbus, Ohio—Sealed bids will be received until June 23 for furnishing and delivering coal to the Court House, Memorial Building, County Morgue and County Infirmary as may be directed. All of the coal is to be mine-run. The estimated amounts required are: Court House, 1200 tons; County Infirmary, 4000 tons; Memorial Building, 200 tons, and County Morgue, 15 tons. All coal for the County Infirmary is to be delivered on the infirmary switch of the Norfolk & Western in not less than carload lots. The County Commissioners reserve the right to reject any or all bids. Address Clk. John Scott, of the Bd. of County Comrs., Columbus, Ohio.

+No. 844—Lexington, Ky.—The Board of Education at this place will be in the market some time during the next month for its annual requirements of coal, amounting to about 1000 tons. Screened lump coal is mostly used, and the price made is about $2.90 per ton, delivered to the schools as required.

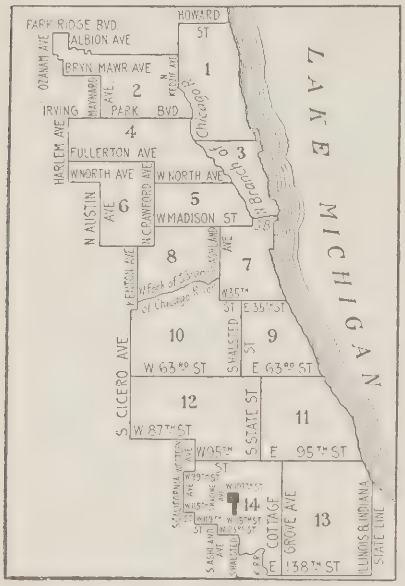
The call for bids is advertised. Address Board of Education, Lexington, Ky.

+No. 845—Washington, D. C.—Sealed bids will be received until noon, June 22, for furnishing 300 gross tons of bituminous splint coal to be delivered in carload lots, f.o.b., Navy Aëronautic Station, at such times as may be required during the fiscal year ending June 30. Address Navy Dept., Bureau of Supplies and Accounts, Washington, D. C.

No. 846—Camden, Ark.—The Arkansas Light & Power Co. at this place usually contracts during July for its annual requirements of coal, amounting to 230 tons of Arkansas slack. The coal is usually bought at $2.40 f.o.b. Camden. Address Purchasing Agent, Arkansas Light & Power Co., Camden, Ark.

+No. 847—Monessen, Penn.—The School Board at this place will receive bids until June 15 for furnishing and delivering a good grade of mine-run coal to the various school buildings. Address Secy. C. H. Dills, Bd. of Edu., Monessen, Penn.

+No. 848—Chicago, Ill.—The Board of Education will receive bids until noon, June 16, for furnishing and delivering coal to the various schools and other buildings of the department during the school year ending June 30, 1916. All proposals must be accompanied by a certified check for $200. Separate proposals are solicited for the new John Worthy School, which it is estimated will require 750 tons of bituminous lump. About 131,025 tons of bituminous coal of various grades and sizes will be required, and 3361 tons of anthracite. The estimated requirements of the various districts are given in the accompanying table, and the limits of the districts are shown on the map herewith. The map, however, does not show the newly annexed Town of Clearing, in which it is estimated that 120 tons of smokeless mine-run will be required. Address Secy. L. E. Larson, Bd. of Edu., Tribune Bldg., Chicago, Ill.



		Anthracite				Bituminous					
Dis.	No. of Buildings	Egg	Range	Nut	Total	Lump	M.R.[1]	Nut	Nut	Screen.	Total
1	27	70	130	9	209	8,600	....	1700	1000	....	11,300
2	16	15	217	5	237	4,000	....	....	....	...	4,000
3	27	...	66	51	117	8,940	....	....	....	2000	10,940
4	34	77	139	34	250	8,505	30	...	1300	...	9,835
5	31	...	244	49	293	11,100	310	....	....	...	11,410
6	24	90	206	27	323	4,675	....	....	...	1500	6,175
7	38	..	138	196	334	14,405	500	....	500	....	15,405
8	41	...	379	94	473	16,820	....	....	1300	2000	20,120
9	35	..	100	59	159	12,690	400	1500	....	....	14,590
10	26	123	152	53	328	6,550	120	....	....	....	6,670
11	23	75	140	38	253	6,240	....	....	....	....	6,240
12	20	...	128	19	147	5,140	....	....	....	2800	7,940
13	6	50	45	6	101	1,080	....	....	....	....	1,080
14	20	...	132	5	137	4,350	90	130	....	....	4,570
Totals	368	500	2216	645	3316	113,095	1450	3330	4100	8300	130,275

[1] Smokeless mine-run.

+No. 849—Dorchester Center, Mass.—The State Hospital Trustees received bids until 10:30 a.m., June 11, for furnishing 275 tons of anthracite coal. Address Henry Lafavour, Finance Com., Boston State Hospital Commission, Dorchester Center, Mass.

Contracts Awarded

+No. 130—Lansing, Mich.—This contract (p. 357), which provides for furnishing the Local Board of Education with about 1700 tons of Pocahontas mine-run coal, has been awarded to the **Lansing Artificial Stone Co.**, at $3.70 per ton. This price is three cents per ton under that of the old contract. Address Secy. Sylvia L. Hunter, Supply Com., City Hall, Lansing, Mich.

+No. 442—Minot, N. D.—This contract (p. 672), which provides for furnishing Ward County with coal during the ensuing year, has been awarded to **L. D. Colton**, at $2.30 per ton for lignite coal. Address County Audr. L. J. Thompson, Minot, N. D.

+No. 531—Frankfort, Ky.—This contract (pp. 357, 748), which provides for furnishing the State Prison and the School of Reform with about 19,000 tons of coal, has been awarded to the **Stearns Coal & Lumber Co.** The contract for the State Reformatory covering 12,000 tons was let at $1.98 per ton, or 2c. less than the old contract, and the contract for the Reformatory covering 7000 tons was let at $2.08 per ton, or 12c. less than the original contract. Because of the uncertainty regarding the decision of the Interstate Commerce Commission on freight rates, West Virginia operators were eliminated from consideration in the contract. Address State Prison Commission, Frankfort, Ky.

+No. 588—Everett, Mass.—This contract (pp. 749, 918), which provides for furnishing the local Board of Education with its coal requirements has been awarded as follows: **J. E. Lewis & Co.**, egg, stove and nut, $6.38; New River bituminous, $4.63. **Metropolitan Coal Co.**, screenings, $3.65. Address Chn. of Com. on Fuel Charles Manser, High School Bldg., Everett, Mass.

+No. 597—Columbus, Ohio—This contract (p. 794), which provides for furnishing the local Board of Education with coal during the ensuing year, has been awarded as follows: **Franklin Builders Supply Co.**, 8000 tons of Hocking two-in. lump, $2.34. **Homer C. Gill**, 500 tons of Pocahontas lump, $3.07½. All bids for the Crestview school building were rejected, and the board given authority to purchase the supply for this building wherever it desires. Address Chn. Bd. of Edu. E. B. McFaddin, Columbus, Ohio.

+No. 659—Philadelphia, Penn.—This contract (p. 836), which provides for furnishing the local Lighthouse Department with coal requirements during the fiscal year, June 30, has been awarded to **J. H. Weaver & Co.**, at $2.65 per ton. The Pennsylvania Coal & Coke Corp. bid $2.60; J. Tatnall Lea & Co., $2.74; Coale & Co., $2.74 and $2.89. Charles Warner Co. was awarded the contract for the light stations and tenders at $5.90 for stove coal, and $6.05 for nut. Address Lighthouse Inspector, Philadelphia, Penn.

No. 813—Boston, Mass.—This contract (p. 1006), which provides for furnishing the Stone & Webster Co. with 15,000 tons of New River or Pocahontas mine-run coal for shipment at one of the lower Lake ports, has been awarded to the **New England Coal & Coke Co.** Address Purch. Agt. R. E. Hamilton, Stone & Webster Co., 147 Milk St., Boston, Mass.

Contract Notes

New Orleans, La.—The **Tennessee Coal & Iron Co.** and the **R. B. Hyams Coal Co.**, of New Orleans, were lowest bidders on the United States plant coal contract, at the Naval Station, Algiers, La., and Burwood, La. The bids have been forwarded to the Chief of Engineers, Washington, D. C. This contract has attracted considerable attention since Mar. 29, and every company in New Orleans was competing on it.

Olympia, Wash.—The **Durham Colleries Co.**, of Tacoma, has been awarded the contract for 2000 long tons of coal to be furnished the Western Washington Hospital for Insane at a price of $3.18 per ton. This supply is expected to last six months.

Italy—A business man in Italy informs an American consular officer that he desires to receive quotations from dealers in bunker coal.

+Kearney, N. J.—The Board of Education here awarded the contract for its fuel supply during the ensuing year to the **S. Smith Coal Co.** The contract includes 200 tons of anthracite stove, 240 tons of egg and 275 tons of nut. The price quoted was $5.85 per ton for delivery previous to July, and $6.30 per ton for delivery from then until April, 1916.

+Elmira, N. Y.—On the bids for furnishing the county with coal during the coming year, B. Yenger was the lowest at $5.75 per ton previous to September, and $6 thereafter. Over 17 bids were received on the contract.

Spain—A business man in Spain informs an American consular officer that he desires to represent American exporters of coal. Correspondence may be in English.

Wilmington, Del.—The **Pennsylvania Coal & Coke Corp.** has been awarded the contract for supplying the Lighthouse Tender (Iris) with coal at $2.60 per ton. J. Tatnall Lea & Co. bid $2.75 and $2.64, and Charles Warner Co. bid $3.05.

Duluth, Minn.—The City Government at this place has rejected all bids submitted for furnishing their coal requirements during the year beginning July 1, on the ground that inferior coal is always supplied on the contract. The Pittsburgh Coal Co. bid $12,500 on approximately 3000 tons. The city believes that they pay as much on a contract as they would by purchasing in the open market, and under the latter condition they would be able to get considerable competition from local dealers.

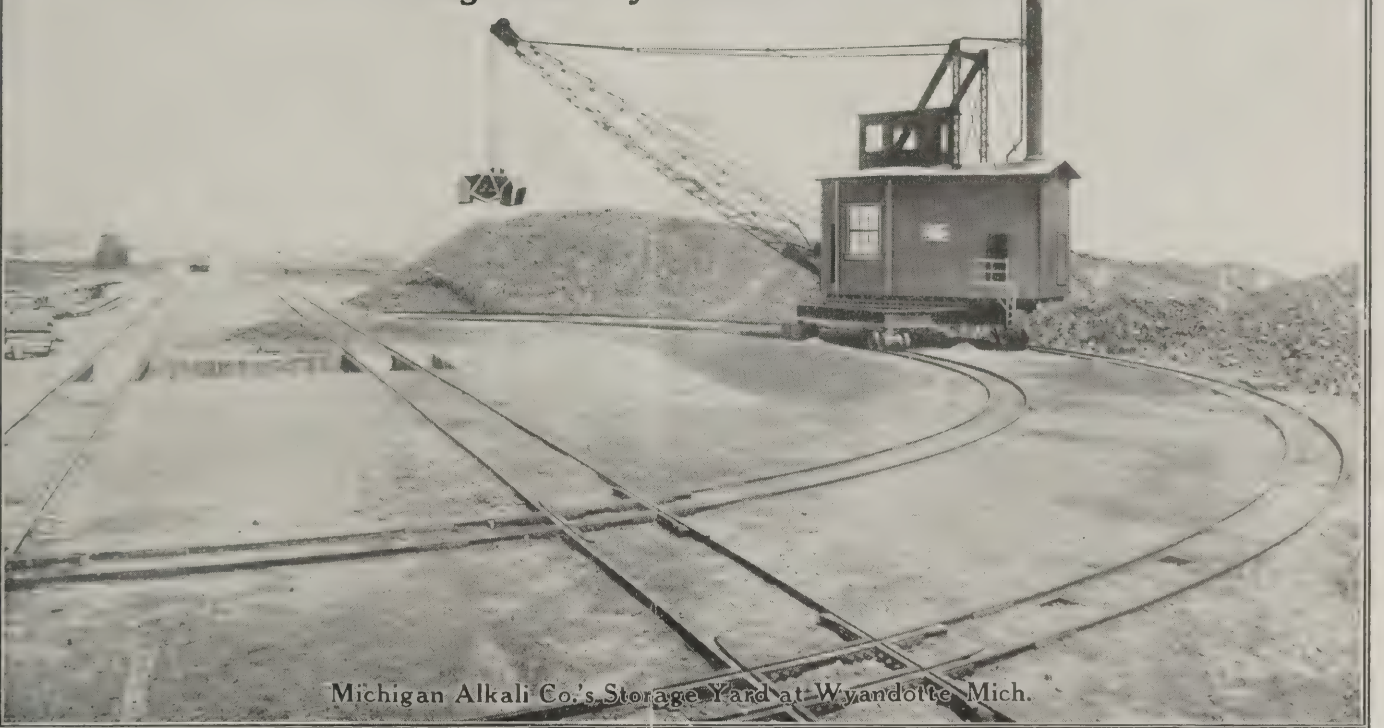
COAL AGE

Volume 7, No. 25
Issued Every Saturday
Hill Publishing Company

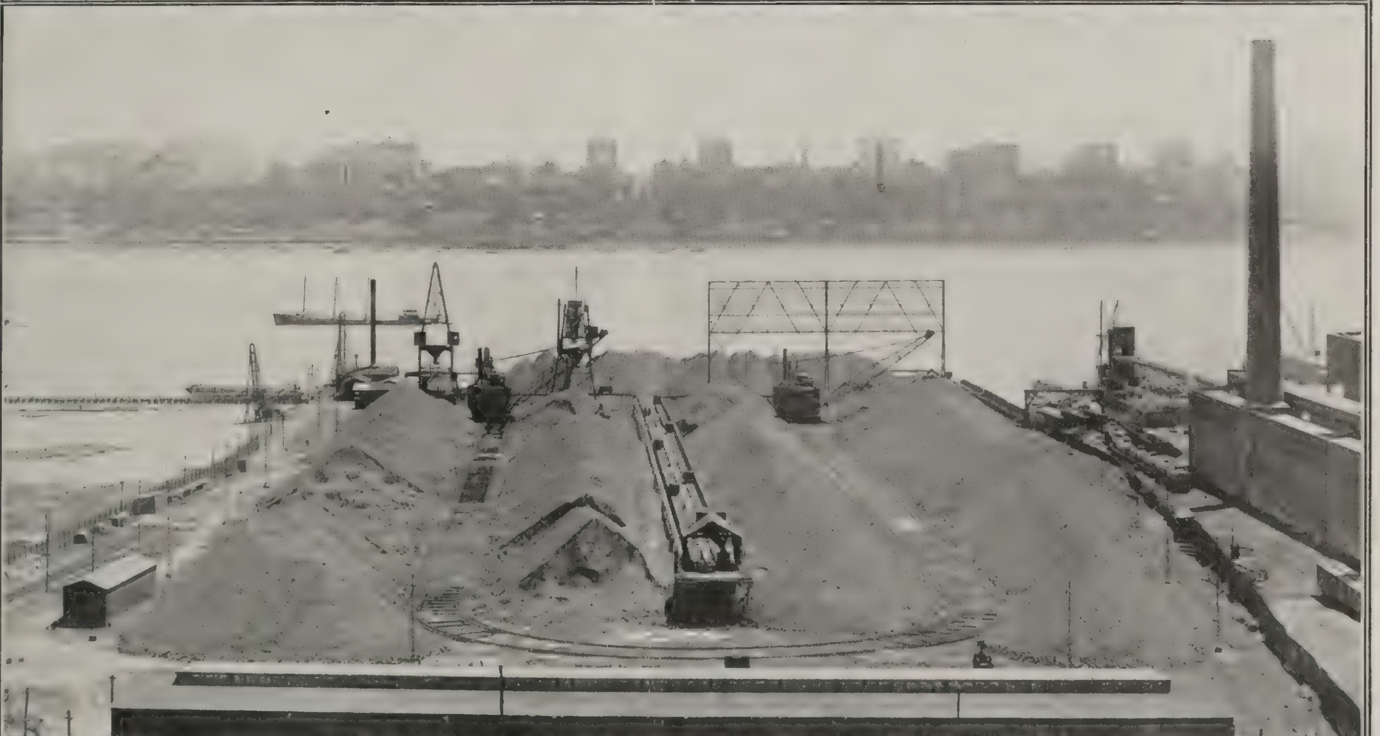
NEW YORK, JUNE 19, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

Storing Coal by Locomotive Crane

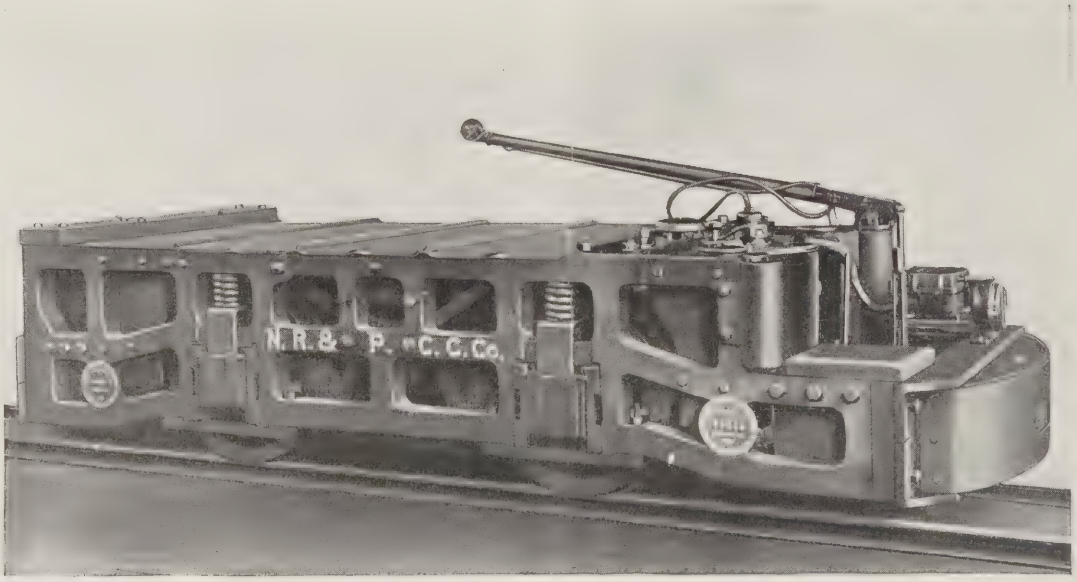


Michigan Alkali Co.'s Storage Yard at Wyandotte, Mich.



New York Edison Co.'s Storage Yard at Shady Side, N. J.

Barsteel Locomotive Advantages—Satisfied Users



Baldwin-Westinghouse Barsteel Locomotive

A few of the users of Barsteel Locomotives

Algoma Coal & Coke Co.
Baker-Whiteley Coal Co.
Clover Fork Coal Co.
Duquesne Coal & Coke Co.
Glen Alum Coal Co.
John Lochrie Coal Co.
Knickerbocker Smokeless Coal Co.
Lehigh Valley Coal Co.
Long Flame Coal Co.
Lower Vein Coal Co.
New River & Pocahontas Consolidated Collieries Co.
Philadelphia & Reading Coal & Iron Co.
Poston Consolidated Coal Co.
Mead Pocahontas Coal Co.
Shade Creek Coal Co.
Standard Coal Co.
Tierney Mining Co.
Verner Coal & Coke Co.
Vulcan Coal Co.
Welch Coal & Coke Co.
Wilbur Coal Mining Co.
Ashland Coal Co.
Berwind-White Coal Mining Co.
Consolidated Coal Co.
Fire Creek Coal & Coke Co.
Houston Coal & Coke Co.
Kimball Pocahontas Coal Co.
Lanark Coal Co.
Lilley Coal & Coke Co.
Loup Creek Collieries Co.
Loyal Hanna Coal & Coke Co.
Mount Carbon Co.
S. J. Patterson Pocahontas Co.
Pemberton Fuel Co.
Pittsburgh Coal Co.
Sesser Coal Co.
Sharon Coal & Coke Co.
Stonegap Colliery Co.
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Ask any of them—They all like Barsteel

Address either company for full information.

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Philadelphia, Pa.

Westinghouse Electric & Mfg. Co.
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Barsteel the frame that won't Break

COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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*STORING BITUMINOUS COAL AT THE MINE: *Pages* 1054-1055

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*MEETING OF THE KENTUCKY MINING INSTITUTE: *Pages* 1062-1064

The Kentucky Mining Institute was made a public function in which everybody took part. The necessity for the rigid regulation of first-aid meets was clearly evident both in the managing and judging of the contest. J. E. Butler. COAL AGE, Vol. 7.

*ALABAMA FIRST-AID MEET: *Pages* 1065-1066

First-Aid has taken hold of Alabama so firmly that "everybody's doing it"—miners, their wives, daughters, sons and the neighbors' boys. This describes the first state-wide meet. In this 74 teams competed. COAL AGE, Vol. 7.

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NUMBER OF COPIES PRINTED THIS ISSUE, 9,100
None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

WHEN Columbus discovered America, he found an uncultivated, unprofitable sweep of country inhabited by savages and animals. He went back to Europe and **advertised** the new country—and now look at us!

If a product is advertised successfully continuously, it's a good product.

WM. BUXMAN, the Brooklyn orator, in an address to the Engineers' Club of Philadelphia, the other day, said a few things that belong on this page.

"Not so long ago, well within my time, a subscription solicitor would go to you—the prospective reader—and would explain that you should read this technical paper because it treated on subjects in your field—you would pick it up, give one look through it and explain that you didn't care for it because it had too much advertising in it.

"But this order of things has changed—naturally—because of the great change in technical paper advertising itself.

"Where in the old days an advertiser enshrouded his proposition in mystery for fear his competitors would find out things, today you find the manufacturer telling you the whole inside story of his goods—taking you by means of the printed form throughout his work rooms—to the plants to which his product has been sold—to the man who is using his goods.

"He shows you exactly why his goods should be used—how they are made—what the plans back of the product are—who has purchased his goods—what results are being secured—where they can be seen.

"He is, in other words, laying his cards on the table—giving you no opportunity to say later, in defense of poor showings, that you were unaware that such and such a machine could accomplish such and such results."

Read the ads—it makes you a wiser, better, safer buyer.

GUS M. HODGES, Ass't. Gen. Mgr., Alba Malakoff Lignite Co., of Alba, Texas, writes:—"I like Coal Age—in fact it can't be beat. The reading is of the best and when I am needing supplies of any kind, I always look at Coal Age advertisements first."

COAL AGE

Vol. 7 NEW YORK, JUNE 19, 1915 No. 25

Shipping Unneeded Coal to a Glutted Market

> OPERATORS *ship coal to a glutted market on consignment and then notify some broker to sell it for the best price obtainable. Or the operator will consign it to himself and then send an agent to sell it for all he can get out of it. No wonder the coal market is demoralized*

Suppose the stock of flour in your commissary is getting low, and Brown, who is a broker for the Gem Milling Co., calls you up and tells you that he has ten carloads of flour on track in the railroad yards. The market price of $7 per barrel that Smith was holding out for would look mighty large under these circumstances. You would go to Brown and tell him that, in order to help him out of a bad hole, you might be willing to take a car for about $5 per barrel, and right off you would call up some of your friends and tell them of the great opportunity that had come your way.

At the next meeting of the directors of your bank, the Gem Milling Co.'s application for a loan would not impress you favorably. You wouldn't care to lend them money just at present, and to support your contention that they shouldn't be allowed any credit, you would tell your fellow-directors very solemnly that this milling company is not exercising much business sagacity or it would not be guilty of such a reprehensible practice as sending ten carloads of flour, for which it had absolutely no orders, to its agent to dispose of as best he could and for the best price obtainable.

However, the other directors still have faith in the milling company and they know that it simply had to raise a little money to pay its employees and to settle for the grain which it has purchased and merely took this means of raising the money quickly. And so, to tide it through another tight season, the directors decide to make it a loan, and you acquiesce.

Now, when you attend the meeting of the stockholders of the Coaltown Wholesale Grocery Co., the president of that concern makes a glowing report of the prospects for the coming year's business and mentions incidentally that he has concluded a deal that will show handsome profits for his supply house. He has bought ten carloads of flour from the Gem Milling Co. at $5 per barrel and in addition the milling company has prepaid the freight.

Then the president states confidentially that "we will not have to pay these bills for sixty days and we can make them wait a little longer than that by making the millers a payment on account, and then sixty days later we can pay the balance." In the meantime, flour will go up, and the grocery company will reap the benefit of increased prices which should have gone to the milling company.

While the president is reciting the story of his sagacity, you are doing some serious thinking. It is our opinion that when the bank directors meet in their next monthly conference or before that time you will certainly notify your fellow-directors that you cannot approve of any further loans to the Gem Milling Co. until it revises its methods of doing business and gets down financially to brass tacks.

So why as a coal operator do you ship coal to market for which you have no orders and wait a month to six months for your money, and perhaps even carry along the freight charges on the shipment also.

A Western Preparation Plant

By R. G. Miller*

SYNOPSIS—On account of competition among producers, as well as the exacting demands of the trade, careful preparation of coal is necessary. This article describes how old and inadequate equipment was replaced with new and efficient apparatus without making any considerable changes in the tipple building.

The preparation of coal is a subject on which much more thought should be expended than has been the case in the past. Considering the vastness of the bituminous-coal industry in this country, relatively little intelligent consideration, until recently, has been given its preparation, and we are therefore behind European practice, although over there producers are handicapped by coal of a poorer average quality and thin veins and are required to exercise more care and labor in preparing their product for market.

The average American coal is of better quality than that produced in foreign lands (Welsh coal excepted) and has therefore received less attention in preparation. Keener competition among producers in our bituminous fields is forcing closer attention to preparation, as this determines more and more its salability and is a factor in establishing and retaining trade.

Prior to 1897 most bituminous mines in this country were equipped only with the well-known bar screens which still survive in many tipples. At that time most operators had only three sizes of coal to market—lump, screenings and mine-run.

When the methods of mining changed, larger percentages of the smaller sizes were made. About the same time the basis of paying the miner also changed. This no longer made it an advantage for him to exercise care in digging the coal, for he received as much for mining the finer sizes as he did if he was careful and produced a larger percentage of coarser fuel.

The changed conditions compelled operators to adopt better methods of preparation, and many installed the inclined type of shaker, it being then the best screen available.

The next tendency was to increase the number of sizes made, and this has grown until such a chaotic condition exists, owing to the multiplicity of sizes of coal produced at various mines, that operators are now making an effort to minimize the number of sizes made and standardize these sizes throughout the bituminous fields.

In addition to shaker screens, at mines where the coal contains foreign matter in such quantities that it is necessary to remove it, apron picking tables were installed. Furthermore, in plants where care in handling the coarser sizes was advantageous, loading booms of the chain and apron type were adopted. Therefore in a screening plant where it was necessary to size, pick and carefully load the coal in railroad cars, a heavy structure was required in order to support shaker screens, picking tables and loading booms.

A marked improvement in equipment and a much simpler arrangement for screening, picking and carefully loading coal after it has left the dump or the weigh pan began in 1912, when there was introduced into this country by the Roberts & Schaefer Co., of Chicago, a horizontal combination screen and picking table, known as the "Marcus," which is fast gaining favor over the old-style inclined oscillating screen. This combination screen and picking table had previously gained marked success abroad.

This company also recently invented a loading boom of the shaking type, which is simple in construction and operation and handles the coarser sizes of coal with almost no breakage, and has obvious advantages over the chain-and-apron type of loading boom.

Coal operators from Colorado on the west to Pennsylvania and West Virginia on the east were quick to recognize the benefits to be derived from the use of these modern devices and are adopting them to meet their special requirements. This adoption is easy on account of the flexibility which this equipment possesses, both as to installation and operation.

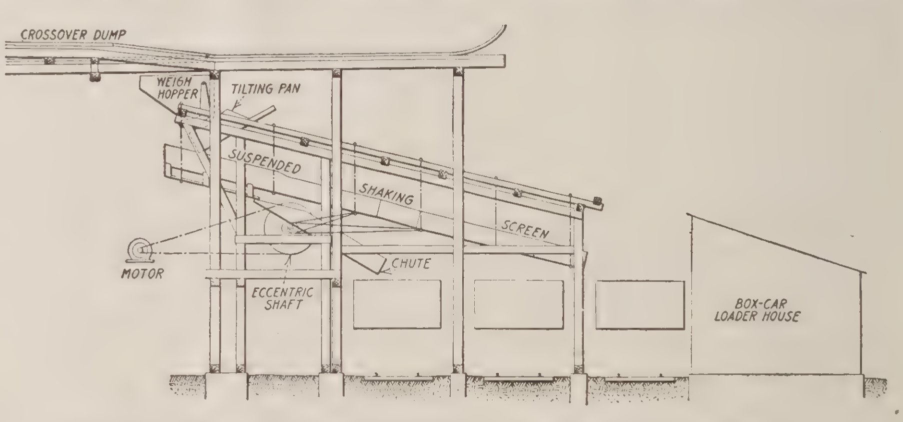


Fig. 1. General Arrangement of the Original Tipple

The plant recently completed at Oak Creek, Colo., for the Moffat Coal Co., is a notable example of an installation in an old tipple from which inclined shaker screens were removed and the Marcus horizontal screen and picking table installed.

The following description should be of special interest to operators who have similar problems to solve:

Fig. 1 shows this tipple with inclined shaker screens as it existed until Apr. 19, 1915, at which time these screens were removed and replaced by a horizontal Marcus patent picking table screen, which on May 3, two weeks later, was in operation, handling a capacity of 2500 tons per day.

Fig. 2 shows the same tipple with the new installation. Coal is dumped from mine cars into the weigh-hopper and weighed, and is then turned into the feeder hopper, from which it is uniformly delivered by a reciprocating feeder to the Marcus screen, over which it passes, and where it is thoroughly screened and picked. The rear end of the screen has four decks. The top deck has bar screens with 6-in. spaces, which were adopted primarily for the purpose of preparing railroad coal.

---

*Assistant engineer, Roberts & Schaefer Co., Chicago, Ill.

When making this variety of fuel, everything going through the bars passes through the gates *A*, *B* and *C* and is delivered to railroad cars on track No. 4, through the chute *L*. When making this railroad coal the lump coal proceeds on the top deck and is thoroughly picked and then delivered either to box cars through gate *H* and chute *O* or passes to gondola cars over the curved lump chute *I*, which it will be noted is provided with loading fingers for trimming the car.

The foreign matter picked from the coal is carried forward in the refuse trough and delivered to the refuse bin, from which it is removed by a small car. This refuse bin stands far enough up the track to make room for a box-car loader, which is on the center line of the screen, while the refuse comes to the bin over a small steel-lined wooden chute. The refuse trough is directly over the center line of the Marcus screen and is operated by the same motion.

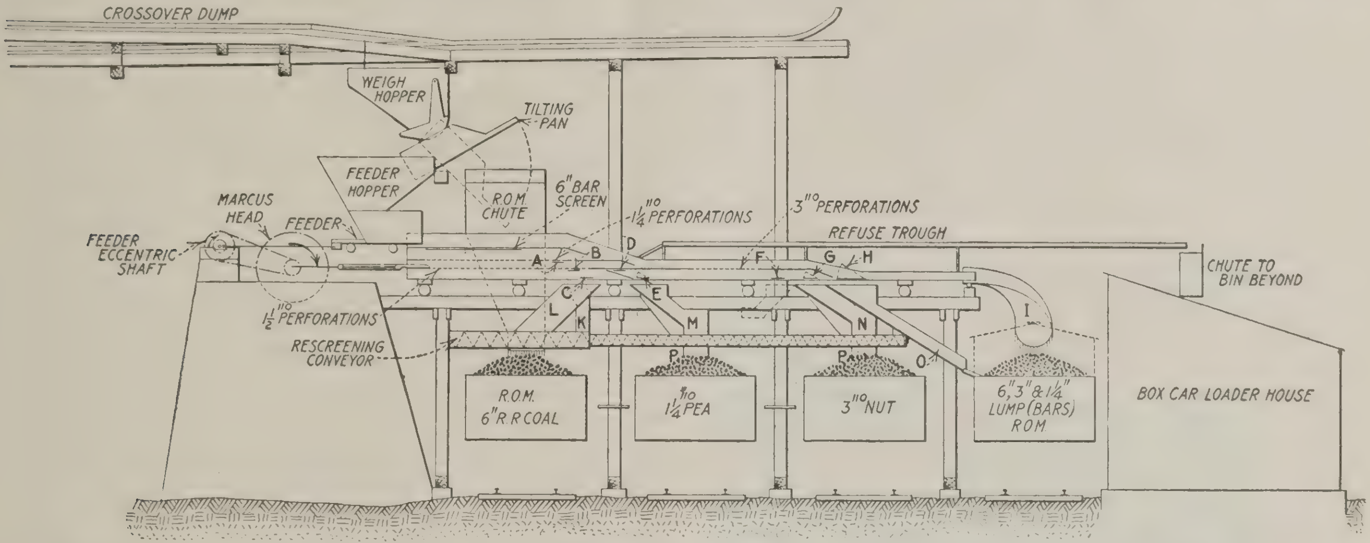


Fig. 2. Arrangement of the Tipple and Preparation Plant after Installation of New Machinery

If at any time it is desired not to run any of the tipple machinery, run-of-mine coal can be diverted to the run-of-mine chute by a tilting pan just below the weigh hopper, thereby loading straight mine-run coal on track No. 4.

However, hand-picked run-of-mine can be prepared by closing all gates, except gate *D* on the screen. In operating the plant in this manner, it will be observed that all coal below 1¼ in. is removed and travels along the bottom deck. This novel feature enables the pickers to see the foreign matter in the larger sizes and remove it effectively and economically.

After the larger sizes are carefully picked they unite with the fines on the bottom deck and pass over the curved lump chute *I* and are loaded into gondolas on track No. 1 as hand-picked run-of-mine. If it is desired to load this into box cars, then gate *H* is opened and the hand-picked run-of-mine passes over chute *O* and into the box car. It is possible, however, to remove ½-in. dust from this hand-picked run-of-mine by opening gate *C*. This is another unique feature of the Marcus which thereby provides a most excellent grade of run-of-mine coal.

When the plant is making screened coal, the dust passes through the ½-in. perforations on the second deck through gate *C* and a door in chute *L* to the rescreening screw conveyor through chute *K*.

It is interesting to note the method of rescreening the sized coal after it leaves the Marcus screen. Chutes *M*, *N* and *O* are provided with perforated bottom plates, and any fine coal made after leaving the screen is removed and carried to the rescreening screw conveyor. This carries it back and unites it with the ½-in. dust at chute *K*, which delivers to a cross screw conveyor, which deposits all fine coal in a small bin at the side of the tipple. This dust is either used under the boilers or carried to a waste pile, depending on its condition. If it is desired, the fine coal from the chutes *M*, *N* and *O* can be dropped into the railroad cars from the screw conveyor through the slide gate *P*.

An additional gate *F* has been placed in the bottom deck of the screen so that in the future 3-in. nut coal can be taken on a conveyor up the track and delivered to a bin over track No. 2 and thence to another box-car loader installed for putting this 3-in. coal into box cars on track No. 1.

By the installation of this equipment it will be apparent that the Moffat Coal Co. has not only been able to materially increase its output, but at the same time to materially improve the quality of each and every grade of coal marketed, except of course the 6-in. railroad fuel, which is loaded without further preparation.

It should also be noticed that this new equipment was installed in an old tipple without changing any of the apparatus above the weigh hopper. This hopper, together with the tipple scales, cross-over dump, etc., was not disturbed in any way, while only slight changes were made in the tipple structure. The great improvement therefore made in this plant, at relatively small expenditure, illustrates the adaptability of the Marcus horizontal screen and picking table in meeting the varying conditions in different tipple structures as well as the requirements of the markets in different coal fields.

This equipment was designed and installed by the Roberts & Schaefer Co., of Chicago, which owns the exclusive patents in the United States for the Marcus screen.

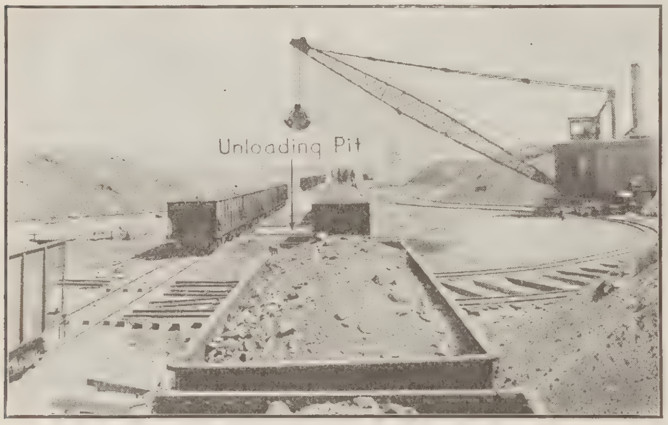
Storing Bituminous Coal at the Mine

By Julius S. Holl*

SYNOPSIS—Storage of coal at the mine does not involve large expense for machinery. With a small expenditure for equipment, coal can be stored and reloaded at a cost of 4c. per ton.

The methods used by coal operators for selling their product are still somewhat antiquated and need remodeling by engineers if larger returns are to be expected in the way of dividends.

If, for example, an order for 30 or 300 cars of Pocahontas is received at the mine, shipment is made only as fast as the coal is mined. If strikes, weather conditions or other delays occur, the buyer must wait, and wait he does, believing the delay inevitable and one which could not be foreseen or prevented. He has been used to waiting, or trying to anticipate his needs far in advance, and he takes it for granted that delays are necessary.



A Central Pit, Two Concentric Tracks and a Crane Form a Simple Means of Storing Coal

This condition of affairs is very much as it was generations ago when a man wished an all-wool garment for protection during the severe winter. First he had to get and shear his sheep, then take the wool to his home to be spun into cloth, from which finally the family made him as good a suit as their ability in this work permitted. Naturally the time between the shearing of the wool and the wearing of the clothes seemed long. It was long, compared with our present-day methods, for a man can go into almost any clothing shop and inside of half an hour purchase a better suit than our friend of long ago, and make his selection from a large variety of *stocks*. On the other hand, we can well imagine winter pretty far advanced before the suit of our forefathers was ready for the good use expected of it.

Need for Coal Stocks

Primitive methods involving delay and uncertainty have had to pass away in the evolution of the clothing business. Success and profits were not to be attained by those who neglected the manifest needs of their clients. It is also true that coal miners and shippers would increase their profits, and incidentally their usefulness to the community, by carrying coal in storage for immediate shipment. They will be more successful in the conduct of their business than those who ship out their orders only as the coal is mined.

The storage of bituminous coal in large quantities at tidewater, or, if for inland consumption, at other points, would also mean uniform operation and production at the mines all the year round, which tends largely to solve the labor problem. This in itself should appeal to the operator as well as the miner. To the operator steady work means protection and increased profits; to the miner, steady work and contentment. Continuous daily operation and output mean efficiency and economy at the mine, just as in the manufacture of automobiles or any other commodity.

The Gulf Smokeless Coal Co., of Norfolk, Va., was one of the first companies to appreciate the advantages of reserve coal storage. It was keenly interested in all devices and types of machines employed for such work, and after an exhaustive study of methods it decided upon the circular storage locomotive crane. This machine has successfully solved the problem. Not only the investment cost is low, but the cost of handling also. It has been conclusively proved a cheap and dependable storage system for large bodies of bituminous coal.

Little Beside a Locomotive Crane Needed

The circular storage system is suitable for capacities of from 6000 to 100,000 tons and upward. It consists of a steam or electrically operated long-radius locomotive crane, equipped with self-filling grab bucket, running on a circular track around a central track hopper, into which coal is dumped from railroad cars. The idea is shown clearly by the illustration of the Michigan Alkali Co.'s coal crane on the front cover and by the illustration of the Gulf Smokeless Coal Co.'s arrangement at Sewall Point, Va. Coal is taken from a central pit by the bucket and delivered to the storage pile, which, when full, assumes a circular outline. By continuing the track system and building more pits, a succession of storage piles can be formed with a single crane. As much as 100,000 tons of coal are stored in each circular pile.

When reloading, the coal is taken from the pile by the bucket and delivered into railroad cars or carts. The crane has a capacity of from 40 to 200 tons per hour, according to the size of the bucket and crane employed. The length of the boom depends to a great extent upon the storage capacity required.

The idea of carrying coal in storage is not new. The anthracite coal miners have stored all sizes for years, and today plant capacity for over 5,000,000 tons is actually in existence, and the labor-handling cost in and out of storage of these millions of tons by highly perfected machinery is less than 5c. per ton. The bituminous-coal operator is now confronting the same needs as were so successfully met by the anthracite coal miners some 20 years ago, but he has an advantage over the hard-coal operators because simple standard machinery can be used for storing bituminous coal, whereas on account of the necessity for keeping hard coal graded in sizes special equipment had to be invented and built for the storage of anthracite and this involved both capital and time.

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*Chicago, Ill.

The crane used by the Gulf Smokeless Coal Co. was designed primarily for storing coal, but it is a more or less standard machine made by the Link-Belt Co., of Chicago and Philadelphia, and used successfully for handling stone, gravel and limestone as well as coal. The labor cost of putting coal into and taking it out of storage varies somewhat with the local conditions. A fair average, however, would be approximately 4c. per ton for the entire handling.

The New York Edison Co. operates two of these cranes at Shadyside, N. J., for storing coal. The capacity of the plant shown on the front cover is 200,000 tons. The cranes are of the same type as used by the Gulf Smokeless Coal Co., running on 20-ft. gage tracks and each operating a 3½-ton grab bucket.

The circular storage system itself is patented and the rights are held by the Link-Belt Co. By using a small crane, the system is as well-suited to storage of modest size as it is to the large installations illustrated.

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Extracts from a Superintendent's Diary

My predecessor spent several hours in camp today renewing old friendships. During the past few years he has been operating a coal mine on some land which he blocked up while he was with our company, but last week his creditors threw his concern into bankruptcy, and he is wandering around now trying to get his bearings. He was in my office about an hour and during that time gave me a rather complete account of the ups and downs of his career since he launched forth as an independent operator.

Everyone in camp remembers him as a successful superintendent, so when the news reached here that the sheriff had taken charge of his affairs, no one knew just what to think about it. It now transpires that his enterprise was destined to failure from the first because of unfavorable conditions which one of his experience might have been expected to foresee. He is broad enough to admit as much; moreover, he is perfectly willing to let others profit by his experience.

It is pretty difficult to profit by the experiences of others, but I feel that in listening to his comments to-day I obtained a glimpse of the coal-mining game from a new angle and the impression burned deep. I learned that a man may hold a responsible position in the operating end of a large coal-mining corporation for years and never realize one-half of the problems that some one has had to work out. For example, how many superintendents known of the tabulations that are required in advance to determine whether a certain tract of coal land has any chance of success, if it must be opened on a particular railroad?

Mr. May's coal seam was of average thickness and the quality would have been considered satisfactory in certain markets; it was of similar quality to the coal he had previously mined, but unfortunately the customers reached by the railroad which served his mine preferred a different class of coal and accepted his fuel only at low prices. As the railroad would not allow its cars to be billed to points beyond its own lines he could not even reach out for markets that were favorable.

Another trouble with the railroad was that it was short of coal cars, and in winter, when the demand for coal became acute, it could not furnish sufficient cars to insure continuous operation of all of the mines on the line. In summer, when the demand for coal was slack, there were plenty of cars to go round, but then there was absolutely no chance to make a profit.

Our company sells a certain percentage of its coal during the summer months to the railroad that serves our mine and receives a fair price for it. The railroad that connected to Mr. May's mine believed in squeezing its fuel contractors whenever squeezing was possible, so Mr. May had no chance there. On top of this, the railroad officials were very arbitrary about assessing demurrage charges for cars ordered in and not promptly loaded out, and in consequence there was little love lost between the local railroad officials and his own clerical force.

Still, he might have pulled through in spite of all these obstacles had he been familiar enough with the sales end of the business to know that all coal contracts are not as binding as, say, indorsements of rich men on notes made by poor men. In the dullest part of the season his largest customer canceled his contract because he got a better price, and that was the last straw that broke the camel's back.

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Ballads of a Coal Miner—I

By Berton Braley

I struck the pitboss for a job today,
  And you'd 'a' thought, the way he growled at me,
That I was some panhandler in the way,
  Whinin' an' askin' him for charity.
I ain't no bum, no beggar an' no shirk
  An' I ain't wantin' nuthin' I don't earn,
An' when I comes around to look for work
  I likes a decent answer in return.

I wonder why it is that when some guys
  Gets just a little power in their grip
They sort o' swells to twice their normal size
  An' thinks they got the whole world on the hip.
The real big men ain't never built like that,
  They don't think that they gotta be so gruff,
But when a feller ain't sure where he's at
  Why then of course he has to throw a bluff.

That was the way that grumpy pitboss done—
  He growled an' swore an' grumbled when I came,
An' when he'd let his temper have its run
  He grunted that he'd hire me, just the same.

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Financial Condition of the Pittsburgh Coal Co.—Back dividends of about 42 per cent. have accrued on Pittsburgh Coal preferred. That company recently disposed of a large portion of its coal lands, receiving upwards of $9,000,000 therefor, and it is felt that when the coal business improves the proceeds of this sale will be used in some method to redeem the accumulated dividends. Various schemes of effecting this have been advanced, but none has apparently received deliberate consideration. Pittsburgh Coal in its best year (1913) earned about $2,700,000 for dividends, or only about 10% on the outstanding preferred. Assuming that back dividends were paid in stock on that basis of earnings, the full 7% on all stock issued could barely be shown. At present 5% is being paid.—"Boston News Bureau."

Analysis of Illinois Freight Rates

By E. J. Knickerbocker*

The accompanying map shows the larger railroad coal properties in Illinois and Indiana. The railroads secured these coal lands for the purpose of protecting their fuel supply. Some of the properties have been developed, the roads mining their own coal supply, while others are held for future use.

The freight rate zones are shown in dotted lines, and the minimum and maximum distances to Chicago, using the short and direct lines of railroad, are as follows:

From northern Illinois or 57c. rate group—Coal City, Ill., minimum, 59 mi. via C. & A. R.R. Aledo, Ill., maximum 176 mi. via C. B. & Q. R.R. Co.

From Springfield, Ill., or 82c. rate group—Mt. Pulaski, Ill., minimum 168 mi. via I. C. R.R. Glen Carbon, Ill., maximum 277 mi. via I. C. R.R.

From southern Illinois, or $1.05 rate group—Mt. Vernon, Ill., minimum 276 mi. via C. & E. I. R.R. Carrier Mills, Ill., maximum 326 mi. via C., C., C. & St. L. Ry.

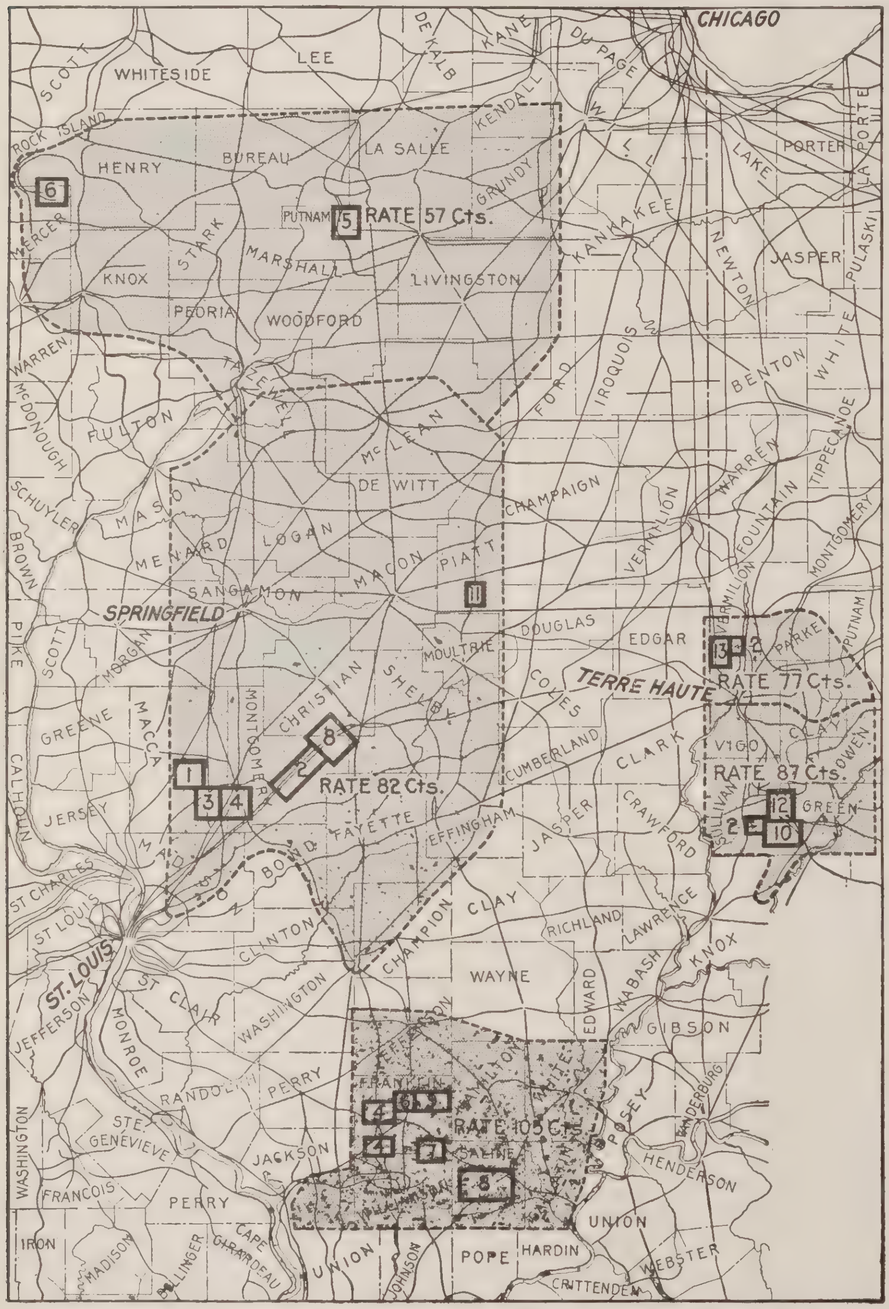
From Brazil-Clinton, Ind., or 77c. rate group—Clinton, Ind., minimum 163 mi. via C. & E. I. R.R. Carbon, Ind., maximum 206 mi. via. N. Y. C.

From Sullivan-Linton, Ind., or 87c. rate group—Siefert, Ind., minimum 192 mi. via C. & E. I. R.R. Paxton, Ind., maximum 210 mi. via C. & E. I. R.R.

Previous to 1906 there was no well-defined basis of rates to Chicago or other markets, and the rates published up to that time did not reflect the actual rate adjustment. As a rule if any one railroad felt that it was discriminated against, it overcame this by making a rate that would put its operators on a competitive basis, and this often resulted in the coal being carried at very low and ruinous figures.

It does not necessarily follow that rates published in 1906 are just or equitable today, as a rate that may have been thought fair nine years ago, or even two years ago, may by reason of changed conditions be an unfair rate today. As an example we may take the rate of 77c. from the Clinton-Brazil district as against rate from the Sullivan-Linton district of 87c. When the differential of 10c. was established between these two districts, the average grade of coal produced in the Sullivan-Linton field was better than that from the Brazil-Clinton district. This is owing to the fact that prior to 1907 there was very little of the No. 4 seam coal mined in the Brazil-Clinton district, while this seam was the principal producer in the Sullivan-Linton district. Today the conditions are reversed.

This map also shows quite clearly that while distance is a factor in establishing rates on coal there are other equally important considerations. The value of the fuel, f.o.b. point of consumption, is what really fixes its railroad rate. Cost of production and the ability of the railroad to transport the coal at a living rate determine the available market and the price of the coal in the market.



Explanation of numbers and markings on the illustration: Coal-land holdings: 1. Chicago & Alton R.R. (U. P. R.R.). 2. Chicago & Eastern Illinois R.R. Co. 3. Chicago & Northwestern Ry. Co. 4. Chicago, Burlington & Quincy R.R. 5. Chicago, Milwaukee & St. Paul Ry. 6. Chicago, Rock Island & Pacific Ry. 7. Illinois Central R.R. Co. 8. New York Central Lines. 9. United States Steel Corporation. 10. Vandalia R.R. 11. Wabash R.R. Operations: 12. Monon Coal Co. mines and holdings. 13. Mines located on Chicago, Terre Haute & Southeastern R.R. Dotted lines: Freight rategroups with local rate to Chicago.

Railroad Coal Properties and Rate Zones in Illinois and Indiana

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*Assistant to vice-president, Central Coal & Coke Co., Kansas City, Mo.

Evolution of Retail Coal Trade in New York City

SYNOPSIS—A brief sketch of the methods prevailing in the retail coal trade of New York City. Modern appliances and large investments have become essential, owing to the close competition for business.

Not only the machinery but the geography and number of retail coal yards in New York City have made great changes in the last 30 years. Three decades ago there were about 300 retail coal dealers in New York, and but few of them had yards on the water front. Today there are about 60, and the inland yard is now practically a thing of the past. The change in geography is owing to the prohibitive cost of hoisting the present great consumption of coal from the boat, hauling it to an inland yard, and then reloading it to deliver to the consumer. The decrease in the number of coal dealers is due to the expensive equipment now necessary to make the enterprise profitable and to the fact that it is next to impossible to lease or buy water-front property, it being mostly owned by the city.

Years ago a customer ordering seven tons of coal would receive seven different deliveries in a one-horse one-ton truck. To day the three-horse truck with five- or six-ton load and the seven-ton auto truck have come to stay. All these horse trucks and the majority of the auto trucks are now elevated by hand with a crank so as to chute the coal into the bins. The motor hoist is in use on some of the latest types of auto trucks. Greater distances to cover and rapidity of delivery are two other necessities which have made the investment in all this expensive equipment unavoidable. A motor truck does not tire, and the last load at night is delivered as quickly as the first load in the morning.

Large Tonnages Handled

The consumption of coal has kept pace with the increase in population, and now some of the great New York office buildings use 20, 30, 50 and even 100 tons a day. With the old-time methods of delivery these could not have been supplied. An auto truck can deliver as much as 125 tons in a day, depending upon the length of the haul. It hauls as much as the old-time railroad car.

At the old-fashioned yards coal was hoisted from the boat by horse power with the ordinary block-and-fall bucket system, and it was considered quite an exploit to handle 100 tons a day. Now many of the yards handle 1500 tons a day in the ordinary course of business, and a clamshell digger which will hold from 1000 to 4000 lb. is the means by which coal is hoisted from the boat. Formerly the coal was stored on the ground and shoveled up into a truck. Nowadays great coal pockets of wood, steel or concrete are maintained by the retailers, and their trucks are filled rapidly by the release of a lever.

The telephone has proved an added facility for the consumer, but an added expense for the retailer. Every modern retail coalyard must have at least one trunk line, and some have as many as a dozen. Deliveries are now made within an hour, and short-weight deliveries are a thing of the past. The Retail Coal Protective Association was inaugurated and laws passed covering the system of making out delivery tickets. At present there are 32 inspectors and one coal trade inspector empowered by the Mayor to take any coal truck to the nearest official public scale and reweigh the load. The penalty for short weight is from $50 to $100.

Coal Pirates of New York Harbor

Another evil that has been eliminated is the petty thieving in transit and especially piracy on the Kill von Kull. Formerly the coal barges were held up and robbed on this stream by petty pirates in oyster boats. At the instance of the New York Coal Merchants Association police launches conducted naval operations against these pirates, and today many of them are serving terms in Sing Sing. This association has coöperated with the authorities and also worked independently for the elimination of all abuses in the trade.

The cost of labor has increased. Drivers of the old-fashioned carts were paid $1 a day. This was advanced to $1.25 and $1.50 and today a two-horse driver receives $2.67 a day, a three-horse driver $3 and a chauffeur on an auto truck $3.66. The price of horses has trebled, the hours of labor have decreased, and insurance on the present big plants is an expensive item. The original investment now necessary to maintain a successful retail coal plant in any city has largely increased on account of the additional storage facilities it is necessary to maintain and the more elaborate equipment. Years ago the retailers owned no barges, and the largest carried about 150 tons. Today many retailers maintain heavy ice-breaking barges which carry from 300 to 1800 tons.

A Siberian Coal Property

War does not close down business in the belligerent countries, and in some of them activity directly results from the state of war and the resulting developments will continue long after its close. Despite the demands of the treasuries of Europe the Irtysh Corporation is floating stock in London, England, for a $10,000,000 operation to mine a sulphide ore near Ust Kamenogorsk containing gold, silver, copper, lead and zinc and to operate a deposit of coal at Ekibastus not far from the Irtysh River in Siberia.

The Irtysh is a navigable tributary of the Ob, or Obi. It lies not far distant from the line dividing Russia from Siberia. The Ekibastus coal deposit lies in the province known as Semipalatinsk. The ore and the coal are nearly 100 miles apart, and a narrow-gage railway will have to be built following the Irtysh River from Ust Kamenogorsk to Yermak.

A Steam-Shovel Should Give the Best Results

The coal measures belong to the Carboniferous system, and the basin appears to lie in the form of an elongated canoe about 8 mi. long and averages about 2½ to 3 mi. wide, narrowing toward each end. The coal deposit will be hard to work as it is 230 ft. thick and is intermixed with shales. The coal comprises about 75 per cent. of the whole bed. Apparently the corporation expects to mine the property by drifting, but there seems no reason why it could not be worked more profitably at first by steam-shovel open-cut methods.

The dip is considerable—25 deg., or almost 47 per cent. However, as the ground is level there must be a band around the basin about 1037 ft. wide, with a cover not exceeding 230 ft. at any place. Twenty miles of such a ribbon of coal would contain, if 230 ft. thick, no less than 761,622,400 tons.

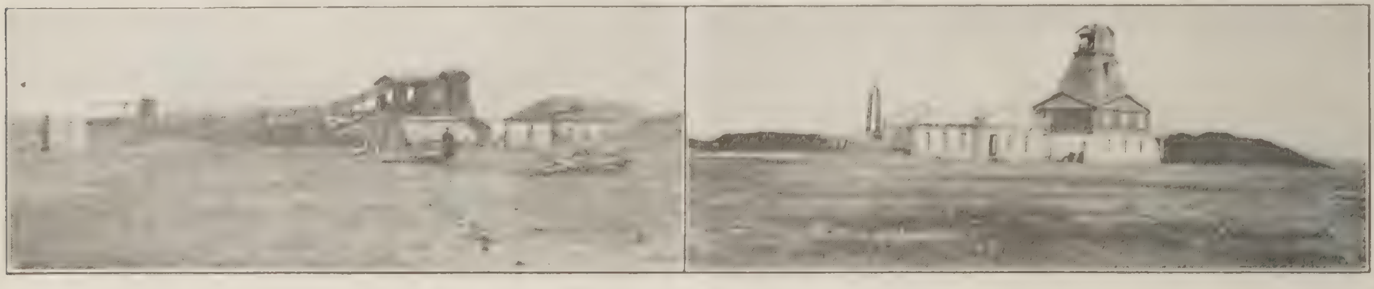
Some of this coal would be worthless because too near the outcrop, and some of the bed is not coal, but slate. It has been figured here as if of only equal weight with coal. Hence if 50 per cent. of the whole volume of the bed stripped is rejected there are 380 million tons of available coal, and the rest of the bed can be mined by the less desirable drifting methods. It is believed there are other beds below that mentioned, but this has not been proved.

NONE OF THE COAL IS OF HIGH GRADE

The value of the steam shovel in heavily dipping beds in a level country has not been as generally recognized as it should have been. It would appear regrettable that the company is thinking of taking out three beds measuring 4 ft. 6 in., 4 ft. 3 in. and 5 ft. 1 in., thus spoiling the rest. The analyses are as follows:

	No. 1 Bed	No. 2 Bed	No. 3 Bed
Fixed carbon	56.76	55.49	52.97
Volatile matter	30.66	20.70	22.78
Ash	10.58	19.00	20.54
Moisture	2.00	4.81	3.71
	100.00	100.00	100.00
Sulphur	1.95	0.38	0.96
Fuel ratio	1.85	2.68	2.32

Geologists will be interested in the remarkable thickness of the deposit and in the wide variation in the fuel ratio of beds so closely associated. These variations in the coals, if correctly reported, suggest geologic trouble and seem further reasons for using a steam shovel. The devolatilization of No. 2 bed hints in our belief at the presence of underlying sills of volcanic rock or else of bodies of such rock which have been thrust between the coal beds. The information at hand does not state whether the beds are numbered upward or downward or indeed in their correct sequence. The first bed makes a coke suited for use in copper or lead furnaces.



THE EKIBASTUS COLLIERY, SEMIPALATINSK, SIBERIA

The view at the left shows the main incline; that at the right the old vertical shaft and buildings now converted into a machine shop, with coal heaps in the background. Note that the ground is absolutely level and that the gradient of the coal bed is roughly 50 per cent., assuring a large area with light cover

Forster, Brown & Rees, of Guildhall Chambers, Cardiff, are the engineers for the coal operations, and the Russo-Asiatic Corporation, of 7 Gracechurch St., London, E. C., are floating the stock.

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The Southern Appalachian Coal Operators' Association will hold its semiannual meeting July 23, 1915, at Knoxville, Tenn. J. E. McCoy, Knoxville, Tenn., is secretary.

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The United First-Aid Corps of the 4th district, Delaware, Lackawanna & Western R.R. Co.'s coal department, will hold its third annual first-aid contest at Harveys Lake, Penn., on Aug. 14, 1915. Secretary, Lewis Richards, 212 East Green St., Nanticoke, Penn.

The Labor Situation

In Ohio the executive and legislative committees of the miners' organization met at Columbus recently to take action on the question of circulating petitions to bring the Gallagher amendment of the Green antitrust law to a referendum vote. There was much difference of opinion, but it was finally decided to circulate the petitions. The announcement was made that the Ohio Federation of Labor would aid in the canvas. If the petitions are to be valid they must be filed in 80 days. The campaign will include a publicity bureau and stump speaking, but the miners will not coöperate with the state Democratic headquarters as it is the intention to make the fight nonpartisan

The Youghiogheny-Pittsburgh Coal Co. on June 7 filed an injunction suit against the United Mine Workers of America, District No. 5 of the United Mine Workers of America, Van Bittner president, Robert Wood secretary, and also against the individual defendants, Van Bittner, Robert Wood, Philip Murray, William Hargest, James Reed, John Kafula and James Crawford Hearing was set for June 14

The plaintiff seeks to enjoin the defendants and others who may be associated with them from withdrawing the workmen and employees from its employ and from issuing orders to the workmen of the plaintiff company to cease work in the mine under the "thick vein" scale of mining.

The court is asked to ascertain and fix the right of the plaintiff company to have its coal mined as the "thick vein" coal, and after a hearing, if the court determines that the coal of the plaintiff is of the thickness being mined in other places as "thick vein" coal, then to enter a decree of injunction restraining the defendants from thereafter interfering with the operation of the plaintiff's mine as a "thick vein" mine.

Does the Location or the Character of Coal Determine Its Classification?

It is understood that the action is of an amicable character, to get the court to determine whether the coal is rightly termed "thick vein" coal. The mine at which the question was raised is a new operation in Fallowfield township, on the Pigeon Creek branch of the Pennsylvania R.R. The company has at that point about 900 acres of coal of the Pittsburgh bed. Mining operations were begun about Apr. 15, 1915, and were continued up to the beginning of the present month, when the dispute as to the classification of the coal arose.

It is maintained that a short distance back from the Monongahela River the coal is of the quality and thickness known as the "thick vein" coal and is so recognized by the defendants. There is a scale of wages adopted for this coal. The contention of the coal company is that at this mine, just opened by it, the coal is of such a thickness as to permit it to come under the "thick vein" coal scale. This scale was accepted from the time the mine was opened in April and until the opening of the present month, when it was classed as "thin vein" mining. The miners were notified that unless the company agreed to pay "thin vein" mining prices they would have to quit work.

The plaintiff company says in its petition: "A large part of the coal owned by your orator was purchased from the Ellsworth Collieries Co. and was a part of a larger body of contiguous coal owned by said Ellsworth Collieries Co., which coal at and prior to the time of purchase by your orator was being operated and mined by the said Ellsworth Collieries Co. on the thick-vein scale of wages. The cost of producing coal under the thick-vein scale is approximately 5c. per ton less than under the scale for the thin coal."

Mine Inspectors' Institute, U. S. A.

By J. T. Beard

SYNOPSIS—Brief outline of the aim and objects sought to be accomplished by the organization. Summary of the proceedings of the eighth annual meeting held at St. Louis, Mo., June 8-11, 1915.

The eighth annual meeting of the Mine Inspectors' Institute of the United States of America was held at St. Louis, Mo., June 8-11, 1915.

The institute is composed of the mine inspectors of the several coal- and metal-mining states and of the provinces of Canada, besides persons commissioned by the Federal Government to act as director of the Bureau of Mines and chiefs of divisions or sections of said bureau. The membership includes both coal- and metal-mine inspectors. The object of the organization, briefly stated, is to secure greater uniformity in the laws regulating mining operations; a wider dissemination of practical and technical mining knowledge, to increase the efficiency of mine-inspection work and insure the better protection of the lives and health of mine workers and the security of mining properties and conservation of mineral resources; to establish a closer relationship between mining bureaus and inspectors in all states and provinces, and to strive for the betterment of mining conditions.

The first session of the institute, Tuesday morning, June 8, was devoted to addresses of welcome to the city and the usual address by the president of the institute, John Dunlop, of Peoria, Ill., which was followed by the appointment of the committees on membership and resolutions. The session was immediately followed by a meeting of the Executive Board to arrange the details of the program prepared by the entertainment committee.

The afternoon session of the same day was opened by the report of the committee on resolutions, which presented numerous applications for membership from many new and old inspectors. The applications were acted upon promptly by the members present to enable the new members to enjoy the full benefit and privileges of the institute at its present session.

The remainder of the afternoon session was devoted to a very interesting and profitable discussion of the need of greater uniformity in mining legislation and the hindrances in the different states in securing such uniformity. Emphasis was laid on the fact that the conditions of mining were so different in different districts and localities that it was a practical impossibility to secure absolute uniformity in the details of mining operations; but it was explained that there were certain general requirements in respect to the safety and health of mine workers that were essential and that these general requirements were the same in all mining states, provinces and districts.

The evening of the same day was devoted to a visit to Forest Hill Park, which was greatly enjoyed by those who accepted the invitation of the entertainment committee.

At the morning session, Wednesday, June 9, the discussion in regard to unformity of mining legislation was resumed. The discussion at this time was confined to whether the mine foreman, assistant mine foreman and fireboss should be required to qualify for such position before a duly authorized examining board. Following the discussion, a resolution was unanimously adopted indorsing the need of suitable qualifications on the part of all candidates for positions involving the direct charge and direction of underground operations.

The remainder of the morning session was devoted to an animated discussion relating to the use of gasoline motors in mines. In the absence of W. L. Morgan, who was to have led this discussion by a specially prepared paper, the members joined in the impromptu expression of their opinion in regard to the utility and safety of employing such motors underground.

While the majority of those who discussed this question were opposed to the use of gasoline motors in mines, no final action was taken by the institute on the question.

The afternoon session was devoted to a very enjoyable automobile trip extending throughout the various sections and suburbs of the city. This was also provided by the entertainment committee.

At the smoker and banquet the same evening, addresses were made by the following: A. J. Moorshead, president and general manager of the Madison Coal Corporation, St. Louis, Mo.; John Dunlop, Peoria, Ill., president of the institute; H. M. Wilson, chief engineer of the Federal Bureau of Mines, Washington, D. C.; J. J. Rutledge, mining engineer, Bureau of Mines, McAlester, Okla.; Thomas Jeremiah, chairman of the committee on coal mining investigations, Willisville, Ill.; R. Y. Williams, director Miners' and Mechanics' Institute, Urbana, Ill.; John P. Reese, president Illinois Mining Institute, Gillespie, Ill.; Edward Flynn, safety inspector, T. C. I. & R.R. Co., Pratt City, Ala.; E. A. Collins, inspector of mines, Ontario Bureau of Mines, Cobalt, Canada; J. W. Paul, mining engineer, Federal Bureau of Mines, Pittsburgh, Penn.; J. T. Beard, associate editor, COAL AGE, New York City.

The session Thursday morning, June 10, was devoted to an address by H. M. Wilson, on various elements and features relating to the securing of uniformity in mining reports. This was followed by a brief discussion of the inconvenience caused by the difference between the fiscal and calendar years in different states, in summarizing the reports of the state mining departments. This was followed by an excellent paper prepared by Dr. J. J. Rutledge, in charge of mine inspection and investigation, in the Indian lands of Oklahoma. Dr. Rutledge's paper was a careful review of the dangers arising from the use of explosives in coal mines.

The afternoon of the same day was given up to a visit to the Anheuser-Busch brewery, where the members who availed themselves of the invitation of this company to visit the plant were most courteously entertained. A visit was also made to the St. Louis Botanical Gardens, which was much enjoyed by all present.

The banquet given to the institute by the mine inspectors of Missouri, the same evening, was largely attended. The morning session, Friday, June 11, was devoted to the report of the committee on resolutions, the election of officers for the ensuing year and the selection of the place for the next meeting, which by unanimous vote it was decided to hold at Joplin, Mo. The result of the election of officers will be announced later.

Editorials

Standing Armies

Those who read the *Appeal to Reason* and the *United Mine Workers' Journal* will know that the miners' unions are firmly of the opinion that standing armies are the great incentive to war. Do away with them, they teach, and war will be at an end.

Those who not only read these interesting papers but also think for themselves will realize that if there were no standing army like the United Mine Workers of America there would be no incentive to industrial war. Do away with the union, and the turmoil will be at an end.

But standing armies are sometimes necessary, and sometimes the union prevents cases of petty tyranny. We are not calling for the suppression of either, but for the considerate use of both. In fact if justice can be secured without army or union, we should be glad to see both abolished.

Unfortunately the people who maintain standing armies like to use them whether those people be banded into democracies or autocracies and do tend to use them, not only to correct abuses and to resent aggression, but to impose hardships and to overthrow a proper self-defense.

And the standing army of the union is no exception. Every two or four years as soon as the treaties expire—and sometimes, even frequently, betimes—the whole strength of the union or of the local is used to secure some concession from the operators, regardless of justification. We shall never abolish standing armies entirely though we may forbid them to individual nations, and we shall never suppress the union though we may make it amenable to arbitration.

In time perhaps we shall manage to induce the miners to be more conscionable in their use of their weapon. Some men carry a revolver for a lifetime and never use it. Some people pay premiums on an insurance policy till they die, and never regret that they have to die to win. But unfortunately the miners do not so regard their standing army.

It costs money; it must biennially, annually, even daily produce results. It must always be active, marching, countermarching, intimidating, always on the firing line. Whoever doubts for what that martial body is used let him read the "Army and Navy Journal" of the United Mine Workers, which is not concerned with the efficiency of the union at all, but with the one question—where its services can be best used.

Such an accursed militarism can have but one result—the perpetual turmoil which surprises William Le Baron and makes the mining industry a matter for general reprobation. In view of this fact, is not the call for character the great demand of the mining industry—character for the operator that he may be fair to his men, character for the miner that he may not abuse his strength to the disadvantage of himself and others?

The miner in the union has a weapon in his possession. It is to be hoped that he will use it rightly or keep it in the hip pocket of his jeans and not brandish it so unthinkingly or menacingly on every available occasion.

The miner does not believe one half that he asserts about the operator. Many of his diatribes resemble the facts as closely as the symbols of things in a Chinese play. Those who go into an Oriental theater and see a bamboo pole miss the point because they do not know it represents a tree. Those who hear the operator denounced as an ogre are frequently oblivious to the fact that the man thus thrashing himself into fury really knows that his employer is a man of most excellent qualities. In fact the language of diatribe is a tongue as well developed as that of baseball or thievery. It no longer tries to be exact. It is intended only to stir the passions and provoke revolt. That it is successful, the frequent labor wars in the coal regions fully attest.

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The Northwestern Market

The producing coal companies of the Pittsburgh and West Virginia regions are naming in the Northwestern markets lower prices than at any time for several seasons past. This is notably evident in Minneapolis and St. Paul. These reductions in price include three-quarter Youghiogheny for lake loading and West Virginia splint.

The Pittsburgh and West Virginia shippers are evidently exerting great pressure on dock companies to induce them to absorb a heavier tonnage than ever before at low prices. Consequently, some of the Indiana and Illinois operators have had to cut prices on contract business in the Northwest.

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The Situation in Indiana

An interesting side-light on the present condition of the coal trade in the State of Indiana is thrown by the recently issued annual report of the Vandalia Ry. The coal traffic of this road shows a reduction of 651,839 tons from that of the preceding year. The major portion of the coal tonnage of the Vandalia Ry. originates at Indiana and Illinois mines, and these figures of one leading coal carrier are a fair index of the declining state of the industry during the past season.

It is estimated that 70 per cent. of the 22,000 miners in Indiana are obtaining only enough work to meet the cost of living, and about 6000 men are entirely idle. Fortunately the miners of Indiana after July 1 will be relieved of the 50c. per month special assessment made by their national organization. The Clinton miners have petitioned the Governor to call a special session of the Legislature to deal with their lack of employment.

If all the stories of miners returning to Europe are to be credited there will soon be no difficulty in providing steady work for those now working irregularly. The prospect of a general strike next year will also serve to speed general business, which has moreover already taken a turn for the better.

The Trend on New Contracts

In the coastwise trade, the most significant contract placed the last few weeks was the 400,000 tons awarded the Crozer-Pocahontas Co. by the Navy Department (No. 664, Class 8, Vol. 7, pp. 836, 953, 954, 955, 1006) at $2.60 f.o.b. Hampton Roads. It was something of a surprise that this contract was taken at 10c. less than the Panama R.R. contracts early in the season, and the fact that the same price was named for Pocahontas that last year was the successful bid on a Cambria County coal at Philadelphia seems to reflect a determination on the part of West Virginia operators to remain close competitors for Government business. It further shows that they are not so sanguine of a broad export market as buyers have been led to believe.

The 47,000 tons for the 15 institutions under the Massachusetts State Board of Insanity (No. 486, Vol. 7, pp. 665, 915, 1005) was awarded at prices 5 to 10c. less than last year, both all-rail and at tide. The bids disclosed a lively competition for the tonnage and confirmed the general impression that the shippers in Pennsylvania as well as in West Virginia, are very keen for new business. The successful bidder on 6500 tons that could be delivered by team in Boston submitted a Cambria County coal, a fact of interest to the Boston dealers. That the trade is still eager for new business also appeared in the prices submitted for the City of Boston Harbor Institutions (No. 461, Vol. 7, pp. 627, 748, 794, 836, 956) amounting to 42,000 tons. This contract was advertised no less than three separate times, the second and third times in the effort to get lower prices, but as it turned out the last tenders were a few cents higher than the second. Prices on the whole averaged this year only a trifle lower than in 1914.

At Philadelphia the anticipated surprises happened in the award of the contract for supplying the Board of Public Education with 52,000 tons of anthracite (No. 508, Vol. 7, pp. 665, 955 and this issue). The largest number of bidders on record presented tenders—23 in all. Considering the price at which pea coal was awarded, $3.54, it is interesting to speculate as to what company or companies will supply the successful bidder. Subtracting the freight, $1.40, from the price this leaves the dealer $2.14 for his coal and expenses.

At a price like this, profit of course is not a consideration, and the opinion seems general that the coal will be furnished at a figure not higher than $1.75 at the mines, and possibly as low as $1.60. It is altogether likely the successful bidders took the coal at this low figure simply in an effort to maintain their delivery organization during the summer season.

In the Kentucky market, the tendency toward a lower price-level was clearly exemplified in the award of the State Prison contract No. 531 (pp. 357, 478, 1050) involving 19,000 tons. The principal unit of this contract covering about 12,000 tons was let at $1.98 per ton, or only 2c. under the old figure, but the balance of the contract, about 7000 tons, was closed at 12c. per ton under the old figure. Had it not been for the fact that the West Virginia operators were unable to bid on this contract because of the uncertainty regarding the decision of the Interstate Commerce Commission on freight rates, it is highly probable this business might have been concluded at even lower figures.

Screened Coal in Middle West

Prices are strongly maintained by the smokeless coal operators in the Middle West, and they are now receiving unusually high prices for screened sizes. Genuine Third-Vein Pocahontas screened sizes are strong, and $1.90 is the best price at which they were offered in the Chicago market recently.

On the other hand, Pocahontas mine run is being sold as low as $1 per ton at the mines, and it is quite apparent that more mine run is being produced than the present market will absorb, although it is confidently expected that toward the end of the month the mine-run demand will quicken into activity at a minimum figure of $1.25. Few contracts are being closed, and retailers are buying more lump and egg than shippers are sending to this market, which adds strength to the sizes.

Splint shippers have passed through a most discouraging period, but it is apparent that the displacement of the large tonnage of smokeless products by the heavy demand abroad and in South America has caused a widening in the demand for splint coals by those who can substitute them for smokeless. In consequence those who have splint coal to sell have had less difficulty in finding buyers, and the supply and demand have been more nearly equalized. The new Splint Dealers Organization in West Virginia seems to be able to curtail production more nearly to the actual demands of the market. The condition, however, is still far from satisfactory.

Prospects of Foreign Trade

The export demand promises to be an important feature of the coal market for the next few months. Among the new inquiries is one of 200,000 tons from France, another of 4000 tons from the same country, and two of 18,000 tons each and another of 150,000 tons from Italy. Several inquiries are reported as coming from Spain, as well as some from South American countries.

Many tramp vessels nave reported at the Atlantic seaports, including New York, within the past week seeking cargoes of coal. During last month it is reported the Baltimore & Ohio R.R. handled 250,000 tons of coal for export. Reports from Pittsburgh are that a western Pennsylvania mine operator has agreed to supply 1000 tons of Youghiogheny gas coal per day for 30 days. This shipment will go to Italy.

Retailing Coal in Philadelphia

The retail dealers of Philadelphia, particularly in the industrial districts, are seriously considering the proposition of bagging coal for delivery over the counter to the customer. In some sections the bucket trade has always been a considerable factor in the retail business. Especially does this apply to the coal sold to peddlers, their purchases from the retail dealers being quite extensive. The bagging of anthracite has been brought about by the active competition of coke in this territory as a domestic fuel. The coke manufacturers have for a number of years past neatly bagged their product in strong paper bags. This method has the advantage of being cleaner and more convenient than getting coal by the bucket.

Sociological Department

Meeting of the Kentucky Mining Institute

By J. E. Butler*

SYNOPSIS—The Kentucky Mining Institute was made a public function in which everybody took part. The necessity for the rigid regulation of first-aid meets was clearly evident both in the managing and judging of the contest.

The fourth annual meeting of the Kentucky Mining Institute was held in the center of the state's richest coal field, at Pineville, May 14 and 15. The principal features of the meet were a trip through the coal fields of Bell and Harlan Counties, an interesting discussion, and a first-aid meet in which 20 teams, representing the principal mines of Kentucky, competed.

The large attendance, the importance of the matters discussed and the number of leading mining men present made it by far the most successful meeting yet held. This success speaks volumes for the energy and foresight of the retiring president and does much credit to the work of the secretary.

The trip through Bell and Harlan Counties was made possible through the generosity of the Louisville & Nashville Ry. This road furnished without charge a special train to carry over 300 interested and interesting sightseers, including miners, operators, visitors of all kinds and their wives and sweethearts. The party left Pineville on the special train at 7 a.m., May 14, and visited many mines on Straight Creek, principally Cary and Arjay, returning to Pineville, where many more joined the excursionists, and immediately left for the plant of the Wisconsin Steel Co., at Benham.

Here W. C. Tucker, vice-president of the institute and general manager of the company, acted as host. The visitors were entertained by side trips to the store, tipple and the fine Y. M. C. A. headquarters. At Coxton the tourists stopped to see the mining operations and to partake of a most excellent luncheon prepared by the Harlan and Lock Branch coal companies and served by ladies from Coxton and Louisville.

A Few of the Operators, Miners, Their Friends and a Goodly Sprinkling of

On the evening of May 14 a banquet was given the members of the institute at the Pineville Hotel. H. La Viers, the president, acted as toastmaster. Short speeches were made by Prof. C. J. Norwood, of Lexington; Walter N. Wells, of Prestonburg; W. C. Johnston, of Pineville; W. N. Ewald, of Louisville; and White L. Moss, of Pineville.

On the morning of June 15 the annual business session was held, the principal speakers being Frank H. Cassell, sales director of the Belknap Hardware Co. of Louisville, Ky.; Senator Joe F. Bosworth, of Middlesboro, Ky.; Walter R. Peck, consulting engineer, of Stone Gap, Va.; and H. H. Small, of Chicago, Ill., the last giving an interesting talk upon the Goodman straight-face mining machines, illustrating the paper with stereopticon views.

After the reading and discussion of the papers, the following officers were elected for the ensuing year:

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*General manager, Stearns Coal & Lumber Co., Stearns, Ky.

President, F. P. Wright, Bevier; vice-presidents, K. U. Meguire, Coxton; J. W. Cockill, Lookout; G. M. Gillette, Jenkins; J. E. Butler, Stearns; B. R. Hutchcraft, Lexington; W. G. Duncan, Jr., Greenville; T. E. Jenkins, Sturgis; secretary-treasurer, Ivan P. Tashof, Lexington. The vice-presidents retiring were: W. C. Tucker, Benham; L. B. Abbott, Jenkins; W. S. Wells, Prestonburg.

In his speech of acceptance President Wright dwelt upon the heroes of peace, calling attention to the fact that the statues in the Capitol at Washington are principally those of warriors, whose business it was to destroy and kill, and that there are practically no monuments to the great builders, the businessmen.

In the afternoon the annual first-aid contest was held on the court-house square. Twenty teams were entered, and in the absence of Major R. U. Patterson, E. B. Sutton took charge of the contest.

The teams were assigned five problems, and there being but five judges it was arranged so that five teams worked at a time and each judge had but one team to watch. From the point of view of efficient judging this was a good plan, but objectionable in that it took too long to conduct the meet. The first or one-man event took 30 min., and the fifth event was omitted for lack of time.

Royal Photo. Co.

KENTUCKY BELLES ATTENDING THE SUMMER MEETING OF THE KENTUCKY MINING INSTITUTE

NEED FOR DRASTIC CONTEST RULES

The place for holding the contest was not well selected. Being a public square, it was practically impossible to keep spectators from crowding on the field and partisans from annoying the judges. A set of rules drawn up by some competent body, such as the American Mine Safety Association or the American Red Cross, in which it would be specified that their medals would not be awarded unless the meet was conducted in accordance with those rules, would go far in assisting first-aid committees in carrying on contests with more system and consequently with more fairness.

Physicians from the district acted as judges, and no possible criticism, only praise, can be given for the manner in which they discharged so delicate a duty. Yet this may be suggested for the benefit of first-aid in general: The work will never have the growth which it deserves, fostered alone by the contests, until the rules used by the doctors in judging are the same as those by which the teams are trained. Efficient umpiring has, more than any other single thing, made baseball the great American game.

Similarly, in this first-aid game, the doctors must follow the same rules as the first-aid men; otherwise there will always be dissatisfaction and charges of partiality. In many instances, instead of stimulating an interest in the subject, the teams return from these annual contests disheartened and resolved to have no more to do with the work. To make the knowledge of first-aid general it should be given a place in the schools, especially those of mining camps and industrial communities.

Of the 20 teams competing special mention must be given the W. G. Duncan team, which has twice successively taken first place in Kentucky contests. It is all that could be expected of such an organization—well-captained, neat in appearance, efficient in the performance of its problems. It is therefore entitled to all that it received, and may look with just pride upon its achievement of winning the second leg, and therefore full ownership, of the cup presented by Milton Sanchez, of Lexington, Ky.

The percentages obtained were as follows, the teams being listed in their appropriate order:

1. Team No. 1, W. G. Duncan Coal Co., Greenville, Ky., 98½ per cent.
2. Team No. 20, Castro team, Continental Coal Corporation, Pineville, Ky., 97¼ per cent.
3. Team No. 16, Stonega Coke & Coal Co., Big Stone Gap, Va., 97 per cent.
4. Team No. 5, Barker team No. 2, Continental Coal Corporation, 96¼ per cent.
5. Team No. 6, Stearns Coal & Lumber Co., Stearns, Ky., 96¼ per cent.
6. Team No. 10, Stonega Coke & Coal Co., Big Stone Gap, Va., 96¼ per cent.
7. Team No. 13, Pruden Coal Co., Pruden, Tenn., 96¼ per cent.

Arrival at Coxton

A Concert at Benham

8. Team No. 2, Arjay No. 1, Continental Coal Corporation, Pineville, Ky., 96 per cent.

9. Team No. 3, Wisconsin Steel Co., Benham, Ky., 95¾ per cent.

10. Team No. 11, Northeast Coal Co., Auxier, Ky., 95¼ per cent.

11. Team No. 18, Wisconsin Steel Co., Benham, Ky., 95¼ per cent.

12. Team No. 9, Pioneer Coal Co. No. 1, Kettle Island, Ky., 94¼ per cent.

13. Team No. 19, Barker No. 3 of the Continental Coal Corporation, Pineville, Ky., 94¼ per cent.

14. Team No. 12, Glendon team of the Continental Coal Corporation, Pineville, Ky., 94¼ per cent.

15. Cary team of Continental Coal Corporation, Pineville, Ky., team No. 8, 93¾ per cent.

16. Team No. 4, Northeast Coal Co., Auxier, Ky., 93¼ per cent.

17. Team No. 15, Pioneer Coal Co. No. 2 Kettle Island, Ky., 93 per cent.

18. Team No. 14, Wallsend team of the Continental Coal Corporation, 92¼ per cent.

Three Groups of Contestants at Kentucky Mining Institute Meet

In the above illustration the group on the left is the team from the Graham mine of the W. G. Duncan Coal Co., Greenville, winners of first prize. The men are J. F. Middleton, T. J. Vinson, S. E. Hite, E. E. Tanant, J. H. Spence and W. L. Cash. The team in the center is the Wallsend team of the Continental Coal Corporation. This team obtained eighteenth place. The right-hand group are the winners of the second prize from Cary, Ky., representing the Continental Coal Corporation. The men are W. Green, John P. Barton, captain; James P. Barton, C. J. Barton, J. G. Brice and L. A. Burk.

19. Team No. 7, Moss & Sons Coal Co., Pineville, Ky., 90¾ per cent.

20. Team No. 17, Arjay No. 2, Continental Coal Corporation, 87½ per cent.

It will be noted that there were several ties between the competitors. In such cases the place on the list was determined by lot.

The special prize offered by Judge W. T. Davis for the team in Bell and Harlan Counties making the highest average was won by the Castro team of the Continental Coal Corporation. It was $24 in cash.

The special prize of $15 offered by R. B. Rice for the Bell County team making the highest average was won by the Castro team of the Continental Coal Corporation.

There were also 22 other prizes awarded, 21 of these being for individual events. The prizes given at the meet were liberal both in number and value. The four events used were as follows:

Event No. 1.—A man has been struck by a fall of slate and his left ear has been torn off; there is a contused wound of his right eye and he has a lacerated scalp wound 4 in. long on the right side of his head. Treat. One-man event.

Event No. 2.—Treat burns of the face, neck, ears and hands. Two men carry patient without a stretcher. Two-man event.

Event No. 3.—Compound fracture of the left leg below the knee, involving both bones. Prepare patient to stand transportation. Two-man event.

Event No. 4.—A man has fallen on an electric wire with his back down and is found unconscious. Rescue and give him artificial respiration for one minute; treat the burns on the back and right upper arm. Improvise a stretcher and carry 50 ft. Full-team event.

The judges for the contest were Dr. C. K. Brosher, Middlesboro; Dr. L. L. Robertson, Middlesboro; Dr. Jacob Schultz, Logmont; Dr. J. B. Mason, London; Dr. L. M. Scott, Jellico, Tenn., and E. B. Sutton, of the Bureau of Mines.

A dance at the Pineville Hotel on Saturday evening brought to a close one of the most enjoyable meetings the institute has held, and the members are greatly indebted to the citizens of Pineville and vicinity and to the other leading operators in that district for their gracious hospitality. The next meeting of the institute will probably be held at Lexington.

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Risk Not Assumed by Miner—A miner does not assume the risk of being injured by noxious and poisonous gases existing in his place of work, so far as the injury arises through the operator's failure to observe statutory requirements concerning ventilation, etc. (Kentucky Court of Appeals, Walls vs. Jellico Coal Mining Co., 170 Southwestern Reporter 19.)

Alabama First-Aid Meet

SYNOPSIS—First aid has taken hold of Alabama so firmly that "everybody's doing it"—miners, their wives, daughters and sons and the neighbors' boys. This describes the first state-wide meet in which 74 teams competed.

The first state-wide first-aid contest ever held in Alabama was given at Rickwood Baseball Park, Birmingham, Saturday, May 29, under the auspices of the Alabama Safety Association, the United States Bureau of Mines, the American Red Cross and the Alabama coal- and metal-mine operators.

For several months past, the United States Bureau of Mines has had W. T. Burgess, an expert in first-aid work, assisting E. B. Sutton, in charge of the Birmingham branch, and these men have been giving instructions and organizing first-aid teams in all the large coal-mining camps where teams had not already been established. So much interest was manifested in the work that a number of the companies held first-aid meets for their employees, and these soon made it evident that the time was ripe for a state-wide meet; the meeting of May 29 was the direct result.

Ladies' Teams Showed Their Skill in Bandaging at the Birmingham Meet

As soon as the decision was made to hold a state-wide meet a list of 50 possible events was published in the Birmingham papers and all the would-be contestants were advised to begin practice on them.

TEAMS WORKED ON DIFFERENT PROBLEMS

From this list of 50 events four programs of five events each were prepared on the morning of the meet, and each team was given one of the programs to carry out. Program number one follows:

Event 1: Lacerated scalp; top of the head bleeding; one-man event. Event 2: Broken left arm below elbow; two-man event. Event 3: Man's left arm and six ribs on the right side broken; treat; three-man event. Event 4: Compound fracture of left leg below the knee; bone sticking out on the inside of leg; full-team event. Event 5: Prepare, lift and load subject on stretcher (regulation or improvised), carry to and pass over obstruction to point indicated by judge; lower and unload subject.

The fifth event was the same on all the programs, and its performance enlivened the monotony of the meeting considerably, as some of the contestants so far forgot themselves as to vault over the wooden horse used as an obstruction while others deliberately walked around it after carefully passing the patient over. In addition to the four mentioned above special programs were prepared for the ladies' and boys' teams.

OVER FOUR HUNDRED PERSONS ENTERED

Seventy-nine teams were entered for the contest, and of these 74 actually reported. Thus there were 370 contestants and 74 patients. There were 4 teams of ladies, 3 of Boy Scouts, 2 of miner boys, 27 of colored miners and 38 of white miners.

The meeting was opened by a grand parade in which all the teams participated, the honors going easily to the colored men's teams because of the manner in which they kept step and their apparent unconsciousness of the spectators in the grand stand.

In the actual events of the day, the winners of the grand prizes for highest team averages were:

White men—Palos team of the Republic Iron & Steel Co., with a score of $97\frac{3}{5}$. Ladies—Wylam team of the Tennessee Coal, Iron & R.R. Co., with a score of 96. White miner boys—Sayreton team of the Republic Iron & Steel Co., with a score of $95\frac{3}{5}$. White Boy Scouts—Wylam team, Wylam Village, with a score of $97\frac{3}{5}$. Colored men—Sayreton team of the Republic Iron & Steel Co., with a score of $96\frac{3}{5}$.

The grand prizes consisted of loving cups for the teams and of medals for the individual team members. The loving cups are to be open for competition annually until won by the same team in two consecutive meets, when they become the property of the team. The medals were donated by the American Mine Safety Association and the Alabama Safety Association. There were also a large number of prizes for single events.

View of the Field with White Teams in Action

The rules governing the contest were those printed on pages 8 and 9 of the Miners' Circular 15, United States Bureau of Mines, and the list of penalties to be imposed was the same as was used at the state-wide meet in Illinois, which was published in full on p. 1030 of last week's issue.

JUDGES OVERLOOKED ERRORS ESPECIALLY IN MANNER OF WORKING

As has been the case with most first-aid meets, the judges were deserving of some criticism. They were all physicians, and with few exceptions were surgeons, but too many of them were not sufficiently familiar with the score cards to judge the events properly and as a result some of the teams were handicapped. Some of the judges also seemed to be unduly impressed by finished work, while the intention was to base the decisions on the work as it progressed.

The credit for the financial success of the meet belongs to E. B. Sutton, local representative of the Bureau of Mines; C. H. Nesbitt, Chief Mine Inspector; and Frank G. Morris, general superintendent of coal mines for the Republic Iron & Steel Co.

For the actual staging of the event W. T. Burgess of the bureau and R. E. Butler, mining engineer of the Republic Iron & Steel Co., deserve most of the credit.

The meeting lasted from 10 a.m. to 5 p.m. and during the entire day a large number of spectators were in the grand stand. The ladies' events aroused the most enthusiasm.

Woodward-Pettebone Meet

On Saturday, Aug. 14, 1915, the United First-Aid Corps of the 4th district, Delaware, Lackawanna & Western R.R. Co.'s coal department, will conduct its third annual first-aid contest at Harveys Lake, Penn.

These contests were formerly held under the auspices of the Woodward and Pettebone United First-Aid Corps, but owing to the success of its former contests the organization has been extended so as to include the whole district, which consists of the following collieries: Woodward, Pettebone, Avondale, Auchincloss, Bliss, Truesdale and Loomis. These collieries employ about 10,000 persons and have 20 first-aid teams.

The prizes for adult persons employed in and around the mines in this year's contest are: First prize, $75; second prize, $50; third prize, $25. The boys' events are open only to boys employed in and around the mines, the first prize being $10 and the second $5. A prize of $10 will be given to the Boy Scouts' events, which will be open to Boy Scouts only.

Teams desiring to enter the contests should communicate with William White, foreman, Woodward mines, Kingston, Penn. Lewis Richards, 212 East Green St., Nanticoke, Penn., is secretary of the new organization.

Miners Hold Meet in Iowa

About 1000 persons met at Des Moines, Iowa, on June 6 for a first-aid meet to determine the championship of the state. The miners themselves organized the contest and placed the control under W. D. Ryan, of Kansas City, United States safety commissioner, who before he entered the Bureau of Mines was secretary and treasurer of the Illinois United Mine Workers' organization.

John P. White, president of the United Mine Workers of America, opened the program with a short address, and he was followed by Governor Clarke, who praised the accident-prevention work of the miners. Only 11 teams were present, but the movement is most promising.

In the one-man event, the Colfax team, Noah Barker, captain, scored 99⅔, and the Buxton team, Leo James, captain, scored 98⅔. In the two-man event Colfax scored 99⅓, and Hocking, John Harwood, captain, scored 98. In the team event Hocking scored 99⅓ and Mystic 97. Teams were present from the places mentioned and also from Avery, Buxton (two teams), Hiteman, Boone, Chariton and Rathbun. Two teams represented Mystic, but only one was in receipt of an award.

A captain's prize was awarded to Noah Barker, captain of the Colfax team, which made the highest number of points in the nine events. The score made was 886 points out of 900. The Colfax team received the medals of the American Mine Safety Association.

After the contests the miners organized a branch of the American Mine Safety Association, and the following officers were elected: W. H. Rodgers, Albia, president; Phil Waterman, Albia, vice-president, and Ed. Sweeney, Des Moines, secretary.

D., L. & W. Dwellings

Contracts will be let this week for 20 double houses of brick to be built for the mine workers at the Loomis colliery of the Delaware, Lackawanna & Western R.R. The houses will have modern plumbing and electric lights and will be ideally located on the slope of a hill on the Nanticoke side, west of the colliery.

The group of houses will be on high ground, and the slope of the hill will furnish natural drainage to the river. Their gabled slate roofs will be most picturesque, and they will front on a little park where tall shade trees are already growing.

The interior arrangement of the houses will be similar to that of the houses in Concrete City, the now famous model village at the Truesdale colliery of the Delaware, Lackawanna & Western R.R., each of which contains seven rooms, stationary washtubs, a buttery and a dry cellar.

Engineering Congress

An International Engineering Congress is to be held at San Francisco, Calif., under the auspices of the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the Society of Naval Architects and Marine Engineers. The first four organizations will meet in annual convention on Sept. 16 and 17; on Sept. 18 and 19 excursions will be made to points of engineering interest by members of the five supporting societies and the Congress, and on Sept. 20-25 the Congress itself will hold its session.

The trips on Sept. 18 will include visits to view the San Francisco high-pressure fire system, the Potrero gas works and electric station "A" of the Pacific Gas & Electric Co. and the Spring Valley water-works properties on the east side of San Francisco Bay. Other trips will be made on the following day to the Spring Valley water-works, storage reservoirs and pumping stations on the San Francisco Peninsula and the Delta Lands of the Sacramento and San Joaquin Rivers.

Also on Sept. 17 and 18 the Congress will visit the Great Western Power Co.'s hydro-electric development on the Feather River and the gold dredging at Oroville. On the 18th and 19th there will be an excursion also to the Pacific Gas and Electric Co.'s hydro-electric development at Lake Spaulding and Drum power house and to the gold mines at Grass Valley. On Sept. 17 to 19 a trip will be made by some of the members to the oil fields at Coalinga.

Excursion of the N. E. C. D. A. to Lansford

By F. R. Wadleigh*

As guests of the Lehigh Coal & Navigation Co., the New England Retail Coal Dealers' Association had an exceedingly profitable and enjoyable trip to the Delaware Watergap and Lansford, Penn.

Leaving New York on the afternoon of June 8, in a special train of seven Lackawanna cars, the party, about 280 in number, arrived at the Watergap in time for an elaborate dinner, one of the most enjoyable features of the trip. In the morning the party was taken directly to the No. 14 breaker of the Lehigh Coal & Navigation Co. This is a model of its kind, both in general appearance and mechanism, and the various processes involved in the preparation of the coal for market were viewed with interest. It seemed to be the consensus of opinion that the product of this colliery was a superior article in every way.

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*Consulting engineer, 426 Real Estate Trust Building, Philadelphia, Penn.

From this colliery, the party was next taken to Lansford, where the boulet plant was shown in operation. This was an entirely new feature to most of the members, few of whom had ever seen anything of the kind. In view of the increasing output and use of boulets, or briquettes as they are generally called, the experiments now being made here in the use of a new binder are most interesting. The plant had been in operation for two or three years using coal-tar pitch as a binder. While this made a satisfactory product so far as structure is concerned, it was unsatisfactory in that it did not eliminate smoke. The binder now being used is crude oil, about 5 per cent. of which is thoroughly mixed with the coal as the latter is pulverized. The resulting product is waterproof, stands handling and burns without smoke.

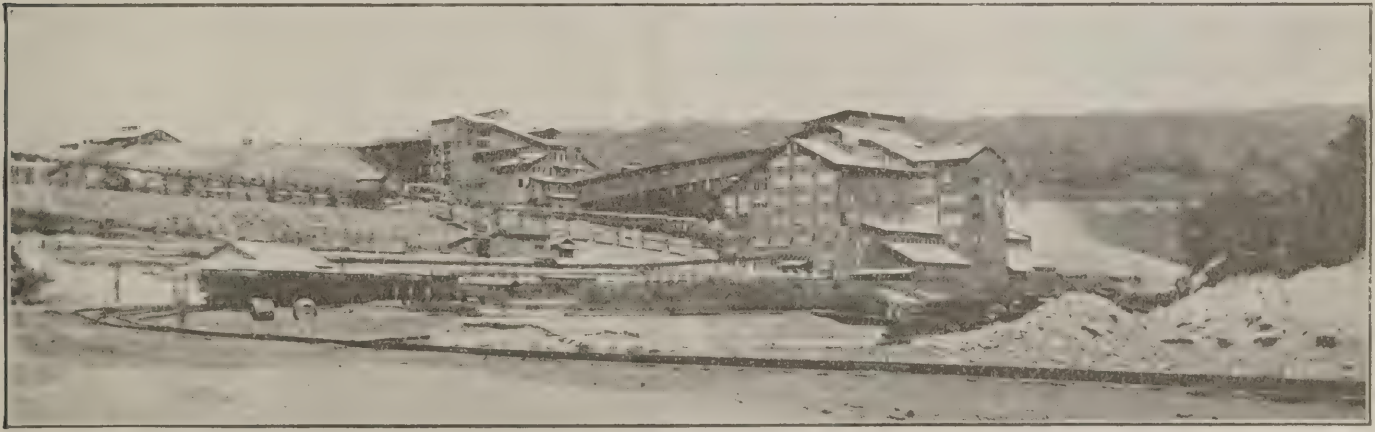
After inspection of the boulet plant, the visitors were taken to the clubhouse of the coal company, where an excellent luncheon was provided, after which the party left for New York.

Occasions of this kind are sure to be mutually valuable to those concerned and of benefit ultimately to the consumer of coal. The officials of the Lehigh Coal & Navigation Co. and of the association are to be congratulated on the efficient manner in which the trip was conducted.

Office Building at Lansford

No. 14 Breaker of the L. C. & N. Co.

Breaker No. 10, Lehigh Coal & Navigation Co.



Another View of Breaker No. 14

Discussion By Readers

Co-operation in Coal Industry

Letter No. 3—When reading the foreword entitled "Commissary Buying," Coal Age, May 22, p. 879, I was reminded of an unconscionable practice of certain concerns in our section of the country that are selling coal at cost and sometimes even at a loss merely because they are obtaining large profits by asking extortionate prices in their commissary departments. To such an extent have these practices been carried that the commissaries have been styled by some of the men as "Robbissaries."

The effect on the selling price of coal is similar to that referred to in the reply to an inquiry that appeared in Coal Age, Apr. 10, p. 653, under the title "Cost of Producing Coal in Iowa." It was stated there that "Correspondence with many coal operators on this point (cost of coal production) brought the statement that, while there was a loss in their coal-mining business proper, this was more than counterbalanced by the profits from selling merchandise and renting houses."

As a protest against such practices, I desire to submit the following comments and to urge what has already been argued ably in Coal Age by Carl Scholz, May 1, p. 777; namely, more coöperation on the part of coal operators. I recall an instance of a coal company that for several years accepted a railroad contract that netted only the cost of production, which they were enabled to do because of the large profits realized in the commissary department by selling supplies to the miners who worked in their mines. Another concern had a large rent-roll, in addition to big returns from the commissary department resulting from extortionate prices asked for goods sold to employees, which enabled them also to market their coal at the simple cost of production.

A brief reference to the principles involved in these methods of conducting a coal business will show clearly that they are unsound and unjustifiable by the recognized rules of business. For example, one of the corporations referred to above, in the development of its business, made a large investment in coal land adjoining its property, for which it was obliged to pay what might be considered a fabulous price. In addition to that it spent a considerable sum in the installation of a large plant equipped with the latest machinery. In so doing it incurred the risk of losing the entire investment, because it adopted no measures of protection against unforeseen accidents or losses. It established no reserve fund of any kind, paid no royalty to itself for the coal extracted—in other words, set aside no sinking fund—and charged off nothing for depreciation and interest.

To illustrate this condition, suppose one invested in bank stock. What would he think if the cashier or management said to the tenants of the bank's office building, "We will only charge you sufficient rental to pay taxes on the building, since we derive an income from the interest on our loans?" Or suppose the bank loaned money for nothing, because the office building was earning a good rental; or suppose the money was loaned without security, thereby incurring the risk of losing the entire amount. Would any sane business man want to purchase stock in that bank?

It is clear that it is time for the coal industry to get down to a solid basis for conducting its coal operations and to adopt an equitable system of merchandising and of renting houses to employees. Each of these departments of business should be conducted on a safe and independent basis, as anything else is ruinous to the coal industry. When this is done, and every operation is earning a reasonable profit, coal mining securities will become gilt-edged instead of "guilt-edged."

General Manager.

——, Ky.

Labor in Mining

Letter No. 5—No little temerity is required to answer the question of Mr. Le Baron, Coal Age, May 22, p. 896, asking a reason for the necessity of strikes in the coal industry. While I may run some risk in attempting to comment on the conditions that suggested this question, I cannot refrain from expressing the thoughts that come to me in this connection.

I am inclined to doubt that this question is asked because the inquirer has no positive convictions in reference to the subject on which he desires to be informed. I believe that he, like many others, has asked the question for the purpose of inviting its discussion by men acquainted with practical conditions affecting the coal industry.

As a first statement I want to say that, in my opinion, strikes are *not* necessary. I realize, however, that a statement of this kind requires some qualification. To my mind, a strike expresses a stupidity that is not confined to any one side of the controversy. It should be plainly manifest to the thoughtful mind that a strike, from any cause, is expressive of a condition bordering on chaos.

How can we claim that our civilization is progressive and that we are attaining—both employers and employed—to higher ideals and standards when it is possible to exchange at a moment harmonious working conditions for those of chaos and idleness? Organization, either of capital or labor, fails of its true object when a clash of conditions affecting the interests of the parties to the controversy causes them to show their teeth and fight like cats and dogs or, even worse, leads them to have recourse to deadly weapons to settle a dispute.

Political economists claim that strikes are the result of a class war; that the interests of employer and employed are antagonistic to one another, and a strike is the natural manifestation of such existing antagonism. We claim to be civilized, but what we need today is *peace,* not *war*. We must set up the standard that strikes are unnecessary and can be entirely eliminated by cultivating a proper feeling of regard and consideration for each other. While some may argue that, if the principle of collective bargaining fails, a strike is necessary to enforce one's demands, it should be remembered that there are other ways of obtaining concessions than by striking. There should be no difficulty in adjusting reasonable demands when the parties are willing to recognize each other's rights.

I recall an incident that occurred some years ago while I was a member of the Miners' Union. The members of the local union made an unreasonable demand and, against the wishes and orders of their executive officers, voted to strike. The result was what might have been expected, and the men were compelled to return to work under worse conditions than before. They not only failed to realize any benefit, but sacrificed the confidence and esteem of their employers. I want to suggest that the remedy for such a state of affairs is to be found in *arbitration*.

A few years ago New South Wales was a hot-bed for strikes. They occurred so frequently that miners who emigrated from Europe came to America rather than start work in that country. Time has largely eradicated the strike evil in that section, and strikes are fast becoming a thing of the past. This was accomplished by means of courts of arbitration, and as a result no strikes occur from any insignificant cause. Both employers and employed have discovered a better way, and chaos has been succeeded by a tribunal of common sense, which tribunal is composed of miners, operators and others whose interests are neutral.

Under these conditions, brains and intelligence have accomplished more than could possibly be obtained through a strike. Permit me to suggest that if we emulate this example, turmoil in the coal industry in this country will soon be a thing of the past. We might well heed the old Bible injunction that carried conviction to the heart of the questioner when his own answer brought the solemn rejoinder, "Go thou and do likewise." We can often admire in another what we fail to adopt as our own standard of action. Strike is a habit as illogical as the drink habit.

WILLIAM CROOKS.

Ensley, Ala.

Letter No. 6—Mr. Le Baron's question asking why strikes are necessary in the coal industry, COAL AGE, May 22, p. 896, is liable to bring forth a number of interesting letters in response. The strike problem is one of such tremendous importance and so far-reaching in its effects that it seems absurd to think that any one person could find a solution. Yet if one can but suggest something that will prove beneficial to a single phase of this vexed problem, some good will be done.

In the early days of mining when larger profits were realized by coal operators it was easy for the mine worker to think that his wages were not commensurate with the profits earned by the company that employed him. His hours were long and the major portion of his wages were absorbed by necessary purchases in the company store. These and other objectionable features, however, can hardly be considered as correctly revealing the underlying causes of strikes by organized labor at the present time.

There is apparently a break in the clouds, and it is possible that the miners are at last realizing that the goose that laid the golden egg is about to expire. The Ohio mine strike of 13½ months illustrates forcibly the futility of attempting to extract unreasonable demands from corporations. The fact that corporations are often wealthy—and there are, at times, indications that they are disorganized—offers no particular advantage or hope of success for strikers.

Although the demands by Ohio miners for 47c. per ton for run-of-mine coal were granted by the operators, it was a defeat for the miners, who were obliged to relinquish many privileges in addition to the loss of work for more than a year. The outlook indicates that weeks or even months may elapse before it will be possible for operators in the No. 8 seam to recover the volume of business that was theirs previous to the strike. This means irregular work and loss of income for the miner for some time to come. The question is also raised in regard to what effect the run-of-mine system will have on the marketing of the coal from the No. 8 seam.

The high cost of living certainly presents a difficult problem for the miner, who is dependent on his daily work. But the solution is not to be found in attempting to gain further concessions from the operators. There must be unity of action, coöperation and the forgetting of differences, which I admit is a difficult matter, but is nevertheless necessary for the general good of the coal industry and the personal welfare of mine workers.

In referring to "a break in the clouds," I had in mind the action of the miners' organization in using its influence with the Ohio legislature to secure an investigation of the alleged discrimination in freight rates, which operated directly against the interests of Ohio miners. Although this move may have been actuated by selfish motives it must be admitted that it had an important bearing on the settlement of the differences existing between operators and miners. In other words, it was an act of coöperation working for the common interests of both parties and is to be commended.

No doubt Mr. Le Baron is mostly concerned in the effect this incessant turmoil may have on the future of the coal industry. For a long time I have thought this question should be carefully considered and discussed, in the hope that suggestions might be made that would mark a red-letter day for the industry of coal mining.

In looking for possible remedies, it is necessary to study the causes that led to the present conditions. Chief among these is the unrestricted and ruinous competition in the selling of coal. This has already been discussed in COAL AGE; and, as has been suggested, the remedy is a closer affiliation in the selling end of the coal industry. This, however, has been found to be opposed by the anti-trust-law bugaboo. I would ask, Could not a commission be appointed with power to regulate and allow certain combinations that appear necessary for industrial harmony and success? This is particularly necessary in the coal industry. The work should be under Government supervision to prevent any combination in restraint of trade.

Another cause is freight-rate discrimination, which at present is receiving careful consideration and will no doubt be improved rapidly, with justice to the railroads and all shippers of coal. I will only mention one other cause of the strike turmoil. This is the natural spirit of antagonism between capital and labor. The only remedy for this is the ability to put one's self in the other fellow's place—Capital to understand that Labor must have living wages and conditions, and Labor to understand that there are limitations in the conduct of all business beyond which Capital cannot venture without certain destruction that will carry Labor with it in its downfall. The remedy for this condition is well understood to be impartial arbitration and the cultivation of the get-together spirit.

C. P. Shockley, Sup't,
Oklahoma Consolidated Coal Co.

Henryetta, Okla.

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Reducing Ventilation When Firing

I know this subject was discussed in the columns of Coal Age quite thoroughly some time ago, without, however, accomplishing the results that might be desired. It would naturally be expected that the discussion of a matter that plays so important a part in the prevention of mine explosions would have been given some attention by the Federal Bureau of Mines and that the suggestions made by so many practical mining men would have been investigated.

It will be remembered by the readers of Coal Age that C. W. Waterman, general superintendent of the Fleming Coal Co., Pittsburg, Kan., two years ago extended a cordial invitation to the Bureau of Mines to visit the mines of the company and make the necessary investigation called for by this question.

Again, I met some of the employees of the Bureau of Mines during the past winter and tried to prevail on them to visit the mines and investigate the conditions prevailing in them in respect to ventilation, gas and dust. This, however, was without avail. I feel that if the bureau will not take the matter up and investigate, it should retract its statement that the still-air theory is wrong in reference to the prevention of mine explosions. My claim is that the sealing of the upcast shaft of a mine and the stoppage of all circulation of air in the mine airways and workings successfully prevent the development of an explosion in the mine under the most aggravating conditions.

According to the report of the discussion of this subject by the mine inspectors at their annual meeting at Birmingham, Ala., June, 1913, as published in Coal Age, Vol. 5, p. 125, Mr. Paul, mining engineer of the Bureau of Mines, seems to question my veracity in respect to the statement I made, Coal Age, Vol. 3, p. 25, that "I found in the center of a main south entry a small tunnel (of air) formed by the rush of air through the gas-filled mine." Mr. Paul is quoted as saying, "In all my experience in mine explosions I have never found a column of pure air so located, or air in the center of an entry which varied from the air against the roof or on the bottom." I would like to ask Mr. Paul a question: Suppose an entry open at both ends is filled with afterdamp and a current of air is forced into this entry under pressure, will not the air current force a passage for itself through the center of the entry along the line of least resistance rather than travel along the roof, floor or sides of the passageway?

Mr. Verner in commenting on this point, Coal Age, Vol. 5, p. 218, remarks that his experience has been similar to mine. Permit me to say that I have entered mines on 14 different occasions inside of 30 min. after explosions have occurred, and in every instance I have found that natural ventilation has set in, regardless of whether the fan was still working. The experience that Mr. Paul questions occurred immediately following the explosion in mine No. 15 of the Western Coal & Mining Co., Dec. 21, 1907. I was the mine foreman at the time. I have given a full account of this experience in Coal Age, Vol. 3, p. 24, which need not be repeated here.

In closing, permit me to say that during the past two years some of our coal companies have installed sprinkling and humidifying systems in their mines and have refused to seal up the upcast shaft, with the result that explosions have occurred in nearly all of these mines, with the loss of many lives. They subsequently sealed the mines and abandoned their sprinkling and humidifying operations, with better results. Our own mines have been sealed in this manner for over 18 months, and we have had no trouble. The mines generate much gas, over 7 per cent. of the working places being marked up each day by the firebosses. There is also plenty of coal dust, and each night over a ton and a half of blasting powder is exploded within two hours' time. In this practice we have never had any trouble. I desire again to invite Mr. Paul, of the Bureau of Mines, to visit our mines and allow me to prove to him that the still-air theory is correct.

Alexander McAlister.

Girard, Kan.

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Dry Air for Rock Drills

Referring to the article entitled "Driving Rock Tunnels in a Utah Mine," Coal Age, Feb. 13, p. 278, I desire to offer a few comments on the reference there made to the avoidance of the freezing-up trouble when using compressed air.

The installation described in this article offers an excellent illustration of the correct solution of the trouble arising from freezing due to the humidity of the air compressed. The conclusions of the writer, however, appear to be based on a misunderstanding of conditions that is altogether too prevalent in the employment of compressed air for power purposes. It is freely admitted that the facts as stated are correct in every detail, but the good results obtained and the absence of any trouble from freezing are not due to the location of the compressor outside of the mine. These two facts bear no relation to each other as cause and effect.

The records of installations show that there are hundreds of compressors located outside of mines and tunnels, while the same trouble from freezing of the air is experienced at the working face where the power is used. The statement was made in the article to which I have referred that "The compressors were placed outside the mine mainly to insure getting dry air, as the atmosphere inside the mine contained a large amount of moisture."

It is well to remember that there is no such thing as dry atmospheric or free air. The expression "dry air" is only relative. According to the U. S. Weather Bureau, the average humidity of the air at various places is as follows: Galveston, 85 per cent.; New York City, 73 per cent.; Salt Lake City, 53 per cent.; etc.

As is well known, the moisture of the air is a perfectly transparent and invisible vapor, until the humidity reaches 100 per cent. or the point of saturation is attained, when the moisture begins to condense and separates from the air as water, which may appear as a fog or mist. This condensed vapor, however, accumulates on the walls of the pipe and trickles down, forming a stream that drains along the pipe line, following the air to the point of exhaust where it is frozen owing to the cold produced by the expansion of the exhaust air, which absorbs the heat from all around.

The point of saturation of the air, or the "dew point," varies with the pressure and the temperature of the air. For example, assume the air entering a compressor contains a certain weight of moisture per cubic foot of air. When this air is compressed to two, three or four atmospheres, its volume is reduced one-half, one-third or one-fourth of the original volume, and since the weight of moisture remains unchanged, the degree of humidity is increased in proportion to the number of atmospheres to which the air is compressed, provided the temperature remains constant.

This, however, is not the case, since the compression of the air causes a rapid rise of temperature. Practically, each rise of 20 or 25 deg. F. doubles the capacity of the air for holding moisture and decreases its relative humidity at the same rate. As a result, the air leaving the cylinder of the compressor is comparatively dry air, although carrying the same weight of moisture as when it entered the compressor.

Bearing these facts in mind, it is clear that, owing to the high temperature and low humidity of the air, little water will collect in the receiver when this is placed near the compressor. On the other hand, the temperature of the air after flowing through a long pipe line is greatly decreased, and as a result the air becomes completely saturated before reaching the working face. It is clear, therefore, that there is a great advantage to be gained by placing a receiver at the end of a pipe line or where the power is used, so as to allow the water to collect at that point and be drawn off without being forced into the air cylinders of the tools. In the present case the air was carried through a 4-in. pipe line 3725 ft. long, which insured its thorough cooling and gave favorable results.

FRANK RICHARDS.

New York City.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Composition of Gases—Gas, like other material substances, is composed of the elements of matter. A **simple** or **elementary gas** is composed wholly of one kind of matter; as hydrogen (H), oxygen (O), nitrogen (N), etc.

Many gases, like many solids and liquids, are **compound.** The molecule of such a gas is formed by the chemical union of two or more atoms of different elements; as methane (CH_4), carbon monoxide (CO), carbon dioxide (CO_2), etc.

A **gaseous mixture** is a mechanical mixture of different gases, simple or compound. These gases are mixed together in any proportion, but are not chemically united.

Firedamp is a mechanical mixture of a combustible gas or gases with air in such proportions as to render the mixture inflammable or explosive. The term, however, is generally understood to mean an inflammable or explosive mixture of methane (CH_4) and air. In English and other foreign textbooks the term "firedamp" is improperly applied to any mixture of explosive gas and air, without regard to whether the proportions are within the inflammable or explosive limits of the gas. Such a mixture will not inflame or explode and is not, properly speaking, a firedamp mixture.

Percentage Composition of Gases—By the "percentage composition" of a compound gas is generally meant the percentage, by weight, of each element composing the gas. This is calculated from the ratio of the relative weight of each constituent element to the molecular weight of the gas.

For example, a **molecule of methane** (CH_4) contains one atom of carbon and four atoms of hydrogen. Then, since the atomic weight of carbon is 12 and that of hydrogen 1, the molecular weight of methane is 12 + (4 × 1) = 16, and the percentage composition of this gas is calculated as follows:

Carbon (C); atomic weight, 12; relative weight.......... 12
Hydrogen (H_4); atomic weight, 1; relative weight, 4 × 1 = 4

Molecular weight of gas.................... 16

The percentage of each constituent element is then:

Carbon, 12/16 (100) = 75 per cent.
Hydrogen, 4/16 (100) = 25 per cent.

100 per cent.

In like manner, a **molecule of carbon dioxide** (CO_2) contains one atom of carbon and two atoms of oxygen. The atomic weight of carbon being 12 and that of oxygen 16, the molecular weight of carbon dioxide is 12 + (2 × 16) = 44 and the percentage composition of the gas is found as follows:

Carbon (C); atomic weight, 12; relative weight.......... 12
Oxygen (O_2); atomic weight, 16; relative weight, 2 × 16 = 32

Molecular weight of gas.................... 44

The percentage composition is then:

Carbon, 12/44 (100) = 27.27 per cent.
Oxygen, 32/44 (100) = 72.73 per cent.

100.00 per cent.

The term "percentage composition" when applied to a gaseous mixture refers to the **percentage by volume** of the several gases forming the mixture.

The Coal Age Pocket Book

Composition of Air—Normal air is composed chiefly of oxygen and nitrogen, which are invariably mixed in the following proportions expressed as percentage by volume and by weight of each of these gases:

TABLE SHOWING COMPOSITION OF NORMAL AIR

	By Volume	By Weight
Oxygen..............	20.9 per cent.	23.0 per cent.
Nitrogen............	79.1 per cent.	77.0 per cent.
	100.0	100.0

Air also contains 0.04 per cent. of carbon dioxide (CO_2), together with smaller amounts of argon, ammonia and water vapor. Atmospheric air, it may be said, is never absolutely dry or free of moisture. The term **"dry air"** in respect to the atmosphere is only a relative expression, meaning that such air is comparatively dry.

Weight of Dry Air—The weight of dry air, per unit volume, varies directly with the pressure it supports, and inversely as its absolute temperature. There are two formulas for finding the weight of 1 cu.ft. of air, one being expressed in terms of the barometer (B), in inches, and the other in terms of the pressure (p) in pounds per square inch.

By the barometer, $$w = \frac{1.3273\,B}{460 + t}$$

By the pressure, $$w = \frac{p}{0.37\,(460 + t)}$$

Moisture in Air—This subject is fully treated under "Hygrometry," and it is sufficient here to say that the water absorbed or held by the air is an invisible vapor that resembles a gas in its behavior, until a sufficient amount is present to fully saturate the space it occupies. This point of saturation is called the **"dew point,"** because at such point the vapor begins to condense and appears as a mist or cloud. The condensation is more rapid in contact with a cold surface.

Normal Air—The term "normal air" in respect to its composition refers to air containing a normal percentage of oxygen (20.9 per cent.) as given above. When the percentage of oxygen present is less than normal the air is said to be "depleted" of its oxygen. This frequently occurs in poorly ventilated places in mines. The depletion of oxygen is the result of the various forms of combustion or oxidation that are constantly taking place in mines, and very largely, also, to the absorption of oxygen from the air by the coal.

Mine Air—Except when diluted with other gases, the air in a well-ventilated mine never shows any appreciable depletion of its oxygen content. Even in poorly ventilated places it is exceptional to find less than 20 per cent. of oxygen, except where other gases are being generated in considerable volume whereby the air is diluted and the percentage of oxygen correspondingly diminished. This fact has been well established by innumerable tests of mine air made at different mines and under varying conditions of ventilation.

Inquiries of General Interest

Value of Coal Analyses

I want to ask, What is the use of keeping men busily employed all over the country determining the heat value of coal? In my opinion, such work is a pure loss of time and energy.

I freely admit that it is well for the purchaser of coal to know its heat value; but when this is obtained, I can see no use in continuing to make similar tests, day after day, of coal delivered from the same mine and operating on the same contract. These tests show approximately the same value, and their constant repetition adds to the operating expense and increases the cost of production.

It is readily seen that this is no small item when one reflects that the accurate apparatus employed requires an investment of approximately $2500 at the start, to say nothing of the cost of maintenance and the material used, together with the additional office expense and salaries. It is a common thing to hear complaints made in relation to the increasing cost of testing coal offered on the market, and these complaints are fully justified. This cost oftentimes more than counterbalances the saving effected thereby in the purchase of coal having the highest heat value.

In my opinion the solution of the problem is to be found in leaving the determination of the heat value of the coal to the mine operator. Mine operators are not always the band of crooks so often claimed. I believe them to be as honest as the average manufacturer.

Under the present system, I cannot blame coal operators for foisting a poor quality of coal upon the buyer whose slogan is generally, "I'll dare you to sell me poor coal—you can't do it." Facing such an imputation of dishonesty, it is not strange that the quality of the coal delivered frequently falls short of the standard required. Would it not be better to use coal experts in a more useful way. For example, employ them to show how fuel can be saved by securing greater efficiency in power plants and a more complete combustion of the coal.

N. G. NEAR.

New York City.

[We hope to have this question fully discussed in the next issue of COAL AGE, by one whose practical knowledge and experience make his remarks of value to shippers and buyers of coal.—EDITOR.]

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Mine Ventilation Problem

Will you kindly answer the following question in regard to the effect produced by enlarging the sectional area of an airway in a mine. In this case, the entire length of the air course including the return remains unchanged. The original cross-section of the airway is 4x9 ft., making 36 sq.ft. of sectional area.

In order to obtain a greater volume of air in circulation, it was proposed to increase this area to 45 sq.ft. by taking down 12 in. of roof slate, thus making the sectional area of the enlarged airway 5x9 ft. This work was started from the intake and carried forward to within a short distance of the return end of the air course. Kindly show by calculation what effect this will have on the circulation of the air, assuming the power on the air remains unchanged.

MICHAEL LOBUONO.

Hooversville, Penn.

In order to answer this question, it is necessary to assume a certain definite length of air course, say 5000 ft. including the return. Assume, also, that the sectional area of the airway was enlarged, as stated, for a distance of 4500 ft., or to within 500 ft. of the discharge.

Since the power is the same in each case, it is necessary to first find the power potential of the original air course and that of each of the two sections of the airway after the work of enlarging the area was stopped. Calling the original airway and the two sections of the enlarged airway A, B and C respectively, the sectional areas and perimeters in each case are as follows:

A, $a = 4 \times 9 = 36$ sq.ft.; $o = 2(4 + 9) = 26$ ft.
B, $a = 5 \times 9 = 45$ sq.ft.; $o = 2(5 + 9) = 28$ ft.
C, (same as A)

The relative power potentials are then

$$\text{A,} \qquad X_a = \frac{a}{\sqrt[3]{lo}} = \frac{36}{\sqrt[3]{5000 \times 26}} = 0.711$$

$$\text{B,} \qquad X_b = \frac{45}{\sqrt[3]{4500 \times 28}} = 0.898$$

$$\text{C,} \qquad X_c = \frac{36}{\sqrt[3]{500 \times 26}} = 1.531$$

In comparing the circulation of air before and after the work of enlargement is done, the ratio of the increased circulation to the original volume of air passing is given by the following formula:

$$\frac{Q_2}{Q_1} = \frac{X_b X_c}{X_a \sqrt[3]{X_b^3 + X_c^3}}$$

Then, substituting the given values in this formula,

$$\frac{Q_2}{Q_1} = \frac{0.898 \times 1.531}{0.711 \sqrt[3]{0.898^3 + 1.531^3}} = 1.188$$

That is to say, the increased circulation is 1.188 times the original volume of air. In other words, the increase of volume in this case is 18.8 per cent. of the original quantity.

Had the work of enlarging the airway been carried the entire distance, the circulation for the same power on the air would have been increased 22 per cent., as shown by the following simple calculation:

$$\frac{Q_2}{Q_1} = \frac{a_2}{a_1} \sqrt[3]{\frac{o_1}{o_2}} = \frac{45}{36} \sqrt{\frac{26}{28}} = \frac{5}{4} \sqrt[3]{0.928} = 1.22$$

Comparing this result with the previous one shows that a larger percentage of benefit is derived in the later stages of the work. This question, although difficult of solution, has a practical bearing on mine ventilation and illustrates the value of the potential method.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—What must be the sectional area of a square airway that is required to pass 50,000 cu.ft. of air per min. under a water gage of 1 in., the length of the airway, including the return, being 1 mi.?

Ans.—Let d equal one side of the square airway. Then, since 1 mi. equals 5280 ft., and 1 in. of water gage corresponds to a pressure of 5.2 lb. per sq.ft., and using the coefficient of friction, $k = 0.00000001$, the side of the airway required in this case is

$$d = \sqrt[5]{\frac{0.00000001 \times 5280 \times 4 \times 50{,}000^2}{5.2}} = say\ 10\ ft.$$

The sectional area of this airway is, then, $10 \times 10 = 100$ sq.ft.

Ques.—At a certain mine there is installed a ventilating fan operated by an electric motor. The fan is producing 300,000 cu.ft. of air per min. against a water gage of 4.2 in. The wattmeter registers 145 kw. for each of the two motors operating the fan or a total of 290 kw. in the fanhouse. At the power plant, 1 mi. from the house, the meter registers 330 kw. What is the mechanical efficiency of the fan, 1 hp. being equal to 0.746 kilowatt?

Ans.—The power on the air, in this case, is

$$H = \frac{300{,}000 \times 5.2 \times 4.2}{33{,}000} = 198.5\ hp.$$

The efficiency of the ventilator is equal to the ratio of the power on the air to the power delivered to the fan shaft, which may be assumed to be 90 per cent. of the power delivered to the motors, or $(0.90 \times 290) \div 0.746 =$ say 350 hp. The efficiency of the ventilator is, then, $198.5 \times 100 \div 350 = 56.7$ per cent.

Ques.—What percentage of firedamp when mixed with air is necessary (a) to show a faint cap; (b) to readily explode; (c) to be at its most explosive point?

Ans.—Assume that the firedamp is a simple mixture of marsh gas and air, and that no dust is present.

(a) When using an unbonneted Davy lamp burning sperm or cottonseed oil, the first faint cap should be observed when the proportion of gas is from 2 to 2½ per cent. of the mixture, depending on the ability of the observer to detect the cap.

(b) The lower explosive limit of the mixture, under the assumed conditions, will occur when there is 7.14 per cent. of gas present.

(c) The firedamp mixture reaches its maximum explosive point when the gas forms 9.46 per cent. of the mixture.

Ques.—What are the necessary supplies that should always be on hand at a mine, for the safe working of the same, and what is your duty in the case when your supplies are not on hand when needed?

Ans.—Besides the usual supplies of timber, tracking, brattice boards and cloth, hardware, tools, powder, oil, hay, etc., there should be kept on hand a complete "first-aid" outfit, including two or more sets of breathing apparatus, a pulmotor, oxygen tanks filled with this gas and an adequate supply of safety lamps of approved pattern. The mine equipment should also include a suitable conveyance to be used as an ambulance and two or more stretchers, blankets and waterproof coverings. In case any of these supplies have run out, it is the mine foreman's duty to at once notify the superintendent or order himself what is required.

Ques.—Explain fully the different methods of mine ventilation. Describe the continuous and split systems of ventilation. Which do you prefer and what are its advantages and disadvantages?

Ans.—The two general systems of ventilation employed in mining are the *exhaust* and the *blower* systems. In the exhaust system of ventilation, some means are employed to create a depression in the main-return airway, so that the pressure at that point is below that of the atmosphere. The excess of the atmospheric pressure at the intake opening of the mine then forces the outside air into and through the mine. In this system the mine is ventilated under a pressure *below* that of the outside atmosphere.

In the blowing system of ventilation some means are adopted to create a pressure in the main-intake airway greater than that of the outside atmosphere. This excess of pressure in the intake forces the entering air through the mine airways.

Furnace ventilation belongs to the exhaust system, while fan ventilation may be either by the exhaust or the blowing system, according to the arrangement of the fan and its connection with the mine.

A continuous air current is one that passes through the mine from the *intake* to the *discharge* opening, in a single undivided current. In splitting, the air current is divided at one or more points in its passage through the mine, which is thus separated into two or more ventilation districts, each having its own air split or current. The split system is much to be preferred, as it provides better air at the working face and a larger quantity of air is circulated by the same power, while the velocity of the air in the workings is such as to cause no annoyance or danger. Also, the gases generated in one section of the mine are conducted immediately into the main-return airway, without passing into other sections. These are the principal advantages of the split system of ventilation. The system has no disadvantages except, it may be, the necessity of providing air crossings at the mouths of the several splits.

Ques.—If it is necessary to double the quantity of air passing in a mine, how much should the pressure and power be increased, assuming mine conditions are unchanged?

Ans.—To double the quantity of air passing in a mine will require four times the pressure and eight times the power on the air, under the assumed conditions.

Coal and Coke News

Washington, D. C.

Probably the most significant event of the past few weeks in a business way is considered here to have been the hearings conducted by the Federal Trade Commission in Boston and New York. The completion of the sessions for the time being has given observers opportunity to take some account of stock and make up their minds in which direction the work of the Commission is pointing. What is thus indicated is likely to be of much importance not only during the next few months but also as determining the direction of events after the opening of the next session of Congress when the question as to whether more legislation on the trust issue either in its domestic or foreign aspects or both is taken up for decision.

While the hearings in question have dealt largely with matters of chief interest to producers of manufactured goods, specialties of various kinds, and the like, much of the testimony has also had an important bearing upon the development of export trade in staple articles in bulk such as coal, metals and similar commodities. Of particular interest in this connection, to the coal industry, was the showing made as to the advantage of foreign trade. This is seen mainly in the fact that foreign trade permits stability in production, fluctuations of domestic and foreign demand frequently or usually offsetting one another.

In order to get the organization needed for the efficient and economical organization of foreign trade it was urged that some form of coöperation or combination in such trade should be allowed to exporters, certainly to the smaller concerns. The problem usually met when such suggestions are made—that the line between large and small cannot easily be drawn in a satisfactory manner—presented itself, but there was no consensus of views on the subject. Some of the larger concerns, moreover, directly testified that they themselves felt comparatively little interest in the situation as they would in any event feel compelled to maintain their own selling organization.

There was a particularly strong demand for a clearer interpretation of the meaning of the anti-trust laws, especially in their application to export trade in order that shippers may know exactly what is permitted in carrying on business and that doubt with regard to given methods may be eliminated.

There was also the usual criticism of existing transportation means, complaint being particularly expressed with regard to the service between the United States and South American ports. There was, however, difference of opinion regarding the proper methods to be employed for improving the situation.

Closer Relations with South America Sought

The outcome of the Pan-American financial conference seems likely to be the holding of regular conferences of the same sort either in Washington or at some point in South America or both. Annual conferences are spoken of, though definite plans for them are still to be developed. It is proposed that a session of the "International High Commission" recommended by the conference be held at the beginning of November next, probably in Buenos Aires.

At this session it is proposed to have discussion of questions of uniform legislation for the several countries resulting presumably in the recommending of measures to the various legislative bodies that would have to act upon them. Among other matters interesting to exporters which are likely to have attention in this connection is the shipping problem, it having been resolved by the recent Conference in Washington that better vessel facilities are necessary and that effort should be made at the earliest possible moment for the provision of such improved facilities in order to secure better opportunities for sale or products and more assured delivery as well as better financial relations between North and South America.

PENNSYLVANIA

Anthracite

Olyphant—Five years ago James H. Rolles, who has spent his entire life in work around mines in the vicinity of Scranton, became convinced that the coal measures extended up the side of the mountain west of Olyphant. He secured a lease of an old mine opening and the right to take out what coal remained. While mining in the old workings he prospected the surrounding land. Early this year bore holes revealed two veins of coal, one 5 ft. thick and the other about three. Assuring himself that the coal extended over the entire tract, he acquired a lease, and proposes to begin mining.

Delaware Watergap—A large party of New England coal dealers was here several days recently on a sight-seeing tour as the guests of the Lehigh Coal & Navigation Co. Later the party went to the Panther Creek Valley to view the extensive coal fields of the above company, together with the enormous new power plant at Hauto.

Mauch Chunk—Quite a number of cars of coal are being taken daily from the waters of the Lehigh River in the dams here and at Parryville, Lehigh Gap and Treichler. Each summer the dredging of coal furnishes lucrative occupation for a number of men in this and other Lehigh Valley towns.

Lansford—Idle for more than a month the large Hauto washery of the Lehigh Coal & Navigation Co. has resumed operation.

Carbondale—At an estimated expense of about $125,000 the Delaware & Hudson Co. is constructing a coal storage plant at Duffy's Field about a mile and a half from Carbondale. This plant will have a capacity of about 170,000 tons. The purpose of this storge plant is to store coal when the demand is light during the summer months. Various sizes are placed on storage and remain there until such time as the demand increases.

Bituminous

Connellsville—The Connellsville coke region recently shipped 321,000 tons of coke in one week, the increase was caused by shipments to Baltimore and Philadelphia for export to Australia and South America. Production during the same week was approximately 315,000 tons.

Preparations are being made to fire 1000 coke ovens operated by the H. C. Frick Coke Co. in the Connellsville district.

Star Junction—Announcement has been made by the Washington Coal & Coke Co. that it needs 100 additional diggers. The company now has 700 of its 1000 ovens in operation.

Greensburg—Chief Burgess John L. Shields is seeking some legal way to prevent property owners from selling the coal under city property. Recently representatives of a large coal company obtained mining rights to the coal under certain lots. Sales of this sort have become so numerous that the business men have become alarmed. The coal under the town is of coking quality, and no other coal field in the country is so noted for caving as this, once the coal is mined out. In all the country around Mount Pleasant holes can be seen where the coal has been removed and ground has caved.

Washington—The Youghiogheny-Pittsburgh Coal Co. has filed an injunction against the United Mine Workers of America, naming Van Bittner, president of sub-district No. 5, and Robert Wood, an officer of that district, to enjoin the organization from declaring a strike. The strike in question occurred on June 1, when the miners were called out of the mine of the company.

Pittsburgh—Reports of a shortage of labor have emanated recently from many points in the bituminous field of Pennsylvania. This decrease in supply was laid to the fact of a considerable number of aliens responding to the call for military duty in Europe. However, an investigation of emigration statistics does not bear out this belief. While it may in some measure account for a deficiency the real reason probably will be found in the decrease of immigration, which has at this time almost reached the vanishing point. Instead of the normal weekly influx of one thousand men, immigration has now practically ceased.

Johnstown—After hearing over a score of witnesses the coronor's jury empaneled to take testimony in the case of the accident that cost the loss of nine lives in the explosion at No. 1 mine of the Smokeless Coal Co., rendered a verdict placing the blame on the officials, declaring the accident could have been avoided if safety lamps had been in use, as recommended some time before the explosion by the mining inspector. The jury also took occasion to laud the heroism of Gomer Phillips, one of the men who lost his life in an attempt at rescue.

WEST VIRGINIA

Charleston—Chief of the Department of Mines, Earl A. Henry, was recently notified that another body had been found in the Layland mine, in which a mine explosion early in March, killed something over 100 men. Every person supposed to have been in the mine at the time of the disaster had been accounted for, and it is possible that the identity of this victim will never be known, as the body was so badly decomposed that identification was impossible. As the section where the body was found was flooded, it was thought that this man stumbled into the water and was drowned. It is believed that the body was submerged when a rescue party explored that region.

VIRGINIA

Norton—The power house of the Norton Coke & Coal Co. was completely destroyed by fire recently. The origin of the fire has not been ascertained, but the loss was estimated as $25,000. The operation of the mine was suspended, but officials of the company made arrangements with the Norton Light & Power Co. to furnish light and power until the coal company's plant could be rebuilt. It is said that immediate steps are being taken to rebuild this plant.

KENTUCKY

Hazard—The Hazard Coal Co. is installing a new boiler to supplement the 400 hp. of the present equipment. The mines are running full time and putting out a capacity production.

Frankfort—A special term of the Federal District Court has been held here to hear evidence in the case of the Virginia Iron, Coal & Coke Co. against Alexander Webb, T. Beekman Hawkins and the Eversole heirs, by which it is sought to quiet the title to 900 acres of coal lands in Perry County.

Central City—Resolutions condemning outrages which have transpired in Muhlenberg County and calling on the friends of organized labor to refrain from violence of any character, were adopted by the United Mine Workers of America, District 23, at a meeting held here recently. The resolutions set forth that the raids, etc., are more or less generally attributed to friends of union labor, that they are endangering the very life of the organization in Muhlenberg County. They then call upon union men to stand rigorously for law and order, promptly ejecting any member of the body who violates peaceful relations with his neighbors.

Hyden—In order to clear the title to his own land, a part of which was covered by the old John S. Susade patent to 40,000 acres, and which covered a large portion of the most valuable coal land in Leslie County, F. M. Sackett, of Louisville, recently purchased the patent. Previously Mr. Sackett, in a signed statement, agreed that if the others interested would make no effort to force up the price of the sale, he would immediately issue to each man who owned land covered by this patent a quit-claim deed to this property. His proposition was accepted by the other landowners and at the official sale he obtained the patent rights at $300, thereafter carrying out the agreement as to other land than his own. The sale was under the forfeiture statutes, which provide that when taxes are not paid on land for five years, the title is forfeited, the land sold and the proceeds turned into the state treasury.

McRoberts—It is anticipated that the Lexington & Eastern R.R. will shortly add two extra trains in order to carry the coal now going out from the fields around McRoberts, Fleming and Haymond.

OHIO

Bellaire—It is estimated that already 10,000 men have returned to work in the eastern Ohio coal mines and that 5000 more will go to work shortly. Over 40 mines were affected by the decision recently reached at a conference in Cleveland, whereby the operators decided to pay the 47 cents per ton demanded by the miners. During the long strike just past, many owners of coal mines lost the bulk of their business, but are now again building it up.

Columbus—The Ohio General Assembly has passed a bill which has been signed by the governor to provide for the conservation of oil, gas, coal and other minerals upon school and ministerial lands in Ohio. The law provides that whenever the state sells lands other than canal property it reserves the right to all minerals on such lands.

Since general resumption of mining in the eastern Ohio district there have been a few labor troubles, but these have been generally of small consequence. One of the most noteworthy was the trouble at the West Wheeling mine where the question of the stockholders of the operating company joining the miners' organization was involved. This question has been coming up regularly in that mine which is a sort of coöperative organization. Some trouble has occurred at the Warwick mine in the Coshocton district but it was of short duration. J. M. Roan, Ohio mine inspector, has not yet been called upon to settle a difficulty.

Amsterdam—The Zerbe mine of the Ohio & Pittsburgh Coal Co. was shut down for an indefinite period recently. This action was taken by the mine management after failing to agree with the miners as to the method of checking average mine cars. It has been customary at this property in the past to supply the cager with "average checks," one of which is placed on each mine car that shows evidence of loss of contents in transit. The miners demanded that all persons having to do with the handling of mine cars, such as drivers, motormen, etc., be supplied with "average checks." Superintendent John Lees suggested that the same system as used heretofore remain in force until such time as higher officials of both company and union could make a satisfactory arrangement. This proposition was rejected by the miners and Superintendent Lees stated that operation would be discontinued indefinitely.

ILLINOIS

Belleville—L. D. Turner, attorney for the Belleville Savings Bank and other plaintiffs against the Southern Coal & Coke Co., has announced that an appeal will be taken to the Supreme Court in the case involving the rights of minority bondholders which was decided recently by the Illinois Appellate Court in favor of the Southern company. The question at issue is whether the majority bondholders, in agreeing to an exchange of their holdings for a new issue and afterward exchanging their new bonds for stock in the reorganized company, forfeited their rights in the first mortgage bonds. The contention of the plaintiffs is that they did. The decision of the Appellate Court was that they did not.

Carlinville—Carlinville has a new coal company or rather a reorganized old one. When the mine closed down last spring, it was anticipated that it would never be reopened, but reorganization with many new stock holders has been effected, and the mine will be reopened as soon as necessary repairs can be made. The new firm expects to put in some new equipment and a new gasoline or electric haulage system for work underground. Some apparatus for coal preparation will also be installed.

Gillespie—The Superior coal mines at Gillespie recently set a new record for mining coal. Mine No. 3 in one day hoisted 5195 tons or 1546 mine cars.

FOREIGN NEWS

Cardiff, Wales—Five thousand Welsh coal miners struck June 14 because of the introduction of the open shop system.

Fernie, B. C.—On the 8th inst. 1100 miners employed at the Coal Creek mines of the Crows Nest Pass Coal Co. went out on strike. The men of British, Russian, Belgian and Italian nationality demanded the dismissal of a number of Germans and Austrians in the employ of the company, which was refused. The military authorities have taken action and on the 9th about 100 unnaturalized Germans and Austrians were interned. This step will probably result in a speedy settlement of the trouble.

PERSONALS

J. C. Brooks, of Louisville, has been appointed commissary manager for the Luke & Drummond Coal Co., succeeding Joe Bruce.

George Watkin Evans, consulting mining engineer, of Seattle, Wash., recently returned from a professional visit to New York City.

D. D. Davidson, formerly of Columbus, Ohio, but who has been located at Grand Rapids, Mich., for the past year, from which city he covered Michigan territory for the New York Coal Co. has gone with the Gate-Churchill Co. of Detroit.

H. M. Byars, superintendent of the Tennessee Coal & Iron Co.'s coal mines at Johns in the Blue Creek region, has just been appointed a member of the Jefferson County Board of Education, to succeed Prof. I. W. McAdory who resigned on account of his health.

Joseph Battles has been appointed district sales manager for the Terry Steam Turbine Co. at Denver, covering the states of New Mexico, Colorado, Wyoming and the western portion of Nebraska. Mr. Battles' address is 326 First National Bank Bldg., Denver, Colo.

W. J. Richards, president and general manager of the Philadelphia & Reading Coal & Iron Co., delivered an address on "Anthracite Mining and Selling" before the convention of the Pennsylvania Retail Coal Merchants' Association in session at Wilmington, Del., on the 16th instant.

J. B. McKenna was recently appointed general manager of the Colorado Fuel & Iron Co., an office which has not been in existence since 1901. Mr. McKenna has been in the employment of the company for 21 years, the last nine of which were spent as manager of the steel works at Pueblo, Colo.

E. C. Roberts, Jr., superintendent of the mines of the Fairmont Coal Co., under management of the firm of E. L. Hedstrom, has resigned and enlisted in a Canadian regiment in Toronto. He has been a member of the 74th Regiment, New York National Guard, and will go out as a second lieutenant.

Patrick Threston, of Plymouth, Penn., while going to work at the Gaylord colliery recently trod upon earth which had been undermined. This resulted in a cave, the earth, settling down around Threston, who narrowly escaped suffocation. His cries brought workmen who hauled him out of the cave by means of a rope.

John Paul, outside foreman at the Pine Knot colliery of the Philadelphia & Reading Coal & Iron Co., has been promoted to superintendent of the collieries in the Minersville District. Elmer Artz, outside foreman at Otto colliery, was transferred to Pine Knot, and John Withelder, assistant foreman at Otto, has been advanced to foreman.

James L. Richards is understood to have resigned from the board of the New England Coal & Coke Co., of which he has been president. Joseph B. Russel, who has also been a director in both the New York, New Haven & Hartford R.R., and the New England Coal & Coke Co., has resigned from the latter. These resignations follow somewhat drastic legislation in Massachusetts prohibiting interlocking directorates.

An attempt was recently made to assassinate J. L. Schull, general manager of the E. C. Snarles mine at Johnson City, Ill. Shots fired at him through the window of the library at the home of his father-in-law, W. E. Chapman, missed him, but struck Chapman and Mrs. Schull. Chapman was killed. Mrs. Schull will recover. The attempt on the life of Schull, it is believed, was on account of the discharge by him of several Sicilian miners.

OBITUARY

Joseph Saronera, mine stripping contractor, aged 65 years, died of heart failure on June 8. He was one of the largest contractors in Shenandoah (Penn.), having 200 men employed by him. He also held a prominent place in the affairs of the community.

H. L. Bevan, superintendent of the Carney Cherokee Coal Co., was drowned June 11 in attempting to swim in the water which filled a strip pit near Mulberry, Kan. Mr. Bevan was seized with cramps and drowned before he could be rescued. He had volunteered to swim to the shovel in the center of the pit, as it had become necessary to reach the machine and no boat was available.

John W. Reid, superintendent of the Old Forge District for the Pennsylvania Coal Co., died recently at Dr. Burns' hospital in Scranton. Mr. Reid was born in England, but came to this country when a boy. He was connected with the Pennsylvania Coal Co. for 46 years, in 1912 being made superintendent of the Old Forge District, embracing Old Forge, Central, Consolidated, and Sibley mines. He is survived by his wife, one son, and one daughter; also a sister.

Angus M. Cannon, 81 years of age, Director of the Savings Bank & Trust Co., and widely interested in business and mining ventures throughout Utah, died recently at his residence at Ashton Ave. and Lake St., Forest Dale. Death was due to general debility due to age. Mr. Cannon, who was a patriarch in the Mormon Church, was born in Liverpool, England, in 1834, coming to this country in 1842. Mr. Cannon was among the pioneers who came to Salt Lake Valley in 1849. He later opened extensive coal deposits along Grouse Creek near Coalville in Summit County, and engaged actively in the coal business. He was also highly instrumental in mineral and land developments throughout the entire state.

Patriarch Cannon is survived by three widows, Mesdames Clara C., Martha M. P. H., and Maria B. Cannon, also by 113 children, grandchildren, and great grandchildren.

RECENT COAL AND COKE PATENTS

Grate Bar. T. S. Johnson, Scranton, Penn. 1,125,551 Jan. 12, 1915. Filed Apr. 7, 1913. Serial No. 759,560.

Furnace Grate. T. M. Kekich, Chicago, Ill. 1,131,524 Mar. 9, 1915. Filed June 28, 1913. Serial No. 776,391.

Gas Producer. H. L. Wallman, Chicago, Ill. 1,125,919 Jan. 12, 1915. Filed July 20, 1908. Serial No. 444,517.

Mining Machine. L. Robinson, Empire, Ala. 1,124,528 Jan. 12, 1915. Filed July 7, 1913. Serial No. 777,762.

Mining Implement. A. Kolenic, Streator, Ill., 1,137,637, Apr. 27, 1915. Filed Jan. 14, 1914. Serial No. 812,111.

Furnace Grate. W. M. Duncan, Alton, Ill. 1,132,918 Mar. 23, 1915. Filed Feb. 21, 1913. Serial No. 749,804.

Smoke Preventer. W. C. Beam, Rockford, Ill. 1,131,106 Mar. 9, 1915. Filed June 14, 1913. Serial No. 773,709.

Mechanical Stoker. A. G. Elvin, Somerville, N. J., 1,137,471, Apr. 27, 1915. Filed Sept. 19, 1914. Serial No. 862,434.

Miner's Lamp. O. V. Fortney, Kitzmiller, Md. 1,132,324 Mar. 16, 1915. Filed Sept. 11, 1914. Serial No. 861,287.

Safety Device for Mine Cars. F. Davis, Uniontown, Penn. 1,132,914 Mar. 23, 1915. Filed Mar. 28, 1914. Serial No. 827,865.

Smoke Consuming Furnace. E. Stanley, Watertown, S. D., 1,136,287, Apr. 20, 1915. Filed Dec. 5, 1908. Serial No. 466,186.

Mine Drill Support. H. P. Corsa, Bingham Canyon, Utah. 1,125,480 Jan. 12, 1915. Filed Nov. 18, 1913. Serial No. 801,679.

Automatic Stoker. D. F. Crawford, Pittsburgh, Penn. 1,131,214 Mar. 9, 1915. Filed June 27, 1910. Serial No. 569,161.

Fuel Saver and Smoke Consumer. J. L. Webster, Ottawa, Canada. 1,125,228 Jan. 12, 1915. Filed Jan. 17, 1914. Serial No. 812,735.

Fire Bridge for Boiler. G. H. Butterworth and R. Canlin, Liverpool, Eng., 1,137,048, Apr. 27, 1915. Filed May 4, 1912. Serial No. 695,258.

Dump Car. C. H. Clark, assignor to Clark Car Co., Pittsburgh, Penn., 1,136,310, Apr. 20, 1915. Filed July 15, 1908. Serial No. 443,654.

Screening Chute for Coal Pockets. C. G. Pfeiffer, Philadelphia, Penn. 1,125,709 Jan. 19, 1915. Filed July 29, 1913. Serial No. 781,709.

Boiler Furnace. J. Dick, assignor to Phœnix Iron Works, Meadville, Penn., 1,137,465, Apr. 27, 1915. Filed Jan. 27, 1913. Serial No. 744,357.

Mechanical Stoker. C. F. Street assignor to Locomotive Stoker Co., Wilmerding, Penn. 1,130,443 Mar. 2, 1915. Filed Mar. 2, 1908. Serial No. 418,837.

Mining Machine and Truck. N. D. Levin, assignor to Jeffrey Mfg. Co.. Columbus, Ohio, 1,137,337, Apr. 27, 1915. Filed Aug. 31, 1910. Serial No. 579,798.

Machine for Mining Coal. C. H. Boardman assignor to Sundries Mfg. Co., Portland, Maine. 1,130,250 Mar. 2, 1915. Filed Mar. 24, 1914. Serial No. 826,963.

Mining Machine Truck. C. J. E. Waxborn, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,136,301, Apr. 20, 1915. Filed July 13, 1911. Serial No. 638,410.

Feeding and Stoking Attachment for Furnaces. J. A. Lanigan, Lancaster, Penn., and D. J. Carson, Buffalo, N. Y. 1,130,411 Mar. 2, 1915. Filed Oct. 14, 1912. Serial No. 725,602.

Mechanical Stoker. H. Iserman, assignor to Multiple Grate Bar Endless Chain Stoker Co., a corporation of New York. 1,125,544. Jan. 12, 1915. Filed Sept. 11, 1911. Serial No. 648,745.

Grate for Mechanical Stoker. F. M. Clark, assignor to Multiple Grate Bar Endless Chain Stoker Co., a corporation of New York. 1,125,474. Jan. 12, 1915. Filed Sept. 11, 1911. Serial No. 648,802.

INDUSTRIAL NEWS

Reform, Miss.—Coal mines will soon be opened here. Coal mining is a new industry for Mississippi.

Montgomery, W. Va.—The Long Branch Coal Co. is building a half mile of railroad and making changes in its tipple. The new track will bring the cars nearer the mine.

Birmingham, Ala.—The Pratt Consolidated Coal Co. is running a steamer, the "M. Carney," for the transfer of passengers and freight from Cordova to Mobile, on the Warrior River.

Boston, Mass.—On and after June 15 the Boston office of the Sullivan Machinery Co. will be situated at 185 Devonshire St., Room 1010, Unity Bldg., instead of at 35 Federal St., as in the past.

Huntington, W. Va.—The coal shipments on the Ohio River during the first week in June were the largest in 50 years, as over 8,000,000 bushels of coal were shipped from Pittsburgh to Cincinnati.

Buffalo, N. Y.—The steamer "E. D. Carter," of 10,000 tons capacity, has been bought by Boland & Cornelius and others and renamed the "W. T. Roberts," after the sales agent of Williams & Peters.

Birmingham, Ala.—The Atlantic Coast Line has just awarded contracts aggregating 260,000 tons of coal to the Pratt Consolidated Coal Co., the Galloway Coal Co., the Eldorado Coal Co. and the Alabama Fuel & Iron Co.

Baltimore, Md.—The Baltimore & Ohio R.R. during the month of May handled 250,000 tons of coal for export. Part of these shipments went to South America, and a part to Italy, France, Sweden, and other countries.

Brownsville, Penn.—Almost twice the amount of coal passed through the Brownsville lock during the month of May as in April. During the month 641,900 bu. of coal were shipped through the lock to points west against 384,000 bu. locked through in April.

Jenkins, Ky.—An order for 200,000 tons of coal to be sent to Tidewater as soon as possible, was recently concluded between the Italian Government and the Consolidation Coal Co., according to information which is believed to be authentic. It is not known definitely what route this coal will be shipped over or what its port of destination on the Atlantic Seaboard will be.

Sugar Notch, Penn.—Philip Mulholland recently brought suit against the Delaware, Lackawanna & Western R.R. Co., asking $10,000 damages for injuries received when struck by a piece of coal which fell down the shaft of the Truesdale Colliery where he was employed as a foot tender. He charges negligence on the part of the company in failure to provide a safe place in which to work.

Knoxville, Tenn.—An involuntary petition in bankruptcy has been filed in the Federal Court here against the Petros Coal Mining Co. The company, according to the petition, went into a receiver's hands on the first of June when the House-Hanson Hardware Co. filed suit against it in the Morgan Circuit Court. The Petros company is a Georgia corporation with property in Morgan County.

Montgomery, W. Va.—Coal tonnage over the Chesapeake & Ohio R.R. for the month of May surpassed all previous records for that month. The figures show that there were handled 2,044,175 tons of coal which is an increase of 233,175 tons over May of last year. During April 1,808,000 tons were hauled. The prospects for June are good, and it is believed that this month will be another record breaker.

Baltimore, Md.—During May the Consolidation Coal Co. made a record in the output of coal from its mines. During the month it produced 1,158,562 net tons, which is nearly 70,000 tons above the previous record, which was made in June, 1914, when the output was 1,089,200 net tons. The present daily output is about 50,000 tons and it is anticipated that this will be kept up throughout the entire current month.

Columbus, Ohio—One of the features of the annual meeting of the Michigan-Ohio-Indiana Coal Association which will be held at Cedar Point, June 22 and 24 inclusive, will be the display of mining machinery, methods of accounting and products of the mines of the operators in the three states. This feature is attracting considerable attention as it is the first time that such a display has been held in conjunction with the convention.

Philadelphia, Penn.—Shipments of anthracite coal in May decreased from the total in the same month last year by 483,592 tons. For the five months ending May 31, the shipments were 26,279,202 tons against 26,815,603 tons in the corresponding period of last year, making a decrease of 536,401 tons. Shipments for May amounted to 5,797,961 tons, the Lehigh Valley handling the greatest tonnage, its shipments amounting to 1,273,106 tons.

Memphis, Tenn.—Five boats and one barge of coal, valued at about $45,000, were recently sunk in the river when the "John A. Wood," tow boat of the Pittsburgh Coal Co., with a tow of coal boats bound south, rammed a steam shovel of the West Kentucky Coal Co. Five boat loads of coal went to the bottom, while the remaining ten floated away. The "Wood" succeeded in gathering up these derelicts and proceeded down the river to consolidate the fleet. One barge of the West Kentucky Coal Co. was also sunk.

New York, N. Y.—The S. K. F. Ball Bearing Co. has been obliged to greatly increase its office space in the Hudson Terminal Building. Within the last four months it has about doubled its offices so that it now occupies a full wing on the sixth floor of the Hudson Terminal Bldg., 50 Church St., New York. This firm is the only ball bearing company importing bearings from Europe that has not been interfered with by the war. Sweden, being a neutral country, is enabled to send large and regular shipments via Norway and Denmark without entering the war zone.

Morgantown, W. Va.—The mining industry of West Virginia was recently enriched by two fine collections of safety lamps and one of rock specimens given, sold, and loaned to the West Virginia State University. James T. Beard, of New York, and William Clifford, of Jeannette, Penn., furnished the safety lamps, while Stuart M. Buck, of Bramwell, W. Va., furnished the rock specimens which were gathered in the Hartz Mountains, Upper Silesia, Northern Hungary, Transylvania, India, the Bohemian border and the Rhine District. This collection also contains specimens from Vesuvius gathered as early as 1835.

Richwood, W. Va.—The suit of the Cherry River & Southern R.R. Co. against the Gauley Coal Land Co. resulted in a decision in favor of the railroad company. The suit grew out of an attempt on the part of the railroad to secure a right of way down Gauley River from Curtin via Brook Ferry and Meadow River to Anglins Creek in Greenbrier County. The company based its objection on the ground that this road would be of a private nature and of little benefit to the public at large. Condemnation proceedings against the land company will be at once instituted, and as soon as these are settled work will be commenced and pushed to completion.

Cincinnati, Ohio—John S. Jones, of Chicago and Granville, Ohio, filed another motion in the U. S. District Court, June 12, in his litigation over the purchase of the stock of the Sunday Creek Co. from the Hocking Valley and allied railroads. The latest motion avers that he has not secured complete control of the affairs of the Sunday Creek Co. for the reason that the Bankers' Trust Co. of New York is still holding certain beneficial certificates, representing the capital stock of the Continental and Hocking companies, subsidiaries of the Sunday Creek Co. He claims that the Bankers' Trust Co. holds the stock for two purposes. One is to secure a performance of the contract between the coal company and the railroad companies for an equal division of the freight from the mines. The other is to secure a guaranty of the railway companies of the bonds of the coal companies. He charges that the Bankers' Trust Co. gave proxies to Gustav Von Der Steinen, who voted the stock at the annual election.

Cincinnati, Ohio—The transaction involving the sale of the properties of the Marmet Coal Co., which has been pending for some months, was consummated recently. The deal is part of negotiations recently concluded, involving the largest sale of coal properties that has ever been made in West Virginia. The purchase price for all the properties involved is said to be between $19,000,000 and $20,000,000, the Marmet properties bringing $1,500,000.

The identity of the interests purchasing the properties was not disclosed, but they are said to include some of the strongest banking interests in New York and Philadelphia. A corporation to be known as the Kanawha Splint Coal Co. has been chartered in West Virginia to take over and operate the properties as one giant coal concern.

Negotiations still pending for other properties may bring into a merger with them $10,000,000 worth of additional holdings in which event it is said the entire project will be taken over by interests in Chicago, New York, Toledo and Columbus identified with the Kanawha & Michigan and the Toledo & Ohio Central railroads. This latter deal has been agreed to by the purchasers of the present involved properties, it is said, provided the additional holdings are obtained, whereupon the entire project will be turned over to the railroad interests.

Coal Trade Reviews

General Review

Concessions on the anthracite circular are readily obtainable in spite of the heavy curtailment. Bituminous exports taxing the loading facilities at Seaboard. Prices a trifle firmer on spot business. Poor showing in the Lake trade.

There is only the thinnest pretense of holding to the anthracite circular and this is only being accomplished by the most rigid curtailment in all directions. June is maintaining its reputation as the dullest month of the year, and the situation is so discouraging that a number of far-sighted buyers have been successful in forcing particularly advantageous terms covering their requirements until the first of the year. But as a rule complaints are not so general among the hard-coal companies as in bituminous; experience has shown that any deficiency in the summer buying is invariably made up in the fall, and the companies as a rule are content to wait their time. In the meantime vigorous action is necessary to keep stocks down and save demurrage charges, particularly on the steam sizes.

With the export bituminous business increased to a point where the loading facilities at Seaboard are being taxed to their full rated capacity, prices are firmer, although actual sales still continue on the same basis. A very slight increase in the spot demand, occasioned probably by some of the more timid consumers anticipating a reaction in the market, has eliminated concessions generally, but competition continues so keen for what business appears, that there is still little hope of any immediate relief.

Prices in the Pittsburgh district are as uncertain as ever, and there appears to be more free coal being offered. Lake shipments make a poor showing even as compared with the exceedingly light movement of last year, and heavy shipments from now on could scarcely bring the tonnage up to last year, while some shippers are receiving requests to restrict shipments still further on account of the congestion at the upper Lake docks.

Optimism prevails in the Ohio market market, due apparently to the appearance of some demand for stocking purposes and a very small increase in the Lake movement. The domestic market occupies a strong position technically due to the light supplies on hand, and the heavy restriction in the consumption of the steam grades. On the other hand steam consumers are still confining their purchases generally to the open market while contracting is attended with great difficulty.

The Middle Western agencies are still experiencing a general dullness, but an advance in quotations is under consideration for the first of next month when the storage coal starts moving. With the exception of an occasional manufacturer working on war orders, the general railroad and industrial demand continues at a minimum. Even the screenings situation has become notably easier during the past week. The anthracite market is somewhat steadier, but the shortage of Eastern coal is becoming more pronounced.

A Year Ago—Further curtailment in the anthracite regions and demand easing off all along the line. Bituminous consumers crowding operators for better prices and markets weak with more declines in sight. Lake trade fair in some sections. Uncertainty in the Ohio situation rapidly clearing up.

BUSINESS OPINIONS

Boston News Bureau—Probably one of the most serious features in the situation is the demoralization in the sterling exchange market. American securities held abroad do not come out in sufficient volume to stem the tide, and our sales of munitions of war to the allies keep steadily increasing European indebtedness. Business in war orders is at the maximum and domestic trade is slowly improving. General confidence is buoyed up by our splendid crop prospects, by our enormous exports of products and by easy money and gold imports.

Dry Goods Economist—Many manufacturing concerns are well pleased with the extent to which their production is taken care of by large orders from foreign governments.

Iron Age—Betterment both in sentiment and in orders is reflected in the week's developments in the steel market. Rail and car orders continue to come from Russia and France. In the past week France has placed 3745 cars in the United States and Canada, including 2000 10-ton box cars and 1000 20-ton flat cars. Its rail orders to the Steel Corporation may have totaled 50,000 tons in the past three months, but there has been no recent order for that amount, as just reported. Of Russia's rail orders 13,000 tons went to Chicago for rolling in the past week and 4000 tons to Pittsburgh. Russia's standard car order was for 13,000, and 75,000 tons of steel have just been placed at Pittsburgh for 7000 of these. As a climax, there are the Russian contracts for 400 locomotives, of which at least 350 come to this country.

Dun's—While general business gains but slowly, the economic situation grows steadily stronger. International uncertainties are still a restraining influence, yet constructive forces multiply and the absence of speculative excesses is helpful of sustained progress.

Marshall Field & Co.—Weather conditions have so retarded retail distribution of dry goods that the semiannual preinventory sale the first three days of this week did not bring as many merchants to market as the corresponding week last year. Road sales and mail orders, however, brought the wholesale distribution of dry goods for the current week up to normal.

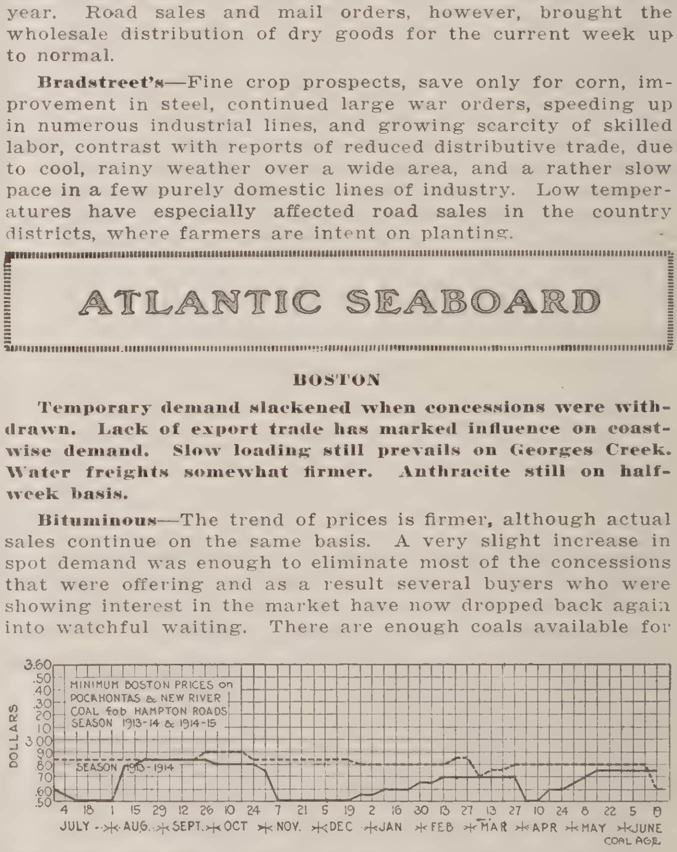
Bradstreet's—Fine crop prospects, save only for corn, improvement in steel, continued large war orders, speeding up in numerous industrial lines, and growing scarcity of skilled labor, contrast with reports of reduced distributive trade, due to cool, rainy weather over a wide area, and a rather slow pace in a few purely domestic lines of industry. Low temperatures have especially affected road sales in the country districts, where farmers are intent on planting.

ATLANTIC SEABOARD

BOSTON

Temporary demand slackened when concessions were withdrawn. Lack of export trade has marked influence on coastwise demand. Slow loading still prevails on Georges Creek. Water freights somewhat firmer. Anthracite still on half-week basis.

Bituminous—The trend of prices is firmer, although actual sales continue on the same basis. A very slight increase in spot demand was enough to eliminate most of the concessions that were offering and as a result several buyers who were showing interest in the market have now dropped back again into watchful waiting. There are enough coals available for this territory besides those shipped from Hampton Roads to make buyers sure of getting supplies at moderate prices, for the present at least, and while Pocahontas and New River have the preference ordinarily, the parties who have yet to contract will not give them much, if any premium.



Low prices continue to be made at the distributing points for delivery inland, and these not so much because of forced sales from "market cargoes" but from rehandling plants in order to keep stocks moving.

There is still talk of possible shortage the coming winter but with perhaps less confidence on the part of the agencies. Certainly there is enough competition over the few orders that come into the market from time to time, and buyers are not as much impressed as they were. The state of the export trade continues to have much to do with the attitude of shippers. Just now it has rather sagged.

There is only a hand-to-mouth supply of Georges Creek for coastwise requirements. Detention again prevails at the Baltimore piers, causing fewer trips of barges and steamers to this territory and therefore a much reduced tonnage.

Firmer prices on the West Virginia coals have the effect of renewing the buyers' interest in the high grades from Pennsylvania. All these brands are actively represented in New England and unless present signs fail their tonnage here is bound to increase. In many quarters where five years ago nothing but Georges Creek was considered, several low-volatile, low-sulphur coals from Pennsylvania are now favorably received, even on the small requirements for forge use.

Water Freights have shown a little advance under the stimulus of better inquiry for coal a week ago and the slow movement of tonnage on account of weather; 90c. was asked for 1500@2000 tons, Hampton Roads to Boston, but nothing higher than 85c. has so far been reported. This is an advance of 5@10c. over the rates reported a fortnight ago.

Anthracite—Mining continues on the basis of three days a week at most of the company mines and there is therefore not a great quantity of domestic sizes offering for sale. On the other hand there is a little complaint that the larger shippers are not filling orders as fast as they might. There is no shortage of any kind or size; it is simply that the operating interests are narrowing the output to the current needs of the market.

Prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.75@2.85
Boston†	....	....	....	3.60@3.78
Providence†	....	....	....	3.50@3.73

* F.o.b. †On cars.

NEW YORK

Heavy exports continue the mainstay of the bituminous market. Little cheap coal being offered. Customary June lethargy prevails in anthracite and mine operations are heavily curtailed.

Bituminous—The export situation continues to be the one redeeming feature of the soft-coal market, new inquiries being received almost daily. The general situation at the New York harbor has changed but little and prices remain practically the same. Shippers are not over-stocked but are able to make prompt shipments on all orders.

The local docks are well supplied with coal, mostly of medium grades, some of which have been offered to quick buyers at substantial concessions. Operations at the mines have not improved; some of the mines producing the high-grade coals are working on an average of five days a week while others are scarcely making half-time. Large manufacturers in New England whose stocks are being gradually depleted are making inquiries regarding prices and quick shipments but do not seem anxious to close contracts. Many large users continue to take shipments in excess of their quota. Demurrage coal is not much in evidence but occasionally a buyer has an opportunity to pick up a real bargain. Some western Maryland was quoted on Monday at $2.15. Average prices of various grades of soft coal during the past week were as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.30@3.40	$3.30@3.40	$3.30@3.40	$1.75@1.85
Georges Creek Tyson	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.55@2.65	....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	....	....	1.35@1.50
Nanty Glo	2.75@2.80	....	....	1.20@1.25
Barnesboro	2.65@2.70	....	....	1.10@1.15
Somerset County:				
Quemahoning	....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe	2.45@2.55	....	....	0.90@1.00
Greensburg	2.75@2.80	....	....	1.10@1.15
Westmoreland	2.95@3.20	....	....	1.15@1.40
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	0.70@0.80
Steam		2.45@2.50	2.45@2.50	0.90@0.95
Western Maryland		2.35@2.45	2.35@2.45	0.80@0.90

Anthracite—The month of June promises to maintain its reputation as the dullest month in the year on anthracite coal. Salesmen report a scarcity of orders and only heavy curtailing of operations is keeping the market from being over-stocked. Many of the mines continue to work on a three-day-a-week basis and the prospects for improvement are not bright. Some shippers are urging consumers to fill their bins in anticipation of a shortage of labor in the mining regions before long.

While shipments at tidewater are prompt, inland dealers are complaining of slow deliveries. Demand for chestnut is slow and considerable of this size is being stored. The call from Canada and the Northwest is brisk and proves to be a good outlet.

The supply of steam sizes is becoming excessive and strong efforts are necessary to keep down the stocks and to save demurrage charges. As a result much good coal is sold at low prices.

Current quotations are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.75		$4.80	
Egg	5.00	$4.80	5.05	$4.85
Stove	5.00	4.80	5.05	4.85
Chestnut	5.25	5.00	5.30	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	1.95@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

PHILADELPHIA

Anthracite trade showing more than the usual summer dullness. Low prices for all sizes, particularly pea, and few buyers. School-coal prices create a stir. Bituminous trade quite dull, but with some prospects for betterment.

Anthracite—The past week has been extremely quiet. Orders are scarce and buying is strictly limited to the current demand. Offerings are reported on all sizes at a considerable reduction on the circular, with the exception of stove, which is held close to the circular, several companies reporting their inability to meet all orders for this size. This is due to restricted mining and not to any unusual demand, as the companies claim they cannot operate their collieries for one size alone.

Pea, as usual, seems to be the particular sufferer, as low as $1.50 being noted on this size, although $1.75 seems to be the market price at the present moment, and some operators still deny they are even selling as low as $2; but despite this assertion the fact still remains that many of the retail men openly state they are protected on the $2 rate up to Jan. 1, 1916. It is noted that there was a bona fide offer made this week on 400 to 500 tons of this size at $1.85, shipper prepaying the freight and giving the customer 90 days to pay the bill. Yet with all these inducements the offer was declined. It appears as though some of the mining interests have come to the conclusion that it is better in the long run to move pea coal at a fair price than to store it indefinitely for future delivery.

Bituminous—The trade still complains of a lack of activity, although operators are optimistic for the future. Tidewater shipments are likely to increase within the next few months to such a volume that it will bring the price to a point higher than for several years, although a drawback to the situation will be the lack of bottoms to move the tonnage.

The circular and individual prices for the week are as follows:

	Line and City	Tide	Individual Line and City
Broken	$3.20	$4.45	$3.00
Egg	3.45	4.70	3.30
Stove	3.70	4.70	3.65
Chestnut	3.85	4.95	3.75

BALTIMORE

Export trade continues to grow and last week saw a new high record for a seven-day movement. Domestic situation very flat.

With a rush that keeps the piers here working almost at full capacity the export trade from this port continues to expand. Last week saw a record movement for a seven-day period; a total of 70,360 tons was sent out as cargo fuel to foreign ports, the same carriers taking 10,849 tons of bunker coal. If maintained this would mean a monthly movement of between 250,000 and 300,000 tons, for June.

The domestic situation remains flat. Coal is selling at almost anything offered, at least on the poorer grades. Slack is not so strong and is offering at 40 to 45c. Cheap coals in both Maryland and West Virginia may be had at 75 to 80c. Low grade Pennsylvania coals are holding around 90c. as a rule.

During the past week the following charters were announced for foreign loading at this port:

Vessel	Country	Tonnage	Destination
Antonio	British	1663	Montevideo
Atlantic	American	3248	Buenos Aires
Hercules	Spanish	2499	Italy
Gleneden	British	3018	Naples
Phoebus	Italian	2013	Italy
Apollo	British	2442	Marseilles
Bratland	Norwegian	3000	Denmark
Ontenada	Spanish	2232	Buenos Aires
Claveresk	British	2441	Felton, Cuba
Castlemoor	British	....	Egypt
Arundo	Dutch	1998	Brazil
Andros	Greek	1859	Siciliy
William E. Downs	American	639	Porto Rico

All the above are steamers except the "William E. Downs," which is a schooner.

HAMPTON ROADS

Export loadings still holding up well. Prices remain at circular. Tonnage at Tidewater slightly above normal.

The dumpings over the various piers at Hampton Roads for the week have been heavy, especially as regards export shipments. Large cargoes have also been moving to New England and ports South. The bunker movement for the week has been fair; while the number of steamers calling for bunker coal have not been so numerous the quantity loaded has been large, some of the vessels taking as high as 1600 tons and over.

The accumulation of coal held by some of the shippers is rather heavy but other suppliers are in some cases short and having coal hurried forward from the mines; on a whole, however, the supply is perhaps in excess of normal.

Schooners are still engaged in the export movement and are loading for ports as far away as Casa Blanca, Morocco, the schooner "Woodward Abrahams" having taken 963 tons for that port. One of the most interesting vessels supplied with bunker coal was the Dutch cruiser "Jacob Van Heemskerck" which took on board 767 tons from barges. Of the export cargoes from Hampton Roads the heaviest shipment was taken by the collier "Ulysses" which loaded over 12,000 tons for the Canal Zone.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Verdun	British	Virginia	Rio Janeiro	2950	$8.76
	Foreign	Virginia	Rio Janeiro	6000	8.64
Edith H. Symington		Philadelphia	Seville	881	7.25
Masarua	British	Baltimore[1]	Rio Janeiro	3189	8.76
Jata Mendi	Spanish	Philadelphia	Barcelona	2746	9.60
North Pacific	British	Baltimore[1]	Italy[2]	2493	10.80
Catalone	British	Baltimore[1]	Italy[2]	2410	
Christoforos	Greek	Baltimore[1]	Italy[2]	2410	
Itasca		New York	Mobile	989	2.00
Achlibster	British	Baltimore	Algiers	2820	10.80
Castlemoor	British	Baltimore	Alexandria	2404	
Andros	Greek	Baltimore	Palermo	1859	
James B. Drake		Norfolk	Lisbon	991	

Note—Steamers are indicated by **bold face type**, all others being schooners.

[1] Or Virginia. [2] West Coast.

OCEAN FREIGHTS

Rates to the West Coast of Italy have declined and steamers can now be secured at or about $10.04. The steamer "Jata Mendi," about 6000 tons' cargo capacity, was chartered to load at Philadelphia for Barcelona at $9.60, and steamers are offered for similar business at $9.36, and will no doubt accept $9.24, possibly $9.12. A large steamer is reported as having been chartered to load coal at Virginia for the Lower Plate at $8.40, but this seems considerably above the market.

Rates are now quotable on about the following basis:

To	Rate
Havana	$2.00@2.25
Cardenas or Sagua	3.00
Cienfuegos	2.75@3.00
Port au Spain, Trinidad	3.50@4.00
St. Lucia	3.50@3.75
St. Thomas	3.00@3.50
Barbados	3.50@4.00
Kingston	2.75@3.00
Curacao	3.50@3.75
Santiago	2.50@3.00
Guantanamo	2.50@3.00
Demerara	5.00@5.25
Bermuda	$3.50@3.75
Vera Cruz	3.50@3.75
Tampico	3.50@3.75
Rio	8.64
Santos*	8.88
Montevideo	7.44@7.92
Buenos Aires or La Plata	7.68@8.16
Rosario	8.40@8.64
West Coast of Italy	9.80@10.08
Spain**	**9.24**
Valparaiso or Callao	6.75@7.00
Marseilles	**9.24**

Note—Rates noted in **bold face type** are only approximate.

* Consignees paying dockage dues. **Spanish dues for account.

W. W. Battie & Co.'s Coal Trade Freight Report.

COKE

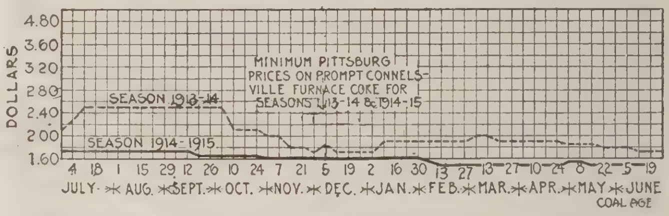
CONNELLSVILLE

Furnace-coke inquiry still in market, with operators stiffening in prices. Foundry demand moderate. Production slightly decreased while shipments make new high record for the year.

No contracts have been closed as yet against the inquiry for second-half furnace coke noted a week ago, and totaling 40,000 tons a month or more. Operators are making an effort to sell on the sliding scale basis, putting the minimum at $1.75, with advances in case basic pig iron advances over $12.50, Valley. It is reported, but not confirmed, that two or three contracts were made a few weeks ago on this basis. Thus far buyers contend that they should not pay over $1.75 at the outside, as a flat price.

The prompt furnace coke market continues stagnant. Foundry coke is in only fair demand for prompt, while there is not much contracting except by those who must have their favorite brands. We quote furnace coke at $1.50 for prompt, $1.60 for June and $1.75 for second-half and foundry coke at $2@2.40 for prompt and $2.20@2.40 for contract, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended June 5 at 314,897 tons and shipments at 321,141 tons, an increase of 5618 tons, this being the best record of the year for shipments.



Buffalo—There is some report of a larger demand for coke, but not of better prices. As a rule the trade is quiet, the general demand for iron and steel not improving. The furnaces in this district are running at a fair rate, but it is agreed that sales are not made easily and that consumers are not willing to stock up. There is no advance in prices, even with considerable scarcity of men reported in the furnace districts. Quotations remain on the basis of $4.15 for best 72-hr. Connellsville foundry, with stock coke at $3.15.

Chicago—A fair demand has been noted for domestic sizes, and increased orders have been placed for furnace and foundry coke. Prices are as follows: Byproduct, $4.55@4.75; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75; furnace, $4.60@4.75.

LAKE MARKETS

PITTSBURGH

No tendency for Lake shipments to increase. Heavy offerings of free coal, with prices as ragged as ever. Operations about 60%.

There has been no further improvement in Lake shipments and, indeed, some operators are in receipt of requests to curtail shipments on contracts on account of crowded docks. Shipments to date make a poor showing as compared with last year, and at this rate a considerable increase could occur after Aug. 1 without making the season's total larger than that of last year. If anything, there is more free coal offered now than formerly, and prices are as much cut up as ever. Manufacturing demand is as good as a week ago, but has shown no further increase. Mines are operating at about 60% of capacity.

The contract asking price on mine-run, to Apr. 1, continues to be about $1.15, but this is practically nominal, as there is no contract demand. We quote the market for prompt unchanged as follows: Slack, 55@60c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

No stir yet in either anthracite or bituminous. Buyers holding off for lower prices or for fall weather to set in. Tone of market shows a slight improvement.

Bituminous—The Buffalo jobber and shipper is waiting as patiently as possible for some stir. The price of bituminous is not changed, as it is practically at the bottom, where it has been for a long time. Quotations are: $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.45 for slack. Allegheny Valley sizes are about 25c. lower than Pittsburgh, all slack being about on a par. There has been a better demand for slack than for sizes, largely on account of its paying less duty in Canada.

Anthracite—While the monthly report of output looks fairly good there is a very dull situation in anthracite everywhere and prospects for only a slight improvement till after the hot weather is past. The anthracite companies are not complaining as the bituminous shippers are, because they expect that any undue slackness now will be made up before the end of the year. Reports from the mines agree that the anthracite collieries are not running much more than the bituminous so it appears that the storage room in sight is not large. The local trade is no better than anything else. Retailers are very anxious to get as much coal moved as possible, but their customers do not respond. As a result the early fall trade should be good.

There is a fairly brisk movement by Lake and if the docks of the Upper Lakes will hold the coal it will continue to go forward. Actual sales are not brisk. Shipments by Lake for the week were 141,000 tons, nearly all to leading ports at the head of the Lakes.

TOLEDO

Lake business still quiet and domestic and steam trade light. Prices not very firm.

There is little movement as compared with other seasons although some coal is going up the Lakes. Both the domestic and steam trades are light. Prices are not holding very firm but it is the consensus of opinion that there is going to be more business in a short time. Some contracts are being let but they are mostly small. Few of the large contracts have as yet been let or even offered. Pocahontas coal is still hard to secure in prepared sizes and prices are high. West Virginia and Kentucky grades are in fair demand and there is commencing to be some movement of Pittsburgh No. 8 Youghiogheny, and Cambridge coal is moving as well as could be expected in the low state of the market.

CINCINNATI

Better demand for steam coal for immediate delivery, but contracting is slow and at lower prices.

It is reported that there is a better demand for fuel than for some time, due to increased operations at many industrial concerns. This is evidenced by some orders received for the resumption of contract shipments in full volume. While these signs of improvement are encouraging, the fact remains that all departments of the market are overcrowded. The domestic situation is still technically strong, but buying is negligible.

COLUMBUS

Prices appear firmer. Some slight stir in stocking is reported although the general dullness still continues. Lake movement still light but increasing slowly.

Some demand for stocking purposes is reported in the Ohio coal trade during the past week. This feature coupled with an increased Lake trade has made the market a trifle more active. But on the whole the situation is still dull and little hope for improvement is seen in the immediate future.

Stocking of Pocahontas and West Virginia splints is noted in limited quantities. Some of the producers report a slight increase in the demand for Hocking, but the stocking period on that variety does not develop until later. Rural dealers are laying in a better stock to take care of the threshing trade which is expected soon and that has an effect. Retail trade is slow although prices are still well maintained, Pocahontas lump is firm at $4 while mine-run is selling around $3.50. West Virginia splints and White Ash are also firm. Retailers' stocks are only fair in most localities.

Steam business is still slow in all sections. Manufacturing continues at a low ebb and requisitions are limited. A large part of the buying for steam consumption is off the open market at cheap figures. Contracting is attended with difficulties. Railroads are taking only a fair tonnage, as freight movement is still limited.

Lake trade is increasing slowly but no great tonnage is moving from Ohio mines to the Northwest. Docks in the Upper Lake ports are still congested.

Circular prices on the whole are fairly well maintained and on some grades a firmer tone is noted. Ohio producers have come to the conclusion that it is better to leave the coal in the ground than to sell at a loss. Consequently the extremely cheap coal offered in former years is not available. West Virginia producers are still offering rather cheap prices in Ohio markets.

Mines have been working at about the following percentages of full capacity:

	Week Ended					Week Ended			
District	May 22	May 29	June 5	June 12	District	May 22	May 29	June 5	June 12
Hocking...	25	30	30	25	Cambridge.	30	35	35	35
Jackson....	25	20	20	20	Masillon...	35	35	35	40
Pomeroy...	50	45	50	50	Eastern O..	5	15	25	30
Crooksville.	30	35	35	30					

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump.............	$1.45	$1.50	.....
Inch and a quarter............	1.30	1.35	$1.30
Three-quarter inch............	1.25	1.30	1.25
Nut........................	1.15	1.25	1.15
Mine-run...	1.05	1.10	1.05
Nut, pea and slack...........	.70	.75	.65
Coarse slack.................	.60	.70	.55

CLEVELAND

Market showing a tendency to weaken and all prices are off 5c. Brokers holding quotations by taking up all cheap coal. Lake shipping remains unchanged.

Fine coals sold from $1.45 to $1.50 at the opening of the week, and the demand was hardly equal to receipts. Only about 300 cars were on track Monday and the only reason prices remained where they were was because brokers were ready to buy anything that was offered at less. They were confident they could make a profit if the coal was newly received and had a day or two between car service.

Coarse coals are also lower and shipment prices are the same as spot. No. 8 and Middle district spot coals were about at par with three-quarter and offered at $1.75; it seemed as if everything left over had been dumped into this market.

Were Lake shipments larger there would not be so much cheap coal in Cleveland. The Lake shippers are preparing to send more coal to the Northwest as soon as there is a demand for harvesting, but they are holding back to avoid piling new coal on that carried over from last year.

Hard coal shipments to the Lake are up to last year, but this is due to the light demand from all-rail customers. Dealers are not stocking, complaining that they have not been able to collect last year's accounts and could not pay for the coal if they took it.

Prices for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	Ohio No. 8
Lump.........	$3.10	......	......	....	......
Lump, ¾ in.....	.....	$2.15	$1.95	$1.85@1.90	$1.80@1.90
Egg...........	3.10	......	......	....	......
Mine run.......	2.65@2.70	2.05@2.10	1.80	1.80	1.75@1.85
Slack..........	......	1.60	1.50	1.50	1.50

LOUISVILLE

Market continues flat though there is somewhat more coal being stocked.

The stocking movement is somewhat more manifest, though it has not attained important proportions. Prices show no changes, except where there is price cutting, and are based on the following, which are the schedule for the month: Block, $1.50; round, $1.20; steam run-of-mine, $1; six-inch round, 95c.; four-inch round, 85c.; nut and slack, 45 to 60c.

MIDDLE WESTERN

GENERAL REVIEW

Buying continues slow and consumption light. Screenings strong. Domestic coals in no demand. Anthracite movement stronger.

Prices are approximately on the same basis and are still being fairly well maintained notwithstanding the inactivity. No appreciable increase in the demand for domestic sizes is noted, although there is a certain amount of buying of various grades to cover immediate requirements. Indiana and Illinois operators are figuring on advancing prices about July 1 because the movement of storage coal has begun and increased buying for June delivery is expected.

Incoming shipments of free coal are not excessive, and are readily disposed of, so that there is little coal on demurrage. The railroads are still taking less than normal amounts, and the demand from manufacturing plants is also restricted. Industries manufacturing war materials are booming, but their individual prosperity does not create in general an increased demand for coal.

CHICAGO

Screenings somewhat softer. Operations generally curtailed. Shortage of Eastern coals. Anthracite market better.

There is more domestic lump being sold from southern Illinois mines at $1.35 than at less, and indications are that this price will be the ruling figure for the balance of the month. Screenings from this section have softened somewhat, holding at about 5c. per ton less than last week. There is some buying of threshing coal from Williamson County mines and steam sizes have been in fair demand.

Increased orders have been placed with Harrisburg and Saline County operators for steam sizes, but screenings have been easier.

The Indiana operators are producing barely enough coal to supply the demand.

The prepared grades of West Virginia smokeless coals continue scarce and high, and few offerings are made. Third Vein and Pocahontas lump are at a high level, and difficulty is experienced in obtaining prompt shipment. Almost all high-grade Eastern coals are gaing strength slowly.

There is an excessive amount of splint coal offered.

There is little activity in Hocking, although very little free coal is on the market. Prices are well held considering the lack of demand.

Eastern Kentucky operators are still forcing coal on the market, with the result that prices are not on a profitable basis.

Improvement is noted in the anthracite demand. Retailers have been placing increased orders for current delivery, and there is a better movement to points beyond Chicago. Prices are well maintained notwithstanding the demoralization in the East.

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump......	$1.25@1.35	$1.25@1.35	....	....	....
4-in. lump..	....	....	$1.35@1.40	$1.25@1.30	$1.40
Steam lump	1.15	1.15@1.25	1.10@1.15	1.15@1.20	1.25
2½-in. lump.	....	....	1.25@1.30	1.20@1.30	1.30
1¼-in. lump.	....	1.25	1.20@1.35	1.15@1.25	....
Mine-run...	1.10@1.25	1.00@1.10	.85@1.10	.90@1.00	.85@1.05
Egg........	1.25@1.35	1.20@1.35	1.15@1.25	1.10@1.20	1.15@1.25
No.1washed	1.25@1.35	....	1.50	....	....
No.2washed	1.25@1.35	....	1.40	....	....
Nut.......	1.10@1.25	1.10@1.15	1.00@1.15	1.00@1.10	1.00@1.05
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.20@1.30	....	....	....	....
Screenings..	.90@ .95	.75@ .85	.75@ .80	.70@ .80	.75@ .80

	Harrisburg & Saline Co.	E. Kentucky	N. Riv. & Poca.	Penna. Smokeless	Hocking
Lump......	$1.25@1.35	$1.25@1.40	$1.90	$1.25@1.50	$1.25@1.35
1¼-in. lump.	1.15	1.10@1.25	....	1.10	1.15@1.25
Mine-run...	1.05@1.10	.85@1.10	1.10@1.25	1.10	1.25
Egg........	1.15@1.25	1.00@1.10	1.90	1.25	....
No. 1 nut..	1.25@1.35	....	....	....	1.15@1.25
No. 2 nut..	1.20@1.35	....	....	....	....
Screenings..	.85@ .90	....	....	....	...

ST. LOUIS

Screenings softer and there is not enough tonnage moving to create any stir. Improved outlook in the inner group.

Not enough tonnage is moving this week to create any stir in the market. The demand for lump is scarcely perceptible. Screenings, which have been holding up well, eased off a little during the week, but not enough to shade the price and a recovery is expected next week. Some sales of lump were reported as low as 75c. There has been no change in the situation in the inner group, where ruinously low prices still prevail. There are indications, however, that the few operators who have stayed out of the selling agency plan on the Illinois Central will soon get into line and make possible a restoration of prices.

There is considerable speculation as to the influence that the opening of the St. Louis-Elkhart byproduct coke plant may have on the local situation. The company will begin delivering in the city and making shipments about June 25. It is expected to compete principally with anthracite. The price is 30% less than for hard coal but it is more expensive than soft coal. St. Louis dealers are taking it on and shipments are to be made to the Northwest and Southwest and to the Coast.

Quotations for the week are as follows:

	Wilm. & Frnk. Co.	Sparta	Mt. Olive	Standard
6-in. lump....................	$1.35@1.50	$1.25	$1.25	$0.90
2-in. lump....................	....	0.95	1.15	0.75
3-in. lump....................	....	....	1.15	....
3x6 egg......................	1.35@1.50	....	....	0.80
No. 1 nut....................	1.[illegible]5@1.50	....	....	....
No. 2 nut....................	1.25	....	....	0.80
No. 1 washed.................	1.35	....	1.25	....
No. 2 washed.................	1.25	....	....	....
No. 3 washed.................	1.25	....	....	..
No. 4 washed.................	1.20	....	....	....
No. 5 washed.................	1.00@1.05	...	....	....
Screenings...................	0.85@0.95	0.80	....	0.80
Big Muddy lump...............	2.25	....	....	....

KANSAS CITY

The wholesale prices remain unchanged and the market has been practically at a standstill all week. The factories and other large industries are still holding to the bottom of the market and it appears that they will do so all summer.

PORTLAND, ORE.

Coal business is quiet. Utah and Wyoming mines advance prices 25c. per ton.

Coal dealers here have been notified that the Utah and Wyoming mines have advanced prices 25c. per ton, making Wyoming coal bought for this district $2.50 per ton, and Utah coal $2.25. Storage prices are not quoted here for the present owing to these advances. Warm weather has set in and little demand is anticipated for domestic purposes until the season opens for next fall.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY

Shipments over this road for April of the current year amounted to 352,750 short tons as compared with 309,427 during the preceding month.

SAULT STE. MARIE

The bituminous shipments through the Sault Ste. Marie Canals for May of the current year amounted to 1,248,447 short tons and the anthracite shipments 248,110 short tons.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for April and the ten months of the fiscal years 1914 and 1915, in short tons:

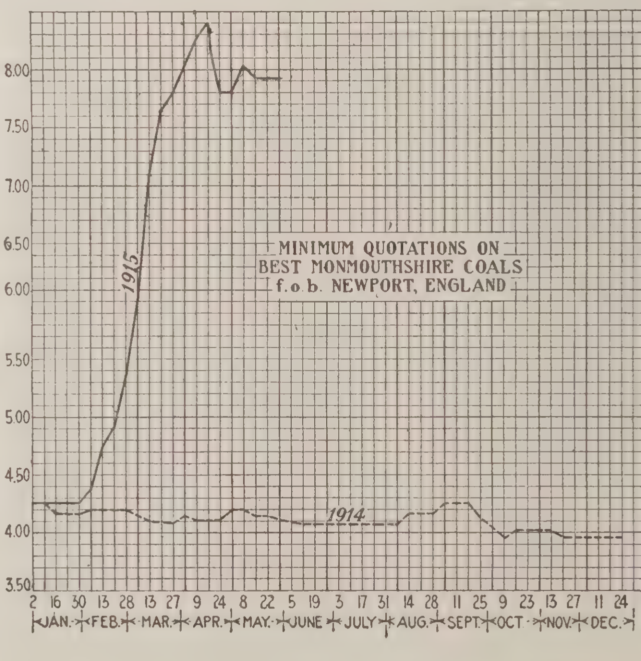
	April				Ten Months			
Destination	1915	%	1914	%	1915	%	1914	%
Tidewater.....	363,167	22	352,414	22	3,038,549	18	2,940,162	19
East..........	157,710	9	213,990	13	2,043,581	12	2,201,691	15
West..........	1,048,357	63	972,771	59	11,159,367	65	9,136,657	60
Total.......	1,569,234		1,539,175		16,241,497		14,278,510	
From Connections								
Bituminous....	98,394	6	98,039	6	931,895	5	923,990	6
Anthra. (local).	246				652			
Anthracite.....	1,205		1,903		11,911		13,324	
Total.........	1,669,079	100	1,639,117	100	17,186,142	100	15,215,824	100
Coke............	21,421		36,215		156,417		328,320	

FOREIGN MARKETS

GREAT BRITAIN

Stocks continue short and consumers are concerned over the outlook. Licensing of exports working more smoothly.

Collieries are experiencing the trouble of restricted production through labor shortage, the outputs being in many cases quite inadequate to meet the demands of buyers, who are now becoming more concerned about the stocking for winter requirements. On the other hand, the export license difficulty is still a subject of great interest to some markets, though in this matter more satisfactory working is being experienced. Another concession which has been made is to the effect that where it is necessary to increase the quantity to be exported, the committee will allow a margin of 10 per cent., not to exceed 200 tons. Taken all round, it is admitted that the licensing regulations are working fairly well, though we understand that some are being refused in connection with the shipments under the recently concluded Swedish State Rys. contract. In the event of further licenses being refused under this contract, it is possible that the Swedish authorities may buy a further quantity of American coal.—"The Iron and Coal Trade Review."



Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

+Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
774	Dept. of the Interior	Washington	D. C.	38,869b	956
774	Dept. of the Interior	Washington	D. C.	4,947a	956
819	State Pur. Agt.	Austin	Tex.		1048
831	Board of Education	Portsmouth	Ohio	1,380b	1949
843	Bd. of County Comrs.	Columbus	Ohio	5,415b	1049
845	Bur. Supplies and Accts.	Washington	D. C.	300b	1050

aIndicates anthracite coal. bIndicates bituminous.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

No. 236—New York, N. Y.—It is stated that the International Paper Co. is again in the market for 100,000 tons of bituminous coal to supply its various plants in different parts of the country. For previous announcement of this, see p. 447. Address Purch. Agt. C. E. Smith, 30 Broad St., New York, N. Y.

No. 691—Watervliet, N. Y.—The requirements on this contract (p. 877) have not yet been determined, the preliminary work necessary for fixing the tonnages required having not yet been completed. Address Col. W. W. Gibson, Watervliet Arsenal, Watervliet, N. Y.

+No. 706—New York—Bids on this contract (pp. 877, 915, 955, 1004, 1048) were opened on June 11. The coal bid on is to be used by 14 city departments. The bids were as follows:

	Egg	Stove	Nut	Broken	Pea	—Buckwheat—			Mine Run
						No. 1	No. 2	No. 3	
Zone 1 Tons	....	....	....	....	2300	....	....	....	....
Wm. Farrell & Son	$6.19	$6.19	$6.19	$5.60	....	$3.45	....	$2.55	....
Geo. D. Harris	6.38	6.45	6.65	5.75	$4.25	3.45	....	2.65	$4.30
Meyer-Denk.-S.Co.	6.50	6.50	6.50	5.75	4.40	....	....	....	3.75
Burns Bros.	6.53	6.53	6.78	5.83	4.23	....	....	....	....
Foster-Scott Co.	6.21	6.34	6.44	5.72	....	....	....	....	....
C. D. Norton & Co.	....	....	....	....	....	3.43	....	2.56	....
Clarksburg Co.	....	....	....	....	4.17	....	....	....	....

On 500 tons of pea coal bids were received as follows: Farrell & Son, $4.50; Harris & Co., $4.45; Meyer-Denker-Sinram Co., $4.40, and Burns Bros., $4.23.

Zone 2 Tons	....	....	....	....	....	....	....	....	....
Wm. Farrell & Son	$6.19	$6.19	$6.19	$5.60	....	$3.28	....	....	....
Geo. D. Harris	6.26	6.33	6.50	5.63	4.53	3.43	....	....	....
Meyer-Denk.-S.Co.	6.50	6.50	6.50	5.75	4.55	3.50	....	....	....
Burns Bros.	6.53	6.53	6.78	5.83	4.55	3.55	....	....	....
C. D. Norton & Co	....	....	....	....	....	3.35	....	....	....
Foster-Scott Co.	6.21	6.34	6.44	5.72	....	....	....	....	....
Zone 3 Tons	....	....	....	....	....	....	....	3100	1550
John S. Conabeer.	....	....	....	....	....	$3.56	$3.08	....	....
Geo. D. Harris	$6.35	$6.40	$6.63	$5.68	....	3.49	3.21	$2.44	$3.24
Burns Bros.	6.53	6.53	6.78	5.83	....	3.70	3.38	....	....
C. D. Norton & Co.	....	....	....	....	....	3.37	3.09	2.28	3.25
Pattison & Bowns.	....	....	....	....	....	....	....	2.27	3.29
Zone 4 Tons	....	....	....	....	....	3850	....	....	....
Olin J. Stephens.	$6.58	$6.58	$6.80	$5.70	....	$3.58	....	....	....
John W. Peale	....	....	....	....	....	3.20	....	....	....
John S. Conabeer.	6.55	6.55	6.80	5.93	....	3.18	....	....	....
Geo. D. Harris	6.37	6.37	6.67	5.72	....	3.14	....	....	....
Burns Bros.	6.53	6.53	6.78	5.83	....	2.98	....	....	....
William Brennan	6.45	6.45	6.70	6.00	....	....	....	....	....
Clarksburg Co.	....	....	....	....	....	3.10	....	....	....

For furnishing 300 tons buckwheat No. 1 the following bids were received: Stephens, $3.72; Conabeer, $3.56; Harris & Co., $3.75, and C. D. Norton & Co., $3.39.

	Egg	Stove	Nut	Broken	Pea	—Buckwheat—			Mine Run
						No. 1	No. 2	No. 3	
Zone 5 Tons	....	....	....	....	....	3600	....	12,000	....
C. D. Norton & Co.	....	....	....	....	....	$3.37	....	$2.76	....
John F. Schmadeke	$6.49	$6.49	$6.74	$5.74	$4.47	3.35	....	2.74	$3.85
Bacon Coal Co.	6.85	6.85	6.85	6.85	4.60	3.70	....	2.77	3.98
S. Tuttle's Son Co.	6.22	6.34	6.54	5.72	4.38	3.37	....	2.72	....
John W. Peale	....	....	....	....	....	3.57	....	....	....
Thos. Woods Sons.	6.09	6.09	6.09	6.09	....	....	....	....	....
F. W. H. Nelson	6.55	6.55	6.80	5.92	4.75	....	....	....	4.35

Bids were also received for furnishing 650 tons buckwheat No. 1 and 715 tons buckwheat No. 3, as follows: Schmadeke, $3.49 and $2.51, respectively; Bacon Coal Co., $3.85 and $2.70; Tuttle's Son & Co. bid $3.52 and $2.62, and Nelson $4 and $3, respectively.

Zone 6 Tons	....	....	....	....	....	2700	....	....	....
John F. Schmadeke	$6.81	$6.81	$7.06	....	....	....	....	....	....
Bacon Coal Co.	7.20	7.20	7.20	....	....	....	....	....	....
Commercial Coal	6.98	6.98	7.23	....	....	....	....	....	....
John W. Peale	....	....	....	....	....	3.43	....	....	....
C. D. Norton & Co.	....	....	....	....	....	3.45	....	....	....

For furnishing 575 tons of buckwheat No. 1, Schmadeke bid $3.69; Bacon Coal Co., $4.20, and the Commercial Coal Co. $3.74.

Zone 7 Tons	....	....	....	....	....	....	....	....	....
Chas. H. Reynolds	....	....	....	....	$4.32	$3.48	....	....	....
Bacon Coal Co.	$6.85	$6.85	$6.85	....	4.44	3.79	....	....	....
S. Tuttle's Son	6.22	6.33	6.58	....	4.37	3.54	....	....	....
McCollum	6.32	6.32	6.32	....	4.36	3.53	....	....	....

On 57 tons each of stove and egg, Bacon Coal Co. bid $7.10 each; Tuttle bid $6.33 and $6.22, respectively, and McCollum $6.32 each.

Zone 8 Tons	....	....	....	....	....	3125	....	....	....
Chas. H. Reynolds	....	....	....	....	$4.62	$4.15	....	....	....
John W. Peale	....	....	....	....	....	3.73	....	....	....
Bacon Coal Co.	$7.20	$7.20	$7.20	....	4.95	3.90	....	....	....
S. Tuttle's Son	6.39	6.68	6.93	....	....	....	....	....	....
McCollum	6.57	6.57	6.59	....	4.67	....	....	....	....

On an additional offer of 3750 tons of buckwheat No. 1, Tuttle's Son & Co. bid $3.52; H. H. Lineaweaver & Co., $3.56; John F. Schmadeke bid $3.65 and C. D. Norton & Co. bid $3.71. For furnishing 24,000 tons of the same size coal, John W. Peale bid $3.21; Lineaweaver, $3.27, and the Empire Coal Mining Co. $3.249. For furnishing 19,000 tons mine-run, B. Nicoll & Co. bid $3.24; C. D. Norton & Co., $3.25, and George D. Harris & Co., $3.39.

Zone 9 Tons	....	....	....	....	....	....	....	....	....
John W. Peale	....	....	....	....	....	$3.74	....	....	....
Bacon Coal Co.	$7.24	$7.24	$7.24	....	$4.79	....	....	....	....
John F. Schmadeke	....	....	....	....	4.74	3.89	....	....	....
C. D. Norton & Co.	....	....	....	....	....	3.72	....	....	....
Zone 10									
McCollum	$6.39	$6.39	$6.64	....	....	....	....	....	....
Burns Bros.	6.42	6.42	6.42	....	....	....	....	....	....
Zone 11									
McCollum	$7.79	$7.79	....	....	....	....	....	....	....
John H. Farril Co.	6.94	6.99	....	....	....	....	....	....	....
Zone 12 Tons	....	....	....	....	....	....	....	....	....
John W. Reimer	$7.15	$7.15	$7.15	....	....	$3.69	....	....	$4.01
John W. Peale	....	....	....	....	....	3.93	....	....	....
B. Nicoll & Co.	....	....	....	....	....	....	....	....	3.90
Geo. D. Harris	....	....	....	....	....	3.79	....	....	3.99
McCollum	7.44	7.44	7.44	....	....	....	....	....	....
J. E. Backus Sons.	7.09	7.09	7.09	....	....	....	....	....	....
Philip Deitz Co.	7.52	7.52	7.55	....	....	....	....	....	....
Zone 13									
McCollum	7.54	7.54	7.54	....	....	$4.19	....	....	....
C. D. Norton & Co.	....	....	....	....	....	3.71	....	....	....
John W. Peale	....	....	....	....	....	3.79	....	....	....
Geo. D. Harris	....	....	....	....	....	3.72	....	....	....
Zone 14 Tons	....	....	....	....	....	....	....	....	....
McCollum	$6.57	$6.57	$6.82	....	....	....	....	....	....
Burns Bros.	6.77	6.77	7.02	....	....	....	....	....	....
J. E. Backus Sons.	7.30	7.30	7.30	....	....	....	....	....	....
Philip Deitz Co.	....	7.55	7.65	....	....	....	....	....	....
Chas. H. Reynolds & Sons	6.47	6.47	6.47	....	....	....	....	....	....
Zone 15									
Olin J. Stephens.	6.58	6.58	6.82	....	....	$3.72	....	....	....
M. L. Bird	6.66	6.66	6.85	....	....	3.83	....	....	....
John S. Conabeer.	6.57	6.57	6.82	....	....	3.56	....	....	....
Burns Bros.	6.57	6.57	6.57	....	....	3.72	....	....	....
T. R. Thorne & Co.	6.24	6.62	6.74	....	....	3.84	....	....	....
Zone 16 Tons	....	....	....	....	....	....	....	....	....
C. D. Norton & Co.	....	....	....	....	....	$3.49	....	$2.65	$3.63

Zoue 16 (Continued)	Egg	Stove	Nut	Broken	Pea	Buckwheat No. 1	Buckwheat No. 2	Buckwheat No. 3	Mine Run
Olin J. Stephens	....	....	....	....	$4.65	3.72	....	....	....
John W. Peale	....	....	....	....	....	3.58	....	....	....
Pattison & Bowns	....	....	....	....	....	....	....	2.64	3.57
Clarksburg Co.	....	....	....	....	....	3.50	....	....	....
T. R. Thorne & Co.	....	....	....	....	4.57	3.64	....	....	....
Wm. Farrell & Sons	....	....	....	....	....	3.50	....	....	....

For the egg, stove, nut and broken requirements in this zone, Stephens bid $6.65 for egg and stove, $6.90 for nut and $6 for broken; Thorne & Co. bid $6.19, $6.49, $6.74 and $5.74, respectively, on the same sizes.

Zone 17—No. 1 buckwheat is required mostly in this zone and bids were as follows:

Tons	9900	5600	500	1800
Joseph Johnson's Sons	$3.35	$3.43	$3.73	$3.35
John W. Peale	....	3.42	3.69	3.33
John E. Donovan	3.39	3.55	3.80	3.39

For the egg, stove and nut coal, Joseph Johnson's Sons bid $7.20 per ton for egg and stove and $7.10 for nut. S. Haber bid $6.89 for egg and stove and $6.95 on the nut.

Zone 18—Bids in this zone were as follows:

Grade	Pea	Pea	Buckwheat No. 3	Buckwheat No. 3	Mine Run
Tons	1760	600	4200	5820	2100
C. D. Norton & Co.	....	....	$1.93	....	$2.90
Pattison & Bowns	....	....	1.88	....	2.92
William Farrell & Sons	$3.73	$3.73	....	$1.97	....
Geo. D. Harris & Co.	3.83	3.88	2.02	....	2.87

Zone 18—continued

Grade	Buck. No. 3	Mine Run	Mine Run	Gas	Buckwheat No. 1	Buckwheat No. 1
Tons	4240	17,255	1060	600	20,300	13,050
C. D. Norton & Co.	....	$2.84	$2.80	$3.26	$2.76	....
Pattison & Bowns	....	....	....	....	2.93	2.99
William Farrell & Son	$1.97	....	....	....	....	....
Geo. D. Harris & Co.	....	2.81	2.85	3.55	....	....
B. Nicoll & Co.	....	2.84	2.89	3.26	....	....
Commercial Coal Co.	....	....	3.40	....	....	....

H. H. Lineaweaver & Co. bid $5.48 on 4200 tons of egg coal, $5.48 on 1250 tons of stove coal and $2.99 on 13,050 tons of buckwheat No. 1. Pattison & Bowns bid $6.18 on 1390 tons of stove coal and Burns Bros. offered to furnish 375 tons each of stove and pea coal for $5.94 and $4.08 respectively.

Zone 19—For furnishing 1575 tons of stove coal and 225 tons of nut coal, John W. Peale bid $6.27 on each and the Commercial Coal Co. $5.67 for the stove and $6.02 for the nut coal. For furnishing egg coal in lots of 10, 15, 20, 30 and 14 tons, the Katonah Lumber, Coal & Feed Co. bid from $7.50 to $8 per ton.

Zone 20—Requirements in this zone are confined almost entirely to bituminous mine-run, bids on which were as follows:

Tons	500	2100	1150	1150	550
B. Nicoll & Co.	$3.90	$3.96	$3.90	$3.84	$3.95
Geo. D. Harris & Co.	3.97	4.04	3.99	3.89	4.04
C. D. Norton & Co.	3.98	4.03	3.98	3.87	3.98
Zone 20 continued—tons	1400	750	5600	2200	2450
N. Nicoll & Co.	$3.79	$3.70	$3.60	$3.85	$3.43
Geo. D. Harris & Co.	3.85	3.79	3.69	3.94	3.52
C. D. Norton & Co.	3.88	3.78	3.65	3.94	3.48
Commercial Coal Co.		4.11		4.29	3.96

For furnishing 400 tons of buckwheat No. 1, John W. Peale bid $4.43 and C. D. Norton & Co. bid $4.12.

The following is a summary of some of the more important bids:

J. W. Peale	$182,475.92	Wm. Farrell & Sons	79,820.28
T. R. Thorne & Co.	36,452.30	J. S. Conabeer	36,843.00
S. Tuttle's Son & Co.	112,397.20	Geo. D. Harris & Co.	325,001.83
Bacon Coal Co.	138,526.96	Clarksburg Coal Min. Co.	28,576.00
M. L. Bird	92,333.06	Pattison & Bowns	122,335.00
Burns Bros.	107,343.82	A. J. & J. J. McCullum	44,111.51
Wm. Brennan	9,317.08	Jos. Johnson Sons	65,403.50
J. F. Schmadeke	107,684.54	B. Nicoll & Co.	184,014.40
C. D. Norton & Co.	387,447.97	Katonah Coal Co.	598.50
T. Haber	2,985.95	H. H. Lineaweaver & Co.	160,750.00
Empire Coal Mining Co.	No Total	O. J. Stephens	62,133.78
Meyer-Denker-Sinram	51,593.26	P. Dietz Coal Co.	9,503.71
Commercial Coal Co.	47,052.67		

Address Contract Clerk, 1226 Municipal Bldg., New York.

+No. 716—Puget Sound, Wash.—Bids on this contract (p. 916), which provides for furnishing the U. S. Government with 100 tons of foundry coke for delivery at Puget Sound, Wash., or f.o.b. works, were as follows: Chicago Junk Co. (Pelton Main coke), $15.40; Debevoise Anderson Co., $2.89; Marshall-Matlack Co., $1.83. Address Paymaster-Gen. of the Navy Samuel McGowan, Bureau of Supplies & Accounts, Washington, D. C.

No. 726—New York—The part of this contract (pp. 916, 955, 1004) relating to supplying 2700 gross tons of egg coal for the fireboats on the North River and New York Harbor is being readvertised. Bids are to be opened at 10:30 a.m., June 21. Address Fire Comr. Robert Adamson, Municipal Bldg., New York City.

+No. 729—Vicksburg, Miss.—Bids on this contract (p. 916), which provides for furnishing the U. S. Engineers of the Third Mississippi River District with 10,000 tons of coal, were as follows:

	West Kentucky Coal Co.			The Monongahela R. Consol. C. & C. Co.				
Places of Delivery and Estimated Quantities	Bid Ton	Bid Gross	Cents per 1,000,-000 B.t.u.	Bid Ton	Bid Gross	Cents per 1,000-000 B.t.u.	Bid Ton	Bid Gross
Mouth of White River, Ark.				Pittsburgh			Cypress Cr.	
	$	$		$	$		$	$
Lump coal, 1200 tons	2.73	3,276	10.7	a3.55	4260	12.7	....	....
Mine-run coal	2.48	2,976	9.7	a3.35	4020	12.4	a2.45	2940
Greenville, Miss.								
Lump coal, 6000 tons	2.85	17,100	11.1	b	....	....	....	....
Mine-run coal	2.60	15,600	10.1	b	....	....	....	....
Vicksburg, Miss.								
Lump coal, 2800 tons	3.23	9,044	12.6	3.50	9800	12.5	....	....
Mine-run coal	2.98	8,344	11.6	3.30	9240	12.2	2.50	7000
Total cost, if all lump coal		29,420						
Total cost, if all mine-run coal		26,920						
For delivery in flats	0.16			c0.20 d0.24			c0.20 d0.24	
For transfer to U.S. boats	0.20			c0.20 d0.24			c0.20 d0.24	
Commercial name of coal	Tradewater.			Youghiogheny.			No. 9	

Location of mine or mines.	Sturgis, Union Co., Ky.		Monongahela R., Pa.			DeKoven, Ky.
B.t.u. per lb. of "dry coal"	13,200.0	Lump	14,200.0	m.r.	13,800.0	12,500.0
% of ash in "dry coal"	9.0	Lump	8.0	m.r.	8.0	13.0
% of sulphur in "dry coal"	2.5	Lump	1.25	m.r.	1.5	3.7
% of volatile matter in "dry coal"	35.0	Lump	34.0	m.r.	33.0	34.0
Moist. in coal "as received"	3.0	Lump	2.0	m.r.	2.5	3.0

a. Price for delivery at Rosedale, Miss., 5 miles below mouth of White River, Ark., as bidder has no representative at latter place.

b. No proposal for delivery at Greenville, Miss.

c. At Rosedale, Miss.
d. At Vicksburg, Miss.
See letter attached to proposal explaining that prices bid "for transfer from barges or flats to and on board. United States boats "include those of preceding item for delivery on flats."

Cypress Creek coal not acceptable under paragraph 23 of the specifications and prices not considered.

Address Maj. Engrs. J. R. Slattery, U. S. Engrs. Office, Vicksburg, Miss.

+No. 740—San Antonio, Tex.—The requirements on this contract (Vol. 7, p. 917), which provides for furnishing the public schools with coal during the fiscal year, 1915-16, are 400 tons of furnace coal and 463 tons of stove. It is estimated that a total of about 900 tons will be required this year. Bids should be submitted on the best grade McAlester domestic lump, commercial lump, and the number of heat units given in each kind. Bids must cover cost of delivery to 34 different buildings. Address Business Agt. Paul. H. Scholz, Bd. of Edu., Prudential Bldg., San Antonio, Texas.

No. 768—Washington, D. C.—Bids on this contract (p. 956), which provides for furnishing 4000 tons of bituminous coal for the Government Engineers, have been received as follows:

Bidder	Price	Coal	Location	Coal Bed or Vein	B.t.u.
H. H. Marlow	$2.99	Jenner	Somerset Co., Pa.	Upper Kittanning	14,100
J. P. Agnew Co.	2.92	Jenner	Somerset Co., Pa.	Upper Kittanning	14,100
Commercial Coal Co., "A"	3.15	White Oak New River	Raleigh and Fayette Counties, W. Va.	Sewell Seam	14,850
Commercial Coal Co. "B"	3.04	Randolph Anchor No. 2	Randolph, Somerset Co., Pa.	C.	14,300
J. Maury Dove Co. "A"	2.893	Jenner	Somerset Co., Pa.	Upper Kittanning	14,100
J. Maury Dove Co. "B"	3.001	Tyson	Lonaconing, Pa.	Upper Sewickley	14,400
Orenda Coal Co.	3.05	Orenda	Boswell, Pa.	C.	14,300

+No. 751—Washington, D. C.—The anthracite bids received on this contract (p. 917), which provides for furnishing the Navy Department with coal (schedule 8288 Steam Engineering) during the fiscal year beginning June 30, were as follows: Cream Bros., 150 tons of broken, $5.35; 100 tons of stove, $6.89. J Maury Dove Co., 3000 tons of egg, $5.62; 150 tons of stove, $6.86; 300 tons of egg, $5.64; 500 tons of pea, $4.09. John C. Hancock & Co., 100 tons of stove, $6.70; 2000 tons of buckwheat, $4.50; 2000 tons of rice, $3. James H. Hill, 3000 tons of egg, $5.99; 300 tons of broken, $5.90; 150 tons of stove, $6.86. Lynah & Read, Inc., 3000 tons of egg, $5.59; 150 tons of stove, $6.30; 300 tons of egg, $5.70; 500 tons of pea, $4.10. Nottingham & Wrenn Co., 3000 tons of egg, $5.75; 150 tons of stove, $6.35; 300 tons of egg, $5.80; 500 tons of pea, $4.70; 300 tons of broken, $5.65. Marshall-Matlack Co., 150 tons of broken, $5.18; 3000 tons of egg, $4.25. William Nungasser, 250 tons of pea, $4.65. Geo. B. Newton Coal Co., 150 tons of broken, $5.78; 100 tons of stove, $6.88; 2000 tons of semibituminous, $3.60; 2000 tons of pea, $4.37; 2000 tons of buckwheat, $2.95; 2000 tons of rice, $2.45; 2000 tons of barley, $2.35. J. W. Peale, 2000 tons of pea, $3.95 until Oct. 31 and $4.30 thereafter; 2000 tons of broken, $5.57. Philadelphia & Reading Coal & Iron Co., 3000 tons of egg, $5.69; 150 tons of stove, $6.36; 300 tons of egg, $5.69; 500 tons of pea, $4.16. E. B. Townsend Coal Co., 100 tons of stove, $6.90; 150 tons stove, $6.99; 325 tons of egg, $6.90. Seymour Coal Co., 2000 tons of pea, $4.07½. Weston, Dodson Co., 2000 tons of pea, $4.19; 3000 tons of egg, $5.45; 150 tons of stove, $7; 300 tons of egg, $5.55; 500 tons of pea, $4.09. Wellington-Wild Coal Co., 100 tons of stove, $7.10; 325 tons of egg, $7.10. Whitney & Kemmerer Co., 250 tons of pea, $4.15; 2000 tons of semi-bituminous, $3.58. Address Paymaster Gen. U. S. Navy Samuel McGowan, Washington, D. C.

No. 802—Boston, Mass.—This contract (p. 1005), which provides for furnishing the Bay State Street Ry. Co. with 155,000 tons of high-grade steam coal, has not yet been closed, although bids were asked for early in June. Deliveries are at various points, but mostly on tidewater at such places as Beverly, Chelsea, Lynn, Quincy Point, Mass., and Newport and Portsmouth, R. I. Several shippers are actively competing for this order and it will be a matter of great interest to the trade to see whether it is awarded on Southern coals or on grades from Pennsylvania; there is an impression it will probably be divided between the two. This contract will give a further line on a rather mixed market at an interesting stage. Shipments will be made by water at most of the plants. About 4000 tons of the requirements are anthracite. Shipments are to be made as required on monthly notice. Address A. P. Emmons, Bay State Ry. Co., 84 State St., Boston, Mass.

No. 839—Hoboken, N. J.—The requirements on this contract (p. 1049), which provides for furnishing the local Board of Education with coal during the ensuing year, are about as follows, the prices given being those at which the contract for the past year was filled: 900 tons egg coal, $5.36; 250 tons stove coal, $5.36; 300 tons nut coal, $5.61. Address Business Mgr. R. A. Marnell, Bd. of Edu., Hoboken, N. J.

New Business

No. 850—Skowhegan, Maine—The Somerset Worsted Mills at this place usually contracts for its coal requirements during the current month. About 14 tons per week are required and deliveries are made by water, railroad and team. Georges Creek coal is being used at present, and the company has a storage capacity of 150 tons. Address Pur. Agt. Ralph Gledhill, R. F. D. No. 4, Skowhegan, Maine.

No. 851—Kingston, Ontario, Can.—The School of Mines at this place is requesting bids for 2000 tons of slack coal, the ash content of which must not exceed 15%. Delivery is to be made on dock at Kingston before Sept. 1. Address School of Mines, Kingston, Ontario, Can.

+No. 852—Canal Dover, Ohio—The Public Service Department at this place will be in the market some time in July for from 1500 to 1700 tons of bituminous mine-run coal. The business is let on competitive bids and usually goes at about $1.60 at the plant. Address Dir. Osmond Salmon, Pub. Service Com., Canal Dover, Ohio.

+No. 853—Boise, Idaho—The Idaho State Board of Education will receive bids until June 21 for furnishing approximately 4500 tons of coal during the next school year. Specifications may be had on application, and bids should cover cost of delivery in the bins of the Idaho state educational institutions. Address Auditor and Bus. Agt. Ralph T. Bickell, State Bd. of Edu., Boise, Idaho.

+No. 854—Tompkinsville, N. Y.—Sealed proposals will be received at the office of the Lighthouse Inspector, Tompkinsville, N. Y., for furnishing bituminous and anthracite coal at New York, New London, Conn., and Newport, R. I. Additional information may be obtained on application. Address Lighthouse Inspector, Tompkinsville, N. Y.

+No. 855—Wilmington, N. C.—Sealed proposals will be received at the office of the United States Engineer, Wilmington, N. C., until June 28, for furnishing about 13,000 tons of bituminous coal. Further information may be had on application. Address U. S. Engineer, Wilmington, N. C.

+No. 856—Kansas City—The Board of Education at this place will be in the market about July 1 for their annual requirement of coal. About 2800 or 2900 tons of semianthracite is used, which is usually bought at $5.34 per ton, and 3900 tons of bituminous at $3.74 per ton. The business is let on competitive bids, which are requested by circular letter to all dealers. Address Board of Education, Kansas City, Mo.

No. 857—Fairport, N. Y.—The Sanitary Can Co. at this place is requesting bids for 1000 tons of buckwheat, and 1000 tons of slack coal for its plant at Fairport, N. Y. Address Pur. Agt. Sanitary Can Co., Fairport, N. Y.

+No. 858—Middletown, Ohio—The local Board of Education will receive bids until 7 p.m., June 25, for furnishing approximately 800 tons of mine-run coal, which will run 60% lump or better. The coal must be equal to or better than Chesapeake, Red Jacket, Thacker, Raymond City, Majestic, Winifrede, Acme, Island Creek or Eureka Block. Bids should cover cost of delivery to the various buildings as required. All proposals must be accompanied by a certified check for $150. Address C. W. Denny, Supply Com., Bd. of Edu., Middletown, Ohio.

+No. 859—Syracuse, N. Y.—The Board of Contract and Supply will be in the market on July 1 for about 7000 tons of anthracite coal, the business going usually on about the following basis: Grate, $5.17; egg, $5.41; stove, $5.71; pea, $4.20; buckwheat, $3.24. The call for bids is advertised, and the business let on a competitive basis. Address Board of Contract and Supplies, Syracuse, N. Y.

+No. 860—Louisville, Ky.—Bids will be received until about the middle of August for supplying practically all of the city institutions with coal during the ensuing year. The current contract, which expires Aug. 31, is held by a number of coal companies, the Atlas Coal Co. having the contract for the City Hospital and Bryne & Speed the Workhouse. On the new contract the supplies for the Home for the Aged and Infirm and the Eruptive Hospital are to be quoted for delivery by rail. Address Asst. City Buyer J. E. Bean, Lousville, Ky.

+No. 861—Newberry, Mich.—Bids will be received at the Newberry State Hospital until 1 p.m., June 28, for furnishing approximately 6000 tons of bituminous and semibituminous coal as required during the ensuing year. Proposals and blank forms may be obtained on application. Address Secy. Dr. E. H. Campbell, Newberry State Hospital, Newberry, Mich.

+No. 862—Burlington, Iowa—Sealed bids will be received until 2 p.m., June 21, for furnishing Des Moines county with coal during the year beginning July 1. Bids are requested on lump coal and should be made f.o.b. West Burlington in carload lots, delivered at County Jail, and also delivered to the poor in ton and half-ton lots. Address County Auditor, F. W. Parrott, Burlington, Iowa.

+No. 863—Galesburg, Ill.—The Board of Education at this place will be in the market some time during July for approximately 2200 tons of lump coal and screenings for use at the school. The screenings are usually bought at $2.25 per ton and the lump coal at $2.69. The call for bids is advertised. Address Board of Education, Library Bldg., Galesburg, Ill.

+No. 864—Indianapolis, Ind.—The Board of Public Safety of this place will receive bids until June 23 for furnishing the coal requirements of the police headquarters and substations, and the same for the fire department. Various kinds of coal are used, including Pocahontas lump and mine-run, Kanawha lump, and Pittsburgh lump, all classes of anthracite, cannel, Indiana egg and nut, and some charcoal. The contract amounts to about $5000 a year. The coal is to be delivered as required at the various stations. Address Board of Public Safety, Indianapolis, Ind.

+No. 865—West Newton, Mass.—Sealed proposals will be received until 2:30 p.m., June 14, for furnishing the city with its fuel requirements, including the School, Street, Fire, Police, Charity and Library Departments. Proposals must be made out on blank forms, which may be obtained on application, and must be accompanied by a certified check for $200. A bond guaranteeing the faithful performance of the contract to the amount of $2000 will be required. Address Pub. Bldg. Comr. Walter R. Forbush, City Hall, West Newton, Mass.

+No. 866—Cleveland, Ohio—The Water-Works Department will have blank forms and specifications ready Sept. 15 on which to submit bids covering their coal requirements during the year beginning Sept. 30. This is the largest annual contract let in this city; it amounts to about $90,000 a year. The contract will be let on Oct. 1. Address City Purch. Agt., Water-Works Dept., Cleveland, Ohio.

+No. 867—Columbus, Ga.—The City Government at this place will be in the market some time during July for about 200 tons of coal for use of the City Fire Department and the Court House. Cahaba red ash coal is ordinarily used, which costs about $3.90 per ton delivered at the Court House. The business is let on competitive bids. Address City Clk. M. M. Moore, Columbus, Ga.

No. 868—Cincinnati, Ohio—City purchasing agent will receive bids until noon June 21 for furnishing the various city institutions with approximately 20,000 tons of coal during the ensuing year. Complete details, including specifications and proposal forms, may be obtained on application. Address City Purch. Agt. Ernst von Bargen, City Hall, Cincinnati, Ohio.

No. 869—Washington, Penn.—Board of Education will receive bids until 7:30 p.m. July 8 for furnishing their coal requirements during the ensuing year, involving approximately 20,000 bu. of 1¼ in. bituminous and 5000 bu. of slack. Separate proposals are also requested for delivery of the coal to the various school buildings. Address Secretary R. W. Mason, Board of Education, Washington, Penn.

✚**No. 870—Peoria, Ill.**—The Board of Education at this place will be in the market some time during July for about 5000 tons of bituminous (Springfield) lump coal, which is usually bought at $2.17 per ton. The call for bids is advertised. Address Board of School Inspectors, 203 City Hall, Peoria, Ill.

No. 871—Chicago, Ill.—The Atwood & Steele Co. at this place will probably be in the market some time during next month for two cars of Pocahontas mine-run coal. Address the Purchasing Agent, Atwood & Steele Co., Chicago, Ill.

✚**No. 872—Danbury, Conn.**—The Board of Education will be in the market some time during July for 650 tons of anthracite coal. The cost is usually $7 per ton delivered in bin. The call for bids is advertised. Address Secretary, Committee on Finance and Supplies, Board of Education, 81 West St., Danbury, Conn.

✚**No. 873—Springfield, Mo.**—The Board of Education here will be in the market some time in July for approximately 1400 tons of screened Kansas lump coal. The usual price is about $3.55 per ton. The business is let on competitive bids and the call for bids is advertised. Address Board of Education, Springfield, Mo.

✚**No. 874—Lima, Ohio**—The Board of Education here will contract some time in July for between 400 and 500 tons of white ash mine-run coal. The business is usually let at about $3.10 per ton. Address Purchasing Agent, Board of Education, 118 N. West St., Lima, Ohio.

✚**No. 875—Idaho Springs, Colo.**—The Boston-Colorado Power & Water Co. will be in the market some time in July for approximately 3500 tons of slack coal which is usually bought at about $2.50 per ton. It is stated that the business is not done on competitive bids. Address Purchasing Agent, Boston-Colorado Power & Water Co., Idaho Springs, Colo.

✚**No. 876—New Albany, Ind.**—The School Board at this place will be in the market some time next month for approximately 700 tons of mine-run coal which is usually bought at about $3 per ton. The business is done on competitive bids, which are invited by circulars to the local dealers. Address Board of School Trustees, Spring St., New Albany, Ind.

✚**No. 877—Miamisburg, Ohio**—The local Power Department will be in the market some time in July for approximately 2500 tons of West Virginia coal, which is usually bought at $2.15 per ton on track. The business is done on a competitive basis. Address Frank DeWitt, Water Works Dept., Miamisburg, Ohio.

No. 878—Marianna, Ark.—The Marianna Electric Co. at this place will be in the market some time in July for 1500 tons of pea and slack coal which is usually bought for about $2.50 per ton. The business is done on a competitive basis. Address Mgr. J. B. Campbell, Marianna Electric Co., Marianna, Ark.

✚**No. 879—Peabody, Mass.**—The Electric Light Department at this place will be in the market during July for approximately 3200 tons of Pocahontas coal which is usually bought at about $4.47 per ton delivered in front of the boiler. The coal is bought on competitive bids. Address Mgr. Warren D. King, Peabody Electric Light Dept., Peabody, Mass.

✚**No. 880—Carthage, Mo.**—The Carthage Water and Electric plant will be in the market some time during July for approximately 5400 tons of Cherokee slack which is usually bought at about $1.90 per ton delivered in the bin. The business is done on a competitive basis. Address Supt. A. P. Knowles, Carthage Water and Electric Plant, Carthage, Mo.

✚**No. 881—Battle Creek, Mich.**—The Board of Education at this place received bids until noon of June 16 for furnishing 2000 tons of Pocahontas mine-run, 200 tons Massillon domestic lump and 200 tons of anthracite furnace coal. A certified check for $250 was required with all bids and a bond not to exceed $3000 must be furnished by the successful bidder. Bids are to cover cost of delivery in the bins at the various school buildings. Approximately 700 tons of coal may be delivered before Sept. 1. No bids will be accepted on coal running less than 14,800 B.t.u. and analysis must in all cases accompany each bid. Address Secy. F. A. Allwardt, Bd. of Edu. Battle Creek, Mich.

✚**No. 882—Tracy, Minn.**—The Board of Education at this place received bids until 8 p.m., June 17, for 300 tons of screened Youghiogheny lump coal, to be delivered at the various school buildings as required during the period from July 1 of the current year until June 1, 1916. Address Clk. C. C. Richard, Bd. of Edu., Tracy, Minn.

✚**No. 883—Trenton, N. J.**—Bids will be received until 7:30 p.m., June 22, for furnishing and delivering 400 gross tons of anthracite pea and 25 tons of stove coal to the Court House, as may be required. Address Chn. John J. McCartan, Trenton, N. J.

✚**No. 884—Ottawa, Can.**—The city clerk at this place received bids until June 10 for furnishing 250 tons of the best quality of anthracite egg coal to be delivered at the County Jail and Court House. Address County Clk. Chas. MacNab, Ottawa, Can.

✚**No. 885—Detroit, Mich.**—Sealed proposals will be received at the office of the Lighthouse Inspector for furnishing fuel for lighthouse vessels, during the fiscal year ending June 30, 1916. Blank proposals and particulars may be obtained on application. Address Lighthouse Inspector, Detroit, Mich.

✚**No. 886—Manchester, Ohio**—The B. P. Stone Electric Light Plant at this place may contract at any time for their annual requirements of coal involving about 700 tons of mine-run. The usual price is about $2.10 per ton delivered, and the coal is subjected to tests before purchasing. Address B. P. Stone, Electric Light Plant, Manchester, Ohio.

✚**No. 887—Binghamton, N. Y.**—The City Government at this place will contract some time during the summer for approximately 2000 tons of anthracite and bituminous coal. The call for bids is advertised. A contract is always made by the Department of Public Works, and purchases in the open market are occasionally made by the Board of Education. Address Department of Public Works, Binghamton, N. Y.

No. 888—Fairbury, Neb.—The G. D. Meyers Water & Light Co. of this place usually contracts some time in the spring for about 2000 tons of Weir nut coal at approximately $2.95 per ton, delivered in the bin. The business is let on a competitive basis. Address G. D. Meyers Water & Light Commission, Fairbury, Neb.

No. 889—North Billerica, Mass.—The Talbot Mills at this place consumes about 3000 to 3500 tons of coal per annum. Consumption is at the rate of 100 tons per day during certain periods and deliveries are made by railroad and wagon. The company has a storage capacity of 2000 tons and when not confining purchases to the open market, they contract in June or July. Address Treas. Thomas T. Clark, Talbot Mills, North Billerica, Mass.

✚**No. 890—Aurora, Ind.**—The Indiana Public Service Co. at this place consumes about 3000 tons of Pittsburgh nut and slack coal per annum. It is understood that the business is not let on competitive bids, and the price is usually about $2.06 per ton. Address C. B. Harring, Indiana Public Service Co., Aurora, Ind.

No. 891—Comanche, Tex.—The Comanche Light & Power Co. consumes approximately 1350 tons of Texas lignite per annum, which is usually bought at $1.75 per ton. The business is done on competitive bids but no particular time is specified for contracting. Address Mgr. E. W. Harris, Comanche Light & Power Co., Comanche, Tex.

✚**No. 892—Jacksonville, Fla.**—Sealed proposals will be received at the office of the U. S. Engineers at this place, until June 28, for furnishing 4000 tons of coal. Bids will also be received until June 30, for furnishing an additional 3000 tons of coal. Complete details and full information may be obtained on application. Address U. S. Engineer's Office, Jacksonville, Fla.

✚**No. 893—Milwaukee, Wis.**—Sealed proposals will be received at the office of the Lighthouse Inspector at this place for furnishing fuel. Complete details may be had on application. Address Lighthouse Inspector, Milwaukee, Wis.

✚**No. 894—Richmond, Ind.**—The Board of Public Safety at this place will receive bids until July 1 for furnishing coal of various kinds. The total contract will probably amount to more than $10,000. Address Pres. Alfred Davis, Bd. of Pub. Safety, Richmond, Ind.

✚**No. 895—Monticello, Ind.**—The County Commissioners at this place will receive bids until July 6 for furnishing the coal supply for the court house, jail and country asylum. Address Audr. A. G. Fisher, Bd. of County Comrs., Monticello, Ind.

✚**No. 896—Indianapolis, Ind.**—The Board of Trustees of the Indiana Women's Prison will receive bids until July 1 for furnishing 1500 tons of coal, to be delivered between Oct. 1, 1915, and Sept. 30, 1916. The bid must be accompanied by analysis, showing the ash and B.t.u. Smokeless will be given preference, other conditions being equal. The coal will be paid for on the basis of the price named, corrected for variation in heating value and ash as shown by analysis. A certified check for $500 must accompany each bid. Address Board of Trustees, Indiana Woman's Prison, Indianapolis, Ind.

+No. 897—Lyndhurst, N. J.—The Board of Education of this place will receive bids until 8:15 p.m., June 24, for furnishing about 90 tons of egg and 250 tons of pea coal to the local schools, deliveries to be made as required. Address District Clk. William J. Liston, Bd. of Edu., Lyndhurst, N. J.

+No. 898—Ann Arbor, Mich.—Bids were received until 5 p.m., June 17, for furnishing the local City Government with 60 tons of egg coal for immediate delivery at the City Hall bins, 40 tons of nut coal to be delivered as required at the Engine House, one carload of Virginia splint coal, and one carload of chestnut coke to be delivered at city yards. Address City Clk. Ross Granger, Ann Arbor, Mich.

No. 899—Plymouth, Mass.—The Standish Worsted Co. at this place usually contracts about June 1 for its annual requirements of coal, amounting to approximately 1500 tons of bituminous. Deliveries are made by wagon at the rate of about five tons per day, the storage capacity being limited to only 20 tons. Address Pres. E. H. Dorr, the Standish Worsted Co., Billington St., Plymouth, Mass.

+No. 900—Liberty, Ind.—The local Municipal Government will receive bids until June 24 for furnishing three cars of Island Creek mine-run coal. Address Town Clk. R. M. Duvall, Liberty, Ind.

No. 901—Crafton, Penn.—Sealed proposals will be received until noon, June 21, for furnishing the local schools with the best Panhandle lump, nut and slack coal during the school year beginning July 5. Address Secy. L. F. Wentz, 425 Fourth Ave., Pittsburgh, Penn.

+No. 902—St. Bernard, Ohio—The Director of Public Service at this place will receive bids until noon, June 21, for furnishing 3600 tons of coal for use at the Water Works and Electric Light Plant during the year beginning July 1. Quotations should be made f.o.b. side track in the rear of the Electric Light plant. Bids should be for straight nut and slack coal and on the basis of short tons. A certified check for $100 must accompany all bids and a satisfactory bond guaranteeing the fulfillment of the contract will be required. Address Secy. Harry Vanden Eynden, Public Service, City Hall, St. Bernard, Ohio.

+No. 903—Charleston, S. C.—The Board of Education at this place will receive bids until noon, June 30, for furnishing the public schools with 100 tons red ash stove and 45 tons Pocahontas coal during the ensuing year. Address Supt. A. B. Rhett, Bd. of Edu., Charleston, S. C.

+No. 904—Uniontown, Penn.—The Board of Education at this place will receive bids until 5 p.m., June 25, for furnishing the school buildings with their coal and coke requirements during the ensuing year. Address C. L. Davidson, Schools District of Uniontown Borough, Uniontown, Penn.

Awards

+No. 258—Albany, N. Y.—The awards on this contract (p. 447), which provides for furnishing the fuel requirements of the state prisons, were as follows:

Institution	Location	Awarded to	Price
State Prison for Women	Auburn	Empire Coal Mining Co.	$1,247.00
State Prison for Women	Auburn	A. Larner & Sons	237.00
Auburn Prison	Auburn	A. Larner & Sons	663.60
Great Meadow Prison	Comstock	Geo. D. Harris Co.	19,893.60
Great Meadow Prison	Comstock	Dock & Coal Co.	1,184.06
Clinton Prison	Dannemora	Dock & Coal Co.	19,195.60
Dannemora State Hospital	Dannemora	Geo. D. Harris Co.	400.00
Dannemora State Hospital	Dannemora	A. Larner & Sons	7,986.00
Matteawan State Hospital	Beacon	A. Larner & Sons	1,499.00
Matteawan State Hospital	Beacon	Emmons Coal Mining Co.	10,430.00

Address Purchasing Committee, Rooms 602 and 603, Capitol, Albany, N. Y.

+No. 342—Albany, N. Y.—This contract (p. 528), which provides for furnishing the fuel requirements of the various state charitable institutions, has been awarded as follows, all awards being given with the exception of those amounting to less than 100 tons: BITUMINOUS—**Marine Coal Corp.**, 1800 tons at $2.88; 1200 tons at $2.49; 1400 tons at $2.34; 2500 tons at $2.53. **Dexter & Carpenter,** 2000 tons at $3.65; 3000 tons at $3.05; 1300 tons at $3.45; 2300 tons at $4.15. **Renshaw & Co.,** 6000 tons at $2.49; 4000 tons at $2.79. **C. L. Amos Coal Co.,** 375 tons at $2.59. The **New Central Coal Co.,** 400 tons of gas coal at $3.30. **B. Nicoll & Co.,** 900 tons of slack coal at $2.74. **Dawson Coal Co.,** 500 tons of mine-run at $3.65. **A. Larner & Son** (chestnut), 140 tons at $5.55; 350 tons at $6.10; 125 tons at $5.35; 455 tons at $5.70; 1500 tons at $5.60; 100 tons at $5.70; (stove) 400 tons at $5.45; 690 tons at $5.85; 225 tons at $5.30; 150 tons at $6.25; 350 tons at $5.30; (pea) 700 tons at $4.27; (buckwheat) 5500 tons at $3.27. **John W. Peale** (buckwheat No. 3), 10,000 tons at $2.22; 3000 tons at $1.90; 1640 tons at $3.19; (egg) 125 tons at $5.05; 900 tons at $5.30. **New York & New England Coal Co.,** (stove) 125 tons at $5; 1720 tons at $5.35; 150 tons at $5; 500 tons at $3.65; 300 tons at $4.95; (chestnut) 500 tons at $5.20. **Wm. Farrell & Son (stove) 100 tons at** $5.25. **Weston Dodson & Co.,** (pea) 300 tons at $3.70; 3200 tons at $4.03. Address Purchasing Committee, Rooms 602 and 603, Capitol, Albany, N. Y.

+No. 508—Philadelphia, Penn.—This contract (pp. 665, 955), which provides for furnishing the local Board of Education with its fuel supply, has been awarded. Awards vary somewhat according to the district but a rough average is: Egg, $5.48; stove, $5.89; nut, $5.84; pea, straight, $3.54; pea on an analysis basis, $3.69. It is understood so far that about 90% of the business has been awarded to the **George B. Newton Coal Co.,** and most of the remainder to **J. A. Gerety.** Other successful bidders were **C. S. Sales, Hare & Son, J. W. Mathers & Co.** A small tonnage of bituminous was awarded at $3.44. Address Supt. of Supplies A. F. Hammond, Room 392, City Hall, Philadelphia, Penn.

+No. 543—Toronto, Can.—This contract (p. 708), which provides for furnishing the Toronto Board of Education with a year's supply of coal has been awarded as follows: **P. Burns & Co.,** Pocahontas lump at $6.60; mine-run screened, $6.35; standard mine-run, $5.85. **Connell Co.,** anthracite, grate, $5.90; egg, stove and nut, $6. The contract for smokeless bituminous, screened at the mine was divided equally between these two companies at $5 per ton. Address Clk. of Supplies Wm. Kerr, Bd. of Edu., Toronto, Can.

+No. 549—St. James, Mo.—This contract (p. 709), which provides for furnishing the Federal Soldiers' Home with 40 carloads of coal during the next year, has been awarded to the **Rutledge & Taylor Coal Co.** The contract was awarded on 6x3-in. egg and 2x3-in. nut. Address Supt. J. P. Brinegar, Federal Soldiers' Home, St. James, Mo.

No. 585—Washington, D. C.—Awards have been made on this contract (pp. 749, 875, General Supply Schedule No. 14), which provides for furnishing coal for the various Government buildings in the District of Columbia, for the fiscal year 1916, as follows:

Location	Awarded to	Coal	B.t.u.	Price
Bur. of Engraving & Print.	J. Maury Dove Co.	New River	14,600	$3.08
Treasury Building	J. Maury Dove Co.	New River	14,800	3.65
Winder Building	L. E. White Coal Co.	New River	14,950	3.80
Propagating Gardens	L. E. White Coal Co.	New River	14,950	3.58
Freedman's Hospital	J. Maury Dove Co.	Tyson	14,400	3.43
General Land Office	J. Maury Dove Co.	Tyson	14,400	3.43
Agricultural Bldg.	J. Maury Dove Co.	Star	14,500	3.26
National Zoo. Park	J. Edward Chapman	Jenner	13,950	3.70
New Museum Bldg.	L. E. White Coal Co.	New River	14,900	3.42
Soldiers' Home	C. W. Hendley & Co.	George's Cr'k	14,500	3.42
State, War & Navy Bldg.	Commercial Coal Co.	New River	14,600	3.54
State, War & Navy Bldg.	Commercial Coal Co.	Packer	12,000	3.49
Gov. Printing Office	J. Edward Chapman	Phila. & Read.	12,160	4.44
Post-Office Bldg.	L. E. White Coal Co.	Mammoth	12,700	4.80
Post-Office Annex	L. E. White Coal Co.	Mammoth	12,700	4.65
Dept. of Commerce	L. E. White Coal Co.	Mammoth	12,700	4.75
Treasury Bldg.	W. W. Griffith	Phila. & Read.	11,800	3.47
Naval Observatory	J. Maury Dove Co.	George's Cr'k	14,150	3.98
Mills Building	Commercial Coal Co.	Packer	12,500	4.67

+No. 646—Atlanta, Ga.—This contract (p. 835), which provides for furnishing the City Government with fuel requirement during the ensuing year, has been awarded as follows: **R. O. Campbell Coal Co.,** screened mine-run for delivery at different stations, $3.60. **Randall Bros.,** straight mine-run, $3.05 to $3.27. **Atlantic Ice & Coal Corp.,** for delivery at the Grady Hospital, $2.95, and for delivery at the prison, $3.05. The gross amount contracted for totaled 8490 tons. Address Pur. Agt. W. E. Chambers, City Hall, Atlanta, Ga.

+No. 664—Washington, D. C.—The portion of this contract (pp. 836, 953, 954), which provides for furnishing the U. S. Navy with 25,000 tons of coal for delivery at Indian Head, Md. (schedule 8079, Class 10), has been awarded to the **Consolidated Coal Co.** at $3.20 per ton. A B.t.u. value of 14,533 is guaranteed. Address Paymaster Gen. of the Navy Samuel McGowan, Washington, D. C.

+No. 699—National Soldiers' Home, Me.—This contract (p. 877), which provides for furnishing bituminous and anthracite coal has been awarded as follows: **Randall & McAllister,** Portland, Me., anthracite egg and range size, $5.72 per ton; bituminous, **Gorman-Leonard Coal Co.,** Boston, Mass., $3.69 per ton. Address Maj. F. L. Appleton, National Soldiers Home, Me.

+No. 713—Cincinnati, Ohio—This contract (p. 916), which provides for furnishing the city with coal has been awarded to the **Reliance Coal & Coke Co.** at the following prices: Court House, $2.89; Armory Building, $2.84; Memorial Hall, $2.84. Address Clk. of County Comrs. Albert Reinhardt, Bd. of County Comrs., Cincinnati, Ohio.

No. 723 Boston, Mass.—Bids have been received on this contract (p. 916) as follows per gross ton: **Metropolitan Coal Co.** (for delivery at Boston), anthracite, $6.70; bituminous, $4.23. **David Duncan & Son Corp.** (for delivery at New Bedford), anthracite, $7.14; **E. B. Townsend Coal Co.** (for delivery at New Bedford), bituminous, $4.28. Address Lighthouse Inspector **R. H. Goddard,** 19 Congress St., Boston, Mass.

+No. 726—New York—This contract (pp. 916, 955, 1004), which provides for furnishing the boats of the Fire Department with coal for the period ending Apr. 1 have been awarded as follows: Fire boats on East River, **Bacon Coal Co.**, at $8395. Fireboats on Harlem River, **Meyer-Denker-Sinram Co.**, $6865.50. On boats berthed in North River and N. Y. Harbor the award has been deferred. Address Chief of Bureau of Repairs & Supplies, J. R. Keefe, Fire Dept., Municipal Bldg., N. Y. City.

No. 748—Detroit, Mich.—This contract (p. 917), which provides for furnishing the Department of Parks and Boulevards with coal during the ensuing year, has been awarded to the **P. Koenig Coal Co.** on the following basis: Bituminous lump, $2.85; smokeless, $3.82; nut, pea and slack, $2.42; mine-run, $3.25; sizes, $7. Address Secy. H. W. Bush, Dept. of Parks and Boulevards, 201 City Hall, Detroit, Mich.

+No. 753—Irvington, N. J.—This contract (pp. 917, 1048) has been awarded to **Littlefield Bros., N. Drake, J. H. Donovan, Irvington & Hilton Coal Co.,** and **Woolley & Blorieus Coal Co.** Address Secy. Wm. A. Sherman, Bd. of Edu., Irvington, N. J.

No. 781—Seattle, Wash.—This contract (p. 956), which provides for furnishing the U. S. Army with 158,500 lb. of the best quality Cumberland coal for delivery at various army posts in the Northwest and Alaska, has been awarded to the **Cumberland Coal Co.** at 70c. per hundred f.o.b. Seattle. Address Col. George B. Davis, Depot Quartermaster's Office, U. S. Army, 3122 Arcade Bldg., Seattle, Wash.

+No. 783—Indianapolis, Ind.—This contract (p. 1005), which provides for furnishing the fuel requirements for the Central Indiana Hospital for Insane, has been awarded to **A. B. Meyer & Co.** Address Secy. L. Ert. Slack, Central Indiana Hospital for Insane, Indianapolis, Ind.

+No. 798—Iowa Falls, Iowa—This contract (p. 1005), which provides for furnishing the local Board of Education with approximately 200 tons of Brazil block lump coal, has been awarded to **Z. K. Hoag** at $4.70. Address Secy. T. E. Bell, Bd. of Edu., Iowa Falls, Iowa.

+No. 804—Newcomerstown, Ohio—This contract (p. 1005), which provides for furnishing the local Board of Education with about 5000 bu. of coal has been awarded to **Hiram Loos** on the basis of $1.50 per ton of mine-run coal, delivered. There were seven bidders on the contract. Address Clk. H. H. Eagon, Bd. of Edu., Newcomerstown, Ohio.

+No. 809—Colfax, Wash.—This contract (p. 1006), which provides for furnishing the Whitman County Government with coal, has been awarded to the **Standard Lumber Co.**, at from $7.45 to $7.95 per ton. Address County Audr. A. R. Metz, Colfax, Wash.

+No. 836—Trenton, N. J.—This contract (p. 1049) has been awarded to **Robert W. Kennedy** at $2126.90. Other bids on this contract were: Phil J. Campbell, $2153.50; the Tattersall Co., $2139; Wilson & Stokes, $2148; J. E. Stevenson Co., $2136.70. Address Clk. E. F. Lamson, State Bd. of Edu., Trenton, N. J.

Contract Notes

Lowell, Mass.—The United States Bunting Co. at this place consumes about 5000 tons of New River coal per year.

Hope Valley, R. I.—The Mystic Woolen Co. consumes about 900 tons of steam coal per year. Deliveries are made by rail.

Union City, Ind.—The S. J. Patterson Co. at this place received the contract for furnishing coal for the water-works plant.

Sheboygan, Wis.—The local Board of Education uses about 900 tons of anthracite and Hocking coal a year. The call for bids is advertised and the business let to the lowest bidder.

Du Quoin, Ill.—The Du Quoin Utility Co. consumes from 10,000 to 12,000 tons of screenings per year which cost from 40c. to $1.10 per ton. The coal is purchased in the open market entirely.

Dexter, Me.—Amos Abbott Co. at this place consumes about 1500 tons of bituminous coal per year. They have a storage capacity of 600 tons and deliveries are made by water and railroad.

Weehawken, N. J.—The Board of Education of this place has awarded the contract for supplying the local schools with egg coal during the ensuing year to the **Consumers' Coal Co.**, at $5.49 per ton.

Redfield, S. D.—The Municipal Light Plant at this place consumes approximately 1000 tons of Elkhorn screenings per annum which is bought at about $5.10 per ton. The business is done on competitive bids but there are no contracts.

Alpena, Mich.—The Alpena Water & Light Department consumes from 1800 to 2000 tons of slack coal per year which usually costs about $2 per ton. The city buys exclusively in the open market. Address Supt. Allwin C. Calkins, Alpena, Mich.

Fremont, Neb.—The City Water & Light Department purchases about 8000 tons of South Kansas screenings per year at from $2.25 to $3.35 per ton. The coal is bought in the open market and is not open to competition. Address Comr. L. D. Wright, City Water & Light Dept., Fremont, Neb.

Buffalo, N. Y.—Supt. C. L. Hyde, of the J. N. Adam Memorial Hospital, reports to the Common Council that the lowest responsible bid for bituminous three-quarter, f.o.b. cars at Perrysburg, N. Y., is $2.20 net, by the Punxsutawney Coal Mining Co. of Buffalo, and recommends that a contract be made.

Wahoo, Neb.—The Wahoo Municipal Light & Water Department consumes about 1800 tons of Kansas slack per year which usually costs about $3.02 in the bin. The coal is bought in the open market but not on competitive bids. Address Supt. H. M. Robertson, Wahoo Municipal Light & Water Dept., Wahoo, Neb.

Los Animas, Colo.—The bids on the contract for furnishing the Naval Hospital at this place with coal were as follows: Five thousand tons of mine-run steaming coal: Cedar Hill Coal & Coke Co., $3.80; Joseph Chilberg, $2.75 or $1.50 f.o.b. Morley; Swastika Fuel Co., $2.80. Six hundred tons, Cañon City lump: Cedar Hill Coal & Coke Co., $5.05; Joseph Chilberg, $5.10 or $2.75 f.o.b. mine.

Knighstown, Ind.—The Ohio & Kentucky Coal Co. of Toledo failed to secure for the second season the contract for furnishing 6000 tons of fuel for the Indiana Soldiers' and Sailors' Orphans' Home, which was recently let to an Indiana firm. The Ohio & Kentucky Coal Co. had the contract last season and made a remarkable record on West Virginia coal. Civic pride seems to have caused a return to the Indiana coal, according to the Toledo firm.

Boston—While the New Haven R.R. was in the market the latter part of May for up to 250,000 tons of high volatile coal, and through the Connecticut Co. for 150,000 more, the invitations did not get to shippers generally and so far as reported the orders have been placed with the New England Coal & Coke Co. as was generally anticipated. This makes considerably in excess of a million tons the New Haven R.R. has bought of one concern the current year.

St. Louis—The contract for furnishing the Blackmer & Post Pipe Co. for the year ending next April has been awarded to the St. Louis & O'Fallon Coal Co. The company takes from 75 to 100 cars a month. The St. Louis & O'Fallon Co. had the contract last year. The terms of the new contract are not divulged but they are understood to be more favorable to the coal company than the one of last year, when lump was furnished at a very low figure. It calls this year for mine run. The Blackmer & Post Co. plans to store coal in anticipation of a strike this year.

The Chesapeake & Ohio Makes a New Record at Hampton Roads—A new record for rapid coal loading at the Chesapeake & Ohio piers was made on May 30 when the steamship "Everett" was loaded and bunkered with 141 railroad cars in 2 hr. and 45 min. The coal was dumped at the rate of 51.2 railroad cars per hour or at the rate of one per minute. There were 7280 tons of cargo coal loaded, and 189 tons of bunker coal. This record was made at pier No. 9, and the coal was loaded for the account of the New River Coal Co., with their G. H. Caperton coal.

Foreign

Spain—Cable reports under date of June 16 are to the effect that a critical situation in the fuel supply has only been avoided by the arrival of American coal.

Italy—Press reports are to the effect that Walter L. Loeb, the New York representative of an important Genoese firm, is inquiring for a large tonnage of soft coal. It is stated that the tonnage involved is about 100,000 tons.

Egypt—An American consular officer in Cairo, Egypt, transmits specifications for the supply of 360,000 metric tons of coal for the Egyptian State Rys. The specifications may be examined at the Bureau of Foreign and Domestic Commerce or its branch offices. The information is furnished by the General Manager of the Egyptian State Ry., Cairo.

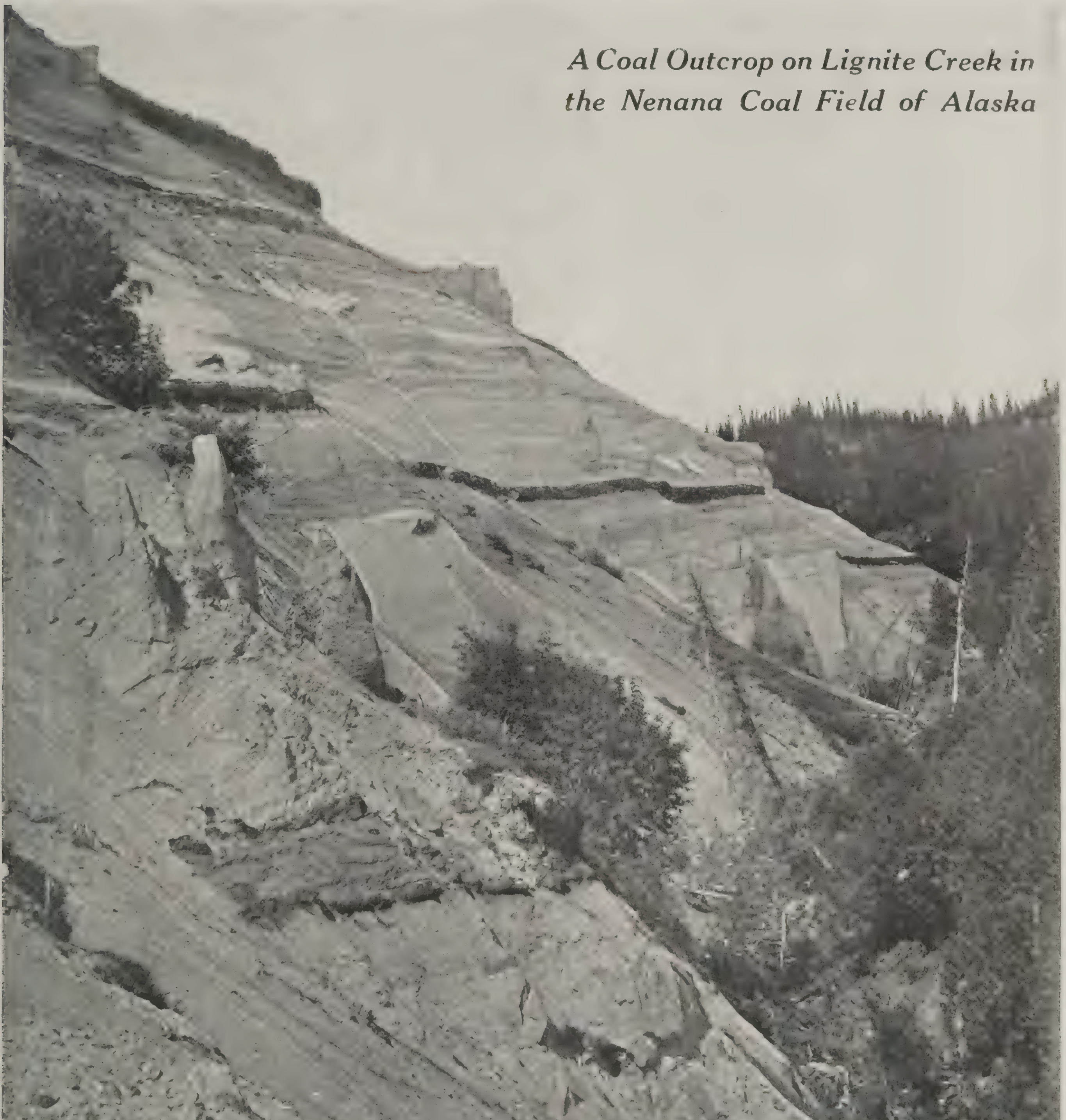
South America—Supplementing Foreign Trade Opportunity No. 16,496 and Confidential Circular No. 631, the Commercial Attaché of the Department of Commerce in South America transmits a detailed report relative to an opportunity for the sale of coal. His report may be examined at the Bureau of Foreign and Domestic Commerce or its branch offices. (No. 16,957.)

COAL AGE

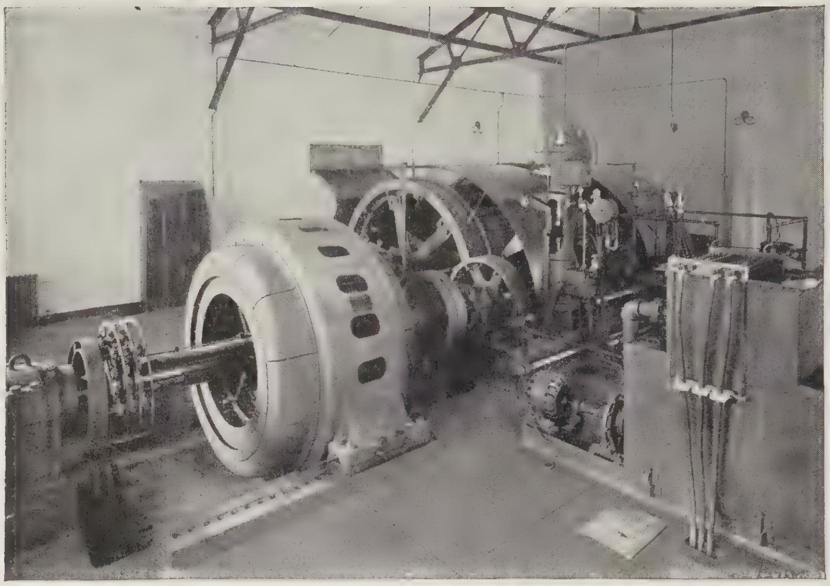
Volume 7, No. 26
Issued Every Saturday
Hill Publishing Company

NEW YORK, JUNE 26, 1915

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page



A Coal Outcrop on Lignite Creek in the Nenana Coal Field of Alaska



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COAL AGE

FLOYD W. PARSONS, *Editor*

Published Weekly by HILL PUBLISHING COMPANY
Tenth Avenue at Thirty-sixth Street, New York, N. Y.
JOHN A. HILL, Pres. ROB'T McKEAN, Sec'y.
Cable Address, "COAGE," N. Y.

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada. $5 or its equivalent to any other foreign country.

Subscribers in Great Britain, Europe and the British Colonies in the Eastern Hemisphere may send their subscriptions to the London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the NewYork Office in every instance.

Advertising copy should reach New York Office by Thursday of week prior to date of issue. Entered as second class matter, October 14, 1911, at the Postoffice at New York, New York, under the Act of March 3, 1879.

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J. P. White is preparing for the spring campaign in the anthracite region. The Hocking Valley operators are meditating whether the new scale in the eastern Ohio district violates the agreement which was made with the union in the southern part of the State of Ohio. If they conclude that it is, a lockout will probably result. COAL AGE, Vol. 7.

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New Apparatus and Equipment: *Pages* 1106-1107

*Rotary Converters in Mining—*The Halby Shoveling Machine—*New Mine Locomotive Headlight—*Novel "Sighting" Apparatus.

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*Longwall in Pittsburgh Seam. Letters Nos. 11 and 12—Value of Coal Analyses—Education in Mining. Letter No. 1—Air Factor in Mine Explosions.

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Density, volume and specific heat of mine gases.

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Law Regulating Explosives—Interchange of Certificates of Competency—Effect of Poor Ventilation on Safety Lamp Flame.

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NUMBER OF COPIES PRINTED THIS ISSUE, 9,100

None sent free regularly, no returns from news companies, no back numbers.

RUN-OF-MINE TALKS

ON YOUR BUSINESS AND OURS

By the Business Manager

MUCH has been said on this page about the necessity of the man in charge of a modern coal mine keeping himself strictly up to date on all subjects connected with mining.

An example of how well this necessity is understood comes to hand in a letter from Lafayette Tuck, Supt., of the Homer City Coal Co., Homer City, Pa.

Says Mr. Tuck:—"We have used Coal Age for the past two or three years and I want to express my appreciation of it.

"Each copy is looked forward to and eagerly read from cover to cover, the advertising pages I believe, receiving the most attention.

"We have recently bought Waterbury wire rope and have sent for catalogs from several pump companies.

"I would like very much to see a discussion on small mine pumps, in Coal Age, as this is a subject that is not fully enough covered for small mines."

THINK of the advantages you have today!

Mr. Tuck wants to know more about small mine pumps. He looks through Coal Age and asks the pump advertisers to give him information. Immediately printed data will be sent him and for any special pumping problems, the engineers of the pump manufacturers are at his service. Besides he asks us to put the question up to our 10,000 readers for discussion.

Could there be a more complete information service imagined than that which is always available to you men in the coal mining industry?

Assuredly it is true that you must keep yourself posted on all that is going on in the progress of coal mining, but it is equally true that you have in your grasp all the necessary means for so doing—at no expense and with no trouble.

Are you making use of the "information service" that is offered you in every issue of your paper?

COAL AGE

Vol. 7 NEW YORK, JUNE 26, 1915 No. 26

The Long Life of Coal Miners

That the life of the miner is laborious but is not unhealthy is proved by the large number of old men in and around the mines, many of whom started work long before what is now the legal age. The risks of accident seem to be more than overbalanced by the immunities from disease.

For many years imagination peopled the mines with "noxious humors." The mine current was considered as harmful as night air—an atmosphere to be shunned. Meanwhile the miners throve in it. It is only recently that analyses have proved it free from bacteria and reason has pointed out that its temperature in its degree and equability is such as to produce the best conditions for the development of unfailing health. Like night, mountain and sea air the atmosphere of the mine is now vindicated even though its healthfulness has not yet been extolled.

VETERAN ANTHRACITE MINERS OF WILKES-BARRE, PENN.

Mark Ford has recalled that at the Washington colliery in England six of the men died at an aggregate age of over 438 years. Thus the men reached an average of over 73 years.

But this record is bettered by the five men in the picture from the William Penn colliery of the Susquehanna Coal Co., Wilkes-Barre, Penn. In 1912 they were still living and working and the average of their ages was nearly 73 years. On his feet on the left is Charles G. Palmer, a miner then at that age. This man had been with the company 41 years. He has recently died at the ripe old age of 75. Standing at his side is Philip H. Jones, a fireboss, aged 73 years. He had been on the rolls of the company for 41 years. Seated from left to right are William Jones, Sr., a miner aged 75 years, service 44 years, William J. Selzer, shipper, age 68 years, service 32 years, and James Malloy, miner, age 73, service 43 years.

At the series of examinations on the mine law in progress among the employees occupying responsible positions in the mines of the Susquehanna Coal Co., each man was asked how long he had been in its employ. Only three of the five divisions have so far reported. In these, one man had been with the company for 50 years, one for 48 years, 16 for over 40 years, 47 from 30 to 40 years, and 96 from 20 to 30 years. It should be remembered that the foregoing figures refer to the service of these men with the Susquehanna Coal Co. alone, and that most of them had worked additional years in the mines elsewhere.

In the Shamokin division the average length of service of 140 men was just short of 19 years; in the Wyoming division 63 men had served an average of nearly 25 years; and in the Lykens division 59 men had been in the employ of the company for 24¾ years.

Some of the longevity of the Susquehanna men may be due in part to the healthfulness of the anthracite region, situated as it is in a temperate clime and at a considerable elevation, but much is also due to the hardiness which the mine worker derives from his work and to the healthfulness of the atmosphere in which he performs his labor.

Coal Preparation in Oklahoma

By George M. Brown*

SYNOPSIS—Oklahoma produces about 3,700,000 tons of coal annually, of which about 2,000,000 tons is prepared for market, while the balance is sold as run-of-mine. Three grades—lump, nut, and a mixture of pea and slack—are ordinarily made. Washing is sometimes resorted to in preparing the small sizes.

Oklahoma is divided into three mining districts. District No. 1 is composed of 27 counties, of which Coal, Latimer and LeFlore produce nearly, if not all, of the coal mined in the district. District No. 2 embraces 26 counties; nearly all of the coal is produced in Pittsburgh County. District No. 3 has only two counties among 22 that produce much coal; these are Haskell and Okmulgee.

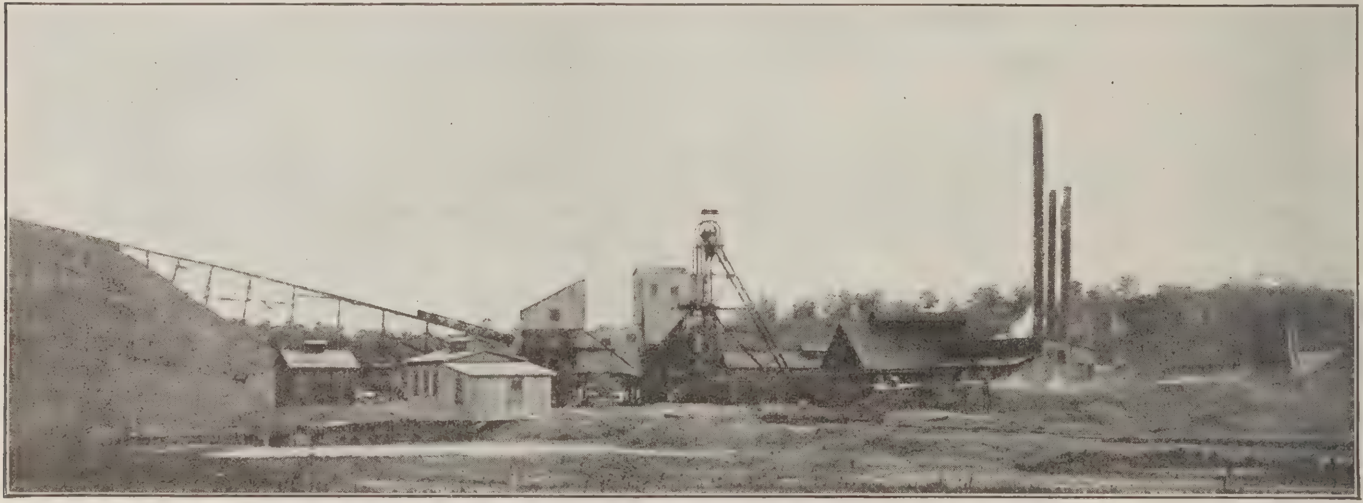

Fig. 1. Modern Plant in Eastern Oklahoma, Mine No. 5, Rock Island Coal Mining Co., at Alderson

The production of coal in Oklahoma from July 1, 1913, to June 30, 1914, was about 3,700,000 tons, according to figures in the state mine inspector's office. The pick-mined coal, or rather the coal shot off the solid, amounted to 3,019,334 tons distributed as follows:

District	Lump	Nut	Pea-Slack	Mine-Run
1	214,141	51,455	101,075	1,097,359
2	379,321	99,411	284,367	358,742
3	43,476	21,394	49,968	318,625
Totals	636,938	172,260	435,410	1,774,726
Percentage	51.2	13.8	35.0	

The machine-mined coal had a large increase over 1912-1913 and amounted to about 685,000 tons, divided as follows:

District	Lump	Nut	Pea-Slack	Mine-Run
1	58,990	20,000*	21,593	15,964
2	43,977	8,446	23,998	89,787
3	99,768	39,796	67,026	197,127
Totals	202,735	68,242	112,617	302,878

*Estimated.

These figures give the reader an idea of the preparation of the coal as regards trade names. In general the coal is treated as follows:

At most of the larger mines the coal is prepared by passing it over shaker screens. These are generally of two parts, either suspended or resting on rollers, and driven by eccentric shafts from a steam shaker engine. The dip of the screens is from 15° to 20°.

Coming from the mine the coal is dumped into the weigh basket from self-dumping cages, crossover dumps or from the common "tip over" dump, depending on whether the mine opening is a shaft or slope. It is then dumped

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*526 East Seminole Ave., McAlester, Okla.

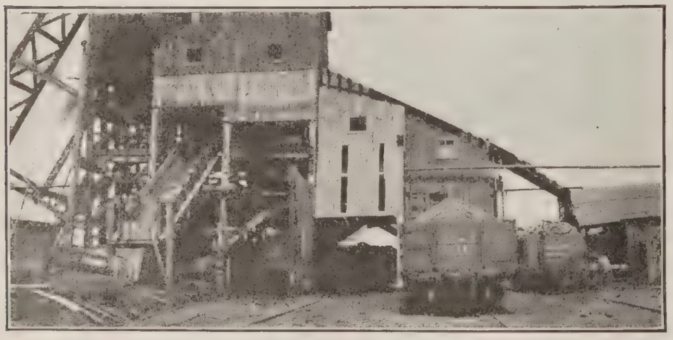


Fig. 2. Loading Arrangements, Mine No. 5, Osage Mining Co., Krebs, Okla.

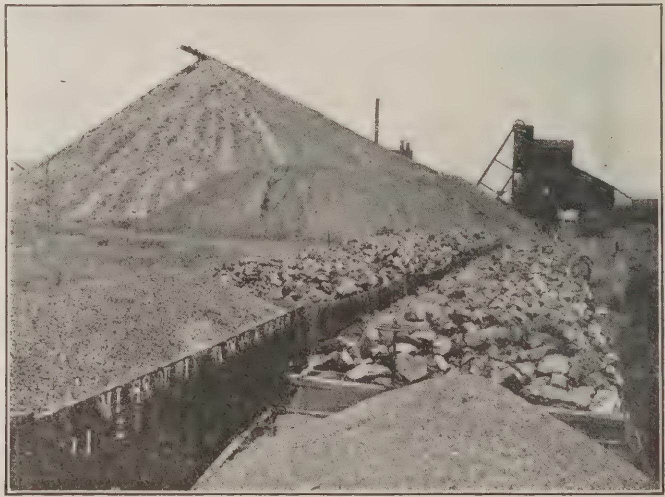


Fig. 3. Some of the Sized Coal from Mine No. 5 at Krebs, Okla.

onto the shaker screen. The sizes of holes and lengths are given in Fig. 6.

Through $\frac{5}{8}$-in. perforations, the product is slack coal; and over $\frac{5}{8}$-in. and through $1\frac{1}{4}$-in. perforations, the product is pea coal; over $1\frac{1}{4}$-in. and through $2\frac{1}{2}$-in. perforations, the product is nut coal; over $2\frac{1}{2}$-in. perforations, the product is lump coal.

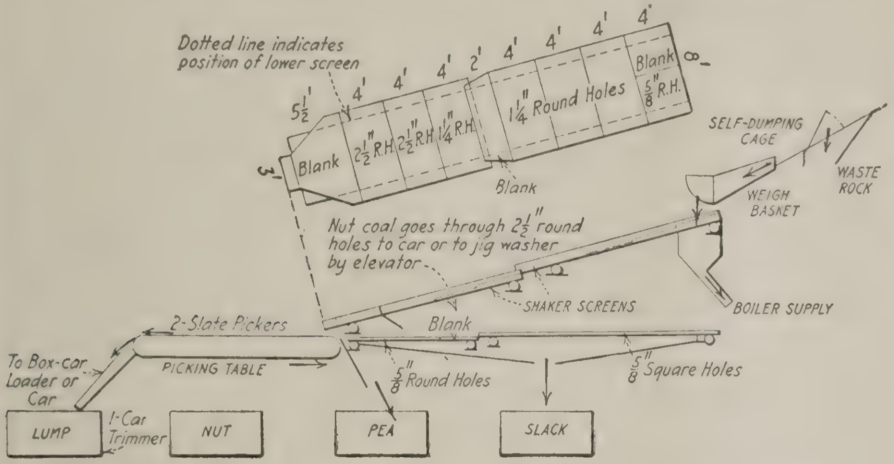


FIG. 4. SCREENING ARRANGEMENT AT MINE NO. 5, ROCK ISLAND COAL MINING CO.

Fig. 6 shows a general practice through the western end of the Oklahoma coal fields. In the eastern portions of the field the coal is generally treated as lump and as mixed nut, pea and slack, giving two sized products only. Where nut coal is separated the slack goes through $1\frac{1}{4}$-in. screens.

THREE GRADES OF COAL ARE MARKETED

In general there are three grades of coal put on the market: Domestic lump, the slack, pea and nut coal being taken out; commercial lump, the slack and pea being taken out; run-of-mine, all sizes being put into one car. (In some cases I believe there is a limit placed on the amount of allowable slack.)

One of the most uptodate screening plants in the McAlester district is at mine No. 5 of the Rock Island Coal Mining Co., at Alderson.

The shaker screen is divided into two parts, resting on rollers. The upper part consists of four plates about 8 ft. wide and 4 ft. long. The upper plate has one-half blank and one-half perforated with $\frac{5}{8}$-in. round holes for boiler supply. The next three plates have $1\frac{1}{4}$-in. round perforations. See Fig. 4. The second part of the shaker has three plates about 8x4 ft., of which the upper plate has $1\frac{1}{4}$-in. and the two lower plates $2\frac{1}{2}$-in. round perforations. From here the lump coal passes onto a horizontal picking table, where the slate and shale are picked out. The cleaned lump then goes to the car or the box-car loader.

The nut coal goes directly to the car if necessary, but usually it is sent by elevator to a jig washer. This brand of coal has proven popular.

The treatment of slack and pea is quite novel. All the pea and slack from the $1\frac{1}{4}$-in. plates on the shaker falls onto a nearly horizontal shaker of two parts. The first part has a $\frac{5}{8}$-in. square-hole screen about 24 ft. long. The second part has about 6 ft. of blank screen and 6 ft. of $\frac{5}{8}$-in. round-hole screen. The product through the screens is slack; over the screens pea coal of good grade is produced. There are several modern washeries throughout Oklahoma where slack, pea and nut coal are washed. The coal is sized as slack, pea and nut, and in general too much slack in pea or nut causes complaints from the consumer. At the present time only jig washers are in use in the McAlester district, and no attempt is being made to wash coal on a large scale.

Machines are becoming more popular in this field and are having a good effect on the sizes produced. At mine No. 5 of the Osage Coal & Mining Co., at Krebs, three average months of shooting from the solid in 1911-1912 gave these percentages of the various sizes produced: Lump, 53; nut, 12; pea, 5; slack 30. For machine mining in the same mine three average months in 1915 gave these percentages: Lump, 52; nut, 14; pea, 10; slack, 24. More lump could be secured if the miners would use less permissible explosive. They seem to be much averse to breaking up the large lumps.

FIG. 5. A CAR OF STEAM LUMP COAL

The writer is indebted to W. A. Evans, general superintendent of the Rock Island Coal Mining Co., and to James Duncan, receiver for the Osage Coal & Mining Co., for permission to use the drawings and pictures shown.

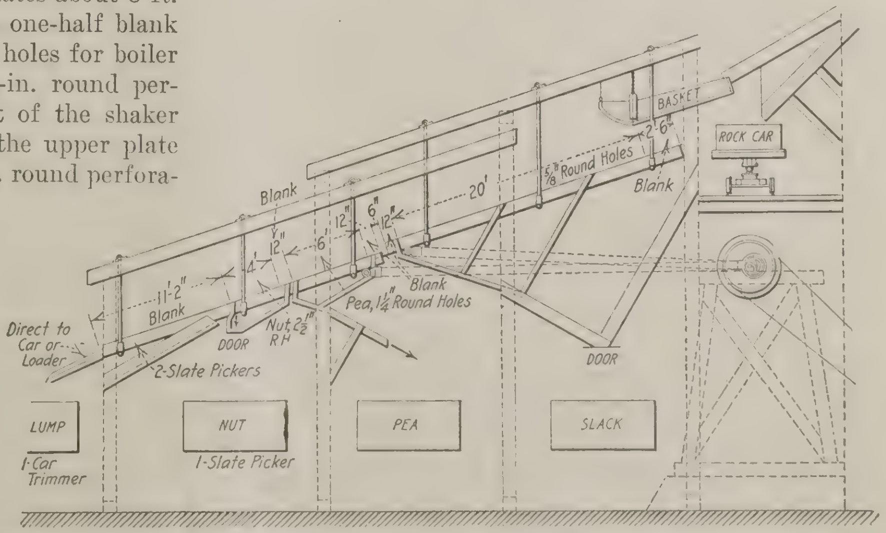


FIG. 6. USUAL ARRANGEMENT OF SCREENS AT THE LARGER OKLAHOMA PLANTS

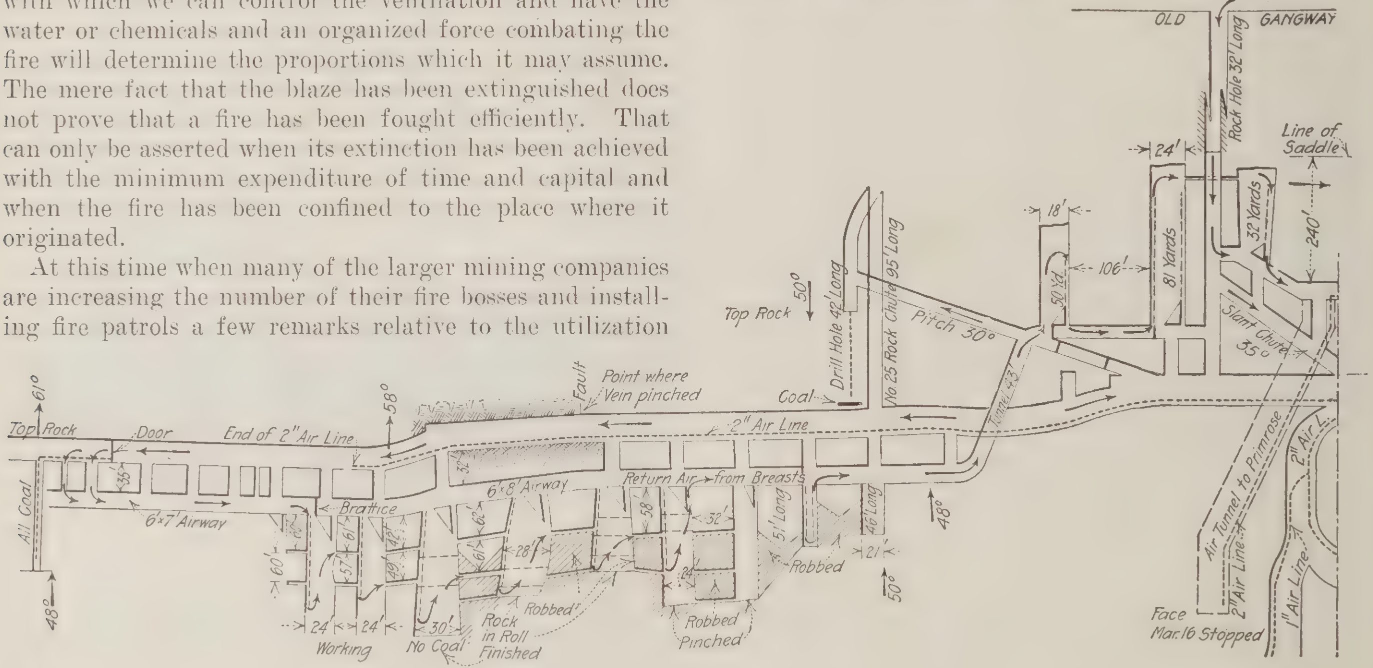
Forestalling Underground Fires at the Lansford Collieries*

By J. McCrystle†

SYNOPSIS—Maps are prepared by the Lehigh Coal & Navigation Co. which show diagrammatically the resources available in coping with fires and the dangers which must be faced. These drawings are not necessarily made to scale.

A mine fire is an ever-present hazard in coal mining, its time, location and cause being always uncertain. Constant vigilance must be maintained at all times, and the ability to fight it successfully will for the most part depend upon the degree of preparedness and upon the preliminary measures that have been taken. The promptness with which we can control the ventilation and have the water or chemicals and an organized force combating the fire will determine the proportions which it may assume. The mere fact that the blaze has been extinguished does not prove that a fire has been fought efficiently. That can only be asserted when its extinction has been achieved with the minimum expenditure of time and capital and when the fire has been confined to the place where it originated.

At this time when many of the larger mining companies are increasing the number of their fire bosses and installing fire patrols a few remarks relative to the utilization of local conditions and on the means of increasing the efficiency of the fighting force may be pertinent.



A Rough Diagrammatic Sketch of a Section of the Mines with Numerous Extensions and Annotations

Importance of First Steps

In the early stages following the discovery of fire, there is always a certain amount of excitement. When the foreman or superintendent arrives, it is imperative to organize the men in the vicinity at once and probably necessary to send for others. There may be a force already on the ground sufficiently large for the work to be accomplished, but the men not having been selected are probably not reliable or otherwise unsuited for fire fighting. The man in charge will first make it his duty to see that no workmen remain in places traveled by return air from the fire. He will have to regulate his ventilation, procure pipe or hose to carry the water, and decide where to make his hose connections. These and innumerable other details will have to be arranged immediately upon his arrival. In the majority of cases the foreman is the only one intimately conversant with the entire ventilating system, the only person who knows the location of the fire-fighting apparatus and water lines, and should he make a bad decision or become injured the fire may have an opportunity to extend beyond the point where fighting it by direct methods will be of avail. A few well-directed efforts in the incipient stages of the fire will be of more consequence than thousands spent later.

The "boss" is the natural leader of the emergency squad. If he is experienced he will appreciate that it is necessary to say "Come, boys" instead of "Go, boys." It will be his work to allay the fears of his squad and to imbue the men with confidence. His usual place is right on the firing line, and he is frequently one of the first to be overcome.

In three cases in my own knowledge the foreman has been scalded by the steam resulting from a too-zealous application of the water, thus leaving the fire squad without a leader.

Formulated Rules for Fire Fighting

To eliminate delays, to insure that everyone will work in conjunction and will play his part, to have dependable men immediately available for combating the fire, to remove as many decisions as possible from the excitement of the moment, so that the right thing will be done the first time, the Lehigh Coal & Navigation Co. has anticipated the possibility of fires in the various underground workings of the western division and has organized a committee of the colliery officials to formulate rules for fighting them. In other words, it has assumed a fire to have

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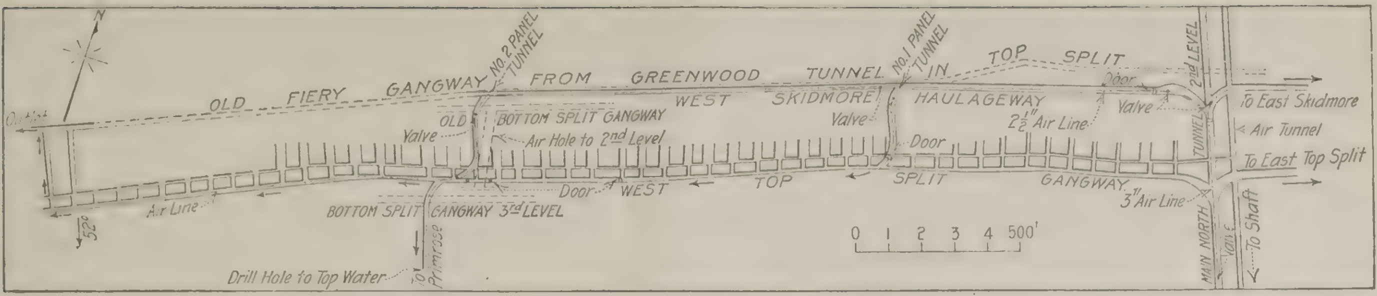
*Paper read at Tamaqua division meeting of the Panther Valley Mining Institute.

†Division engineer, Lehigh Coal & Navigation Co., Lansford, Penn.



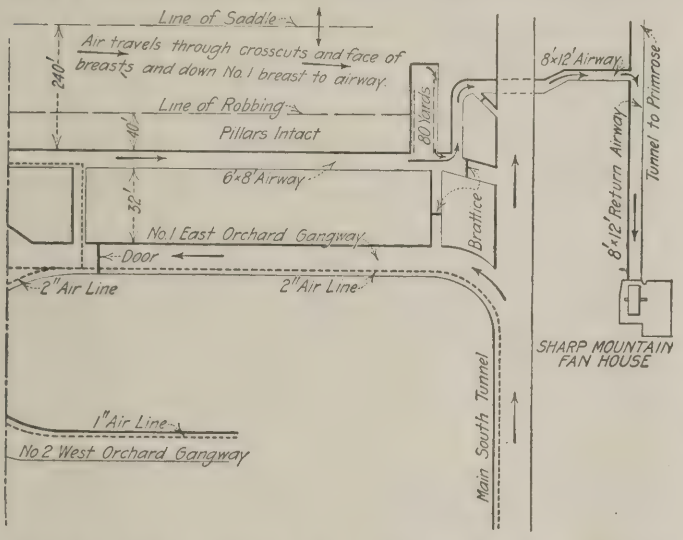
A Map Prepared to Exhibit the Fire-Fighting Possibilities in a Mine Level

started in possible places in each vein and has then adopted fire rules.

These regulations, however, do not embrace a policy for fighting a fire that has gained headway, but cover only the work from the time of the discovery of a fire until water is applied or the higher officials arrive. The preliminary work thus performed may be said to bear the same relation to a fire as "first aid" does to an injury.

Sketches Furnish a Visual Record of Situation

To facilitate and simplify this work, sketches have been made to scale of each of the several fireboss districts, showing the workings, the location of the doors and regulators, the air line and valve, the location of the fire apparatus and anything that would have any bearing on a possible fire. The sketches and instructions are of such size as to be readily carried in the pocket. Each fireboss has a set of his individual district, while complete sets are kept at each fireboss' "shanty" and at the foreman's, superintendent's and fire inspector's offices. The sketches are revised as often as necessary to conform with the changes in the ventilation, the erection of doors, the extension of air lines, etc.



Made by the Fireboss for Fire-Fighting Purposes

Further, each fireboss has a pitch plan drawn by himself of his own territory showing the length of the breasts and pitch, the headings, ribs, thickness of coal, condition of roof and manways, and any data that would have any bearing on either a probable fire or future mining. These are but picture sketches, and no attempt is made to have them to scale. The value of these picture plans when an effort is being made to cut off or get a heading above the fire can be readily realized.

A map of the entire colliery showing the complete air system, air lines, valves and water lines accompanies the foreman's, superintendent's and fire inspector's sketches. The sketches further allow the fireboss to follow the rules graphically; they enable the higher officials who probably are not familiar with the details of the workings to grasp the situation readily, and if anything should happen to either the foreman or fireboss the sketches would reproduce information that otherwise would undoubtedly be unobtainable.

All Air and Water Lines Are Connected

In most large anthracite mines, particularly those having any rock work in progress, compressed-air lines are found following many of the gangways. These may be used for fighting fires and may be rendered readily available beforehand by making connections between them and the water-line, these connections being controlled by valves. Should no pipe be laid in the gangway in question, it may be found more expedient to tear up the pipe in another gangway and relay rather than to wait for other pipes to be brought in from some other source.

When placing doors and brattices, their use in an emergency is now carefully considered. Formerly the ventilating needs were alone regarded as important. In all air lines laid recently, tees, unions and valves have been placed at short intervals, so that the line may be broken with minimum trouble and the hose connected as near the fire as possible.

The fire committee consists of the superintendent, foreman, fire inspector and engineer. Once-a-month meetings are held at which the firebosses, etc., are questioned regarding rules. Afterwards any alterations made in the air lines or ventilation during the previous month are noted, and any suggested changes or additions to the existing rules are discussed. It will be noted that firebosses, etc., are required to memorize the rules, just as railroad employees are instructed to commit to memory the regulations prepared by the transportation companies for which they work. No reference to the instructions should be necessary during an emergency.

In preparing the fire rules a separate study has been made of each gangway or section. The first steps to be taken are then discussed and finally embodied into a set of rules to govern each condition.

In this way the responsibility is to a large extent removed from the shoulders of the foreman and a deliberate policy is substituted for the snap judgment made under excitement. While everyone covered by the rules has his own individual part to perform, the whole force is coördinated so as to do team work.

The first rules for fire service refer to the removal from danger of any workmen likely to be affected and explain the most expedient way of getting them out in safety. Then follow rules for cutting off the air, allowing just enough to clear away the smoke, and in these clauses the various doors and regulators required are designated. Should the fire be discovered at night or while the fireboss is making his inspection in the morning, the foreman and fireboss must be informed. A good telephonic system is installed everywhere, connecting all parts of the collieries inside and out. Thus the man who discovers the fire can notify the engine house or fan house as soon as the ventilation has been regulated. There is always someone on duty at those places. He should be informed as to the extent and location of the fire. He in turn telephones to the foreman and superintendent, leaving the fire or nightboss to turn his attention wholly to the fire.

The valves are then adjusted so as to carry water to the site of the fire, the compressed air being shut off and the water turned on. Long before a fire occurs the foreman has prepared a list with the addresess of men on whom he can depend and on whom he will probably have to call for assistance. A subordinate to whom the list has been intrusted can readily summon these men on demand.

Recently the company has added to the book of fire rules data and tables which may prove valuable to the possessor in the performance of his various duties. He is required to familiarize himself with these and to become proficient in their use.

Since rules and monthly meetings have been introduced interest has been reawakened in subjects that usually are forgotten as soon as the certificate as mine foreman is granted; the precautions for the prevention of fire are being more closely observed, and there is apparent a general improvement in the work and morale of all concerned.

Extracts from a Superintendent's Diary

Again and again I am reminded of the fact that a man's point of view is largely governed by his experience. Today, for example, I made my final decision upon the purchase of a new ventilating fan for our No. 3 mine, and in choosing the fan, to meet the requirements as I saw them, I had to disregard the recommendations of our electrical engineer as well as our master mechanic.

They preferred a small high-speed fan of high efficiency and low cost, direct-connected to a motor with a rating slightly in excess of our maximum requirements. Their experience with alternating-current motors had taught them that motors of that type give highest efficiency when operating close to their rated capacity, and being engineers, primarily, efficiency and cost received first consideration with them.

My experience had taught me that there are times when it is very necessary to speed fans up far beyond their regular capacity, and if one has a large fan running below its rating that is a simple matter; but if one has a fan and motor working on regular duty to maximum capacity a sudden unexpected demand furnishes a serious problem. After a discussion, in which I gave them the benefit of my information, they came to agree with me and withdrew their recommendations.

There was a time when I considered it beneath my dignity to act on suggestions volunteered by my subordinates, but in looking back I realize now that they were well qualified to offer me suggestions then, as my experience up to that time had not given me a vision much broader than their own. Now, however, the question of dignity would not hold me back for a moment, but as a matter of fact I seldom receive suggestions from my employees that are worthy of much consideration because with my broader vision I see so many obstacles that have never occurred to them.

In this connection I am always reminded of a little story one of my mine foremen tells about one of his drivers, a little colored boy.

Sam was given a mule to drive with a run extending the entire length of a cross-heading, and he had to deliver his cars to a side track, from which the loads were handled by electric locomotives. In giving him his instructions, the boss driver failed to warn Sam about the danger of entering the side track with loads when the switch light showed red to indicate that the current was on.

On his first trip, when Sam arrived at the side track with his loads, his mule seeing the red light refused to pull the cars into the siding. Sam could not understand.

He got down from the cars and began to remonstrate with the mule something after this manner: "Say there, yo' fool mule, what yo' stallin' 'bout? Yo' bettah go long now an' tend to business for I'se seized wid a peevish feelin'; yo' can't temporize wid me, dat yo' can't."

Still the mule stood still, so Sam got busy with his lash. The mule remained as stubborn as before. Then the locomotive passed along the main entry and the red light turned white. Immediately the mule started off and pulled into the siding. Sam deliberated over the performance for a few moments, and the mystery cleared. Then he reached up and patted the mule on the head.

"Say, ole mule, 'pears lak de wrong thinking machine wus put in charge of dis yere outfit," was the way he worded his apology to the mule. Pretty good illustration of what sometimes happens when brains attempt to dictate to experience.

Personnel of the West Virginia Coal Association

The names of the executive committee of the West Virginia Coal Association are as follows, the committeemen and alternates being given in their respective order:

Fairmont district, C. H. Jenkins, R. B. Isner; New River district, G. H. Caperton, S. A. Scott; Pocahontas district, W. D. Ord, L. E. Tierney; Tug River district, George Wolfe, A. B. Rawn; Thacker district, T. E. Houston, F. L. Schoew; Guyan district, A. R. Bisel, J. J. Ross; Kanawha district, J. W. Dawson, E. O. Dana; Wheeling district, J. C. McKinley (no alternate); Chesapeake & Ohio Shippers' Association, William Puckett, Quin Morton; Independent Operators, J. G. Bradley, George Wolfe.

The officers of the committee are as follows:

J. W. Dawson, chairman, Charleston, W. Va.; C. H. Jenkins, vice-chairman, Fairmont, W. Va.; A. H. Land, treasurer, Barbourville, W. Va.; W. H. Cunningham, secretary, Huntington, W. Va.

The general offices of the company are in the Robson-Prichard Building, Huntington, W. Va.

⁂

Life Tenant's Right to Dispose of Coal.—One who merely owns a life interest in land has no right to sell coal underlying the tract, although he may take reasonable use of the same for domestic purposes. (Kentucky Court of Appeals, McCoy vs. Ferguson, 175 Southwestern Reporter 23.)

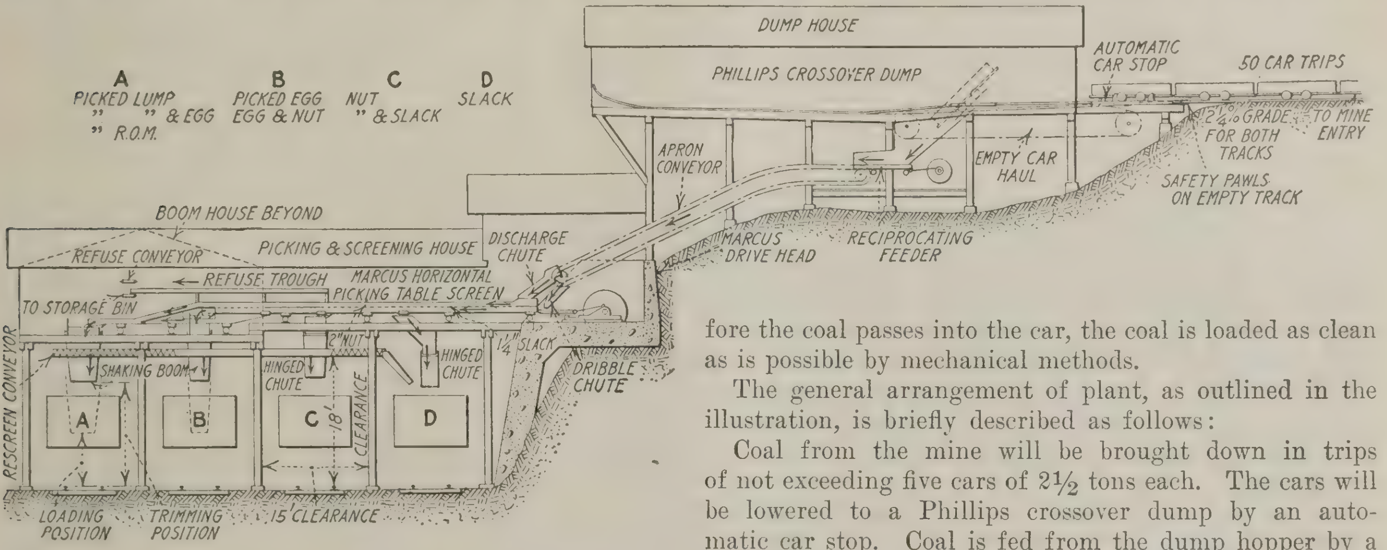
An Eastern Preparation Plant

By W. R. Ourand*

SYNOPSIS—A West Virginia plant in which has been embodied apparatus for a fuel preparation which is decidedly in advance of present market requirements.

The Harty Coal Co. was recently organized to develop coal properties on the Virginian Ry. in Wyoming County, just east of Mullens, W. Va. This coal lies in the northeastern corner of the Pocahontas field on the headwaters of the Guyandotte River.

The coal produced on the Virginian Ry. comes principally from the Winding Gulf Branch in the New River field or from points farther west and is hauled eastward through Clark's Gap in the Flat Top Mountains to points along the Atlantic seaboard. Shipments from the great loading plants at Sewall Point and at other seaboard piers and local railroad consumption constitute the immediate field for disposal of these coals.



General Arrangement of Tipple and Preparation Plant

For this reason coal at the mine is loaded into railroad cars for shipment with little or no effort to produce either a high percentage of lump or sized coal or to pick out slate or other foreign matter. It is probable that efforts to prepare a more uniform fuel will not be extensive in this section until other outlets are secured. An improved preparation of coal for shipment will then be required similar to that now being made at the mines in other West Virginia fields supplying the domestic trade in neighboring states.

However, in anticipation of new markets and in advance of similar means of preparation in this locality, the Harty Coal Co. has equipped its new operation with the most modern picking and screening machinery, and is prepared to produce four sizes of coal—picked lump, picked 4-in. egg, and picked 2-in. nut and 1¼-in. slack—together with picked run-of-mine or any other usual combination of sizes.

On account of the somewhat soft and friable nature of the coal, less strenuous methods of mining are to be attempted, so that the larger sizes of coal will be produced in a greater percentage than at present. The tipple equipment is designed with the idea of reducing breakage to the minimum and permitting the full percentage of larger sizes produced to be loaded into cars.

To this end the new type of shaking loader boom is installed for the lump and egg coals. In addition to providing an easy descent and perfect trimming of the car, this boom assures an extra-high-class product by its ability to rescreen any fine coal made in the preparation of the larger sizes. As this rescreening is done just before the coal passes into the car, the coal is loaded as clean as is possible by mechanical methods.

The general arrangement of plant, as outlined in the illustration, is briefly described as follows:

Coal from the mine will be brought down in trips of not exceeding five cars of 2½ tons each. The cars will be lowered to a Phillips crossover dump by an automatic car stop. Coal is fed from the dump hopper by a reciprocating feeder delivering to an apron conveyor, which lowers it to the horizontal picking table screen, on which it is picked and separated into the desired sizes. The refuse removed is discharged into a conveyor without need of rehandling and is deposited in a storage bin.

The Mine-Car Storage Yard

The mine-car storage yard leading from the mine entry is arranged with both loaded and empty tracks on a common grade sloping at 2¼ per cent. toward the dump. This necessitates an empty car haul capable of pushing 50-car trips up this grade. Provision is also made with safety pawls for holding this trip on this adverse grade until it is picked up and hauled back into the mine by the locomotive.

The tipple structure over the railroad tracks is arranged for rather unusual conditions because of the requirements of the railroad. A minimum clearance of 18 ft. above the top of rail and a lateral clearance on each track of 15 ft. are given for the permanent structure in addition to arranging all equipment so that it may be raised entirely out of these minimum clearances.

This arrangement permits the Virginian Ry., which has only a single track at this point, to utilize all tipple yard tracks when necessity demands. The plant was designed and the equipment supplied by the Roberts & Schaefer Co., of Chicago, the installation being directed by J. C. Sullivan, manager of the Harty Coal Co.

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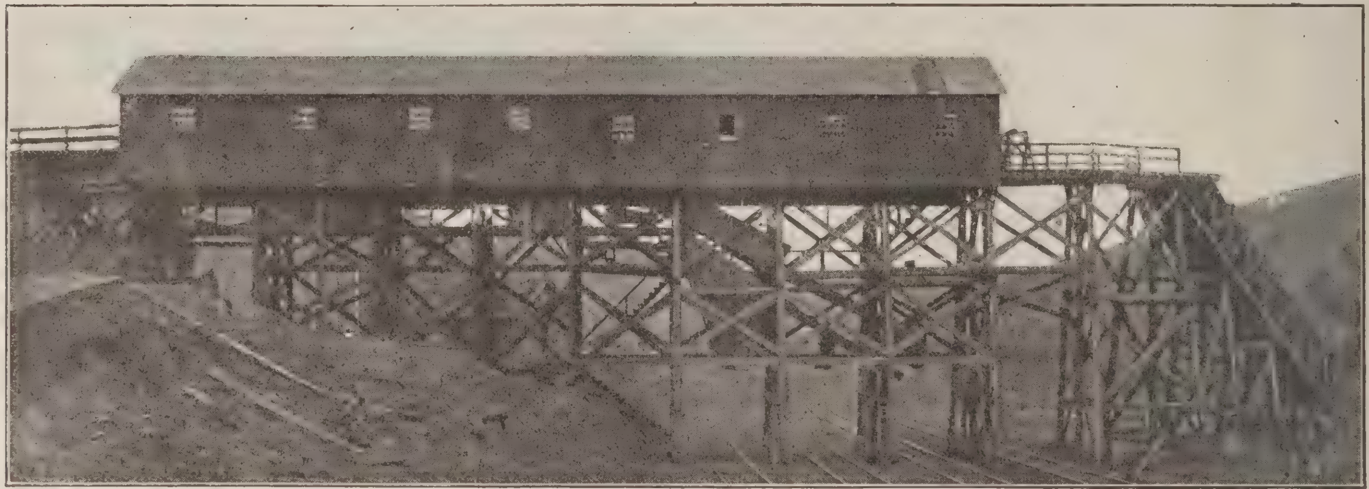
*Assistant engineer, Roberts & Schaefer Co., Chicago, Ill.

Efficient Tipple Arrangement

By R. G. Read*

SYNOPSIS—Details of an installation designed to thoroughly screen a large tonnage at a very small labor and maintenance cost with a minimum initial investment.

The operations of the Maryland Coal Co. of West Virginia are located at Wendel on a branch of the Baltimore & Ohio R.R. leaving the Parkersburg division at Simpson. The tipple at No. 1 mine is of the usual gravity screen type where the coal is dumped directly into a chute leading to the screens. Owing to the fact that the impurities exist in this coal largely in the slack or very fine sizes it was found necessary to resort to some more efficient means of screening, and in the No. 2 tipple this fact was recognized and given special consideration. As the coal from this mine is used largely in the lake trade, no special sizing of the coal is required, and the use of shaking screens was not considered necessary, although it was at first thought that the final separation between nut and slack would have to be made in this manner.



Maryland Coal Company's Tipple, Simpson, W. Va

The equipment as it was installed is shown in the accompanying illustration. The coal is brought in 50-car trips to the tipple, the locomotive is then run around and the trip backed onto the car-haul or rather coupled to the three cars which are left standing over the car-haul. This method of operation obviates the necessity of using any form of knock-over or spring-dog or spur on the car-haul. The car-haul feeds the cars to the dump at a uniform rate of five cars per minute, each car being pushed over a slight knuckle which allows it to settle back so as to allow the coupling pin to be easily removed, after which the forward movement of the trip pushes the car over the knuckle, from which point it runs by gravity over the scales and into the Phillips crossover dump. An automatic device opens the door as the car is being dumped. (For description of this device see article by Elkins Read, Coal Age, p. 434, Mar. 14, 1914.) The scales are equipped with a printing beam which automatically records the weight of each car, so that the dumping and weighing of the coal are done practically without labor.

The coal is dumped into a hopper having a capacity of two cars, from which it is fed by means of a motor-driven reciprocating feeder. This is provided with adjustable crank disks so as to vary the rate of feed by changing the stroke. The coal passes from the feeder plate to the dead plate of the screen.

Screening Equipment

The screening equipment consists of two gravity bar screens. The upper screen is 8 ft. wide and 16 ft. long, made in sections with 4-in. drop to turn the coal over. The bars are spaced for 1½ in. clear opening and are of the Akron type. Veil plates in sections are provided for making run-of-mine coal. The lower screen is 8 ft. 6 in. wide, and 16 ft. long and the bars are spaced for ¾ in. clear opening.

The lump coal is loaded by means of a spiral pipe chute with necessary counterweighted apron extensions for loading high and low cars. The chutes are so arranged that the nut coal can be loaded separately or with the lump to make ¾-in. lump coal, or it may be loaded with the slack. The slack is loaded through a hopper with drop-bottom gate, which acts also as a trimming plate.

The car-haul in connection with the feeder makes it possible to handle a very large tonnage with a small hopper. This reduces breakage. The coal being delivered to the screens at a uniform velocity never attains the high speed which is so objectionable in an equipment where the coal is dumped directly onto the screens, and consequently the breakage is materially reduced. A careful investigation has proven that no appreciable breakage results from dumping the coal into the small hopper.

The results accomplished by this equipment justify the belief that a similar outfit can be used to advantage in a great number of places where the conditions call for a thorough screening of a large tonnage at a very small labor and maintenance cost with a minimum initial investment.

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*Contracting engineer, Fisher Building, Chicago, Ill.

The Electric Mine Locomotive and Its Motor Equipment

By R. R. Dunlop*

SYNOPSIS—Tables are here presented that show the drawbar pull and haulage capacity of various weights of locomotives on level track and on grades up to 10 per cent. when equipped with either cast or steel-tired wheels. These figures are sufficiently accurate for all commercial purposes.

Numerous articles have been written regarding the procedure of selecting the proper weight of locomotive for a given haul, but most of the methods offered are complicated and involve the use of formulas and characteristic curves. These may be appreciated by a few engineers, but not by the average mine manager or foreman, whose time is usually occupied and for whose use data must be brief and to the point.

For the purpose of providing a simple and practical method of selecting the proper weight locomotive for a given duty, I offer Tables A and B, which show the haulage capacity of mine locomotives when equipped with chilled-tread cast-iron wheels and steel-tired wheels.

TABLE A. HAULAGE CAPACITY OF ELECTRIC MINE LOCOMOTIVES EQUIPPED WITH CAST CHILLED WHEELS

This table gives the drawbar pull in pounds and the haulage capacity in tons for a given weight of locomotive on various grades, when equipped with chilled cast-iron wheels. A co-efficient of friction of 30 lb. per ton has been assumed on level track, and 20 lb. per ton for each per cent. of grade.

Grade	Level		1%		2%		3%		4%		5%		6%		7%		8%		9%		10%	
Loco. Wght., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons
3	1200	40	1140	23	1080	15	1020	11	960	9	900	7	840	6	780	5	720	4	640	3	600	2
4	1600	53	1520	31	1440	20	1360	15	1280	12	1200	9	1120	7	1040	6	960	5	880	4	800	3
5	2000	67	1900	38	1800	26	1700	19	1600	15	1500	11	1400	9	1300	8	1200	6	1100	5	1000	4
6	2400	80	2280	45	2160	31	2040	23	1922	17	1800	14	1680	11	1560	9	1440	7	1320	6	1200	5
7	2800	93	2660	53	2520	36	2300	25	2240	20	2100	16	1960	13	1820	11	1680	9	1540	7	1400	6
8	3200	107	3040	61	2880	41	2720	30	2560	23	2400	18	2240	15	2080	12	1920	10	1760	8	1600	7
10	4000	133	3800	76	3600	51	3400	38	3200	29	3000	23	2800	19	2600	15	2400	13	2200	10	2060	9
12	4800	160	4560	91	4320	62	4080	45	3840	35	3600	28	3360	22	3120	18	2880	15	2640	13	2400	10
13	5200	174	4940	98	4680	67	4420	49	4160	38	3900	30	3640	24	3380	20	3120	16	2860	14	2600	11
15	6000	200	5700	114	5400	77	5100	57	4800	43	4500	35	4200	28	3900	23	3600	19	3300	16	3000	13
17	6800	226	6460	129	6120	87	5780	64	5440	49	5100	39	4760	32	4420	26	4080	21	3740	18	3400	15
18	7200	240	6840	136	6480	92	6120	68	5760	52	5400	41	5040	34	4680	28	4320	23	3960	19	3600	16
20	8000	267	7600	152	7200	103	6800	75	6400	58	6000	46	5600	37	5200	31	4800	27	4400	21	4000	17
25	10000	330	9500	190	9000	118	8500	95	8000	72	7500	58	7000	46	6500	38	6000	32	5500	26	5000	22
30	12000	400	11400	227	10800	156	10200	113	9600	87	9000	70	8400	56	7800	46	7200	38	6600	32	6000	26

TABLE B. HAULAGE CAPACITY OF ELECTRIC MINE LOCOMOTIVES EQUIPPED WITH STEEL-TIRED WHEELS

This table gives the drawbar pull in pounds and the haulage capacity in tons for a given weight of locomotive on various grades, when equipped with steel-tired wheels. A co-efficient of friction of 30 lb. per ton has been assumed on level track, and 20 lb. per ton for each per cent. of grade.

Grade	Level		1%		2%		3%		4%		5%		6%		7%		8%		9%		10%	
Loco. Wght., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons	Drawbar Pull, lb.	Haulage Cap., tons
3	1500	50	1440	29	1380	20	1320	15	1260	12	1200	9	1140	8	1080	6	1020	5	960	4	900	4
4	2000	70	1920	39	1840	26	1760	20	1680	15	1600	12	1520	10	1440	8	1360	7	1280	6	1200	5
5	2500	84	2400	48	2300	33	2200	24	2100	19	2000	15	1900	13	1800	10	1700	9	1600	8	1500	6
6	3000	100	2880	58	2760	39	2640	29	2520	23	2400	18	2280	15	2160	13	2040	11	1920	9	1800	8
7	3500	117	3360	67	3220	46	3080	34	2940	27	2800	22	2660	18	2520	15	2380	12	2240	11	2100	9
8	4000	133	3840	77	3680	53	3520	39	3360	30	3200	25	3040	20	2880	17	2720	14	2560	12	2400	10
10	5000	167	4800	96	4600	66	4400	49	4200	38	4000	31	3800	26	3600	21	3400	18	3200	15	3000	13
12	6000	200	5760	115	5520	79	5280	59	5040	46	4800	38	4560	30	4320	25	4080	21	3840	18	3600	16
13	6509	216	6240	126	5980	85	5720	63	5460	50	5200	40	4940	33	4680	27	4420	23	4160	20	3900	17
15	7500	250	7200	144	6900	99	6600	73	6300	57	6000	46	5700	38	5400	32	5100	27	4800	23	4500	19
17	8500	283	8160	163	7820	112	7480	83	7140	65	6800	52	6460	43	6120	36	5780	30	5420	26	5100	22
18	9000	300	8640	173	8280	118	7920	88	7560	68	7200	55	6840	45	6500	38	6120	32	5760	27	5400	23
20	10000	333	9600	192	9200	132	8800	98	8400	76	8000	62	7600	51	7200	42	6800	36	6400	30	6000	26
25	12500	416	12000	240	11500	164	11000	122	10500	96	10000	77	9500	64	9000	53	8500	45	8000	38	7500	32
30	15000	500	14400	287	13800	197	13200	146	12000	114	12000	92	11400	76	10800	63	10200	53	9600	46	9000	39

The drawbar pull of the locomotives listed in Table A is arrived at as follows:

A locomotive equipped with cast-iron wheels will, on a level track, develop 400 lb. per ton drawbar pull before the wheels slip. The drawbar pull of a locomotive equipped with cast-iron wheels will decrease 5 per cent. for each per cent. of grade, as this per cent. of drawbar pull is necessary for hauling the locomotive itself up the grade.

Referring to Table A, it will be noted that a 10-ton locomotive will develop 4000 lb. drawbar pull on a level track and will only develop 75 per cent. of this drawbar pull on a 5-per cent. grade, or, in other words, the drawbar pull is decreased 25 per cent., or 5 per cent. for each per cent. of grade.

It will be noted also that the haulage capacity of all locomotives shown in Table A and Table B is determined by assuming a resistance of 30 lb. per ton of load for level track and 20 lb. per ton additional for each per cent. of grade.

Referring to Table A a 10-ton locomotive will haul 133 tons on level track and on a 5-per cent. grade it will haul 23 tons. In other words, 4000 lb. is divided by 30 on a level track and 3000 lb. is divided by 130 on a 5-per cent. grade.

Referring to Table B a 10-ton locomotive will develop 5000 lb. drawbar pull on a level track and on a 5-per cent. grade it will only develop 80 per cent. of this drawbar pull, or 4000 lb. On a level track 167 tons can be hauled, which equals 5000 divided by 30, and on a 5-per cent. grade 31 tons can be hauled, which is equal to 4000 divided by 130.

The use of these tables will permit of the selecting of the proper weight of locomotive for a given train load on various grades with sufficient accuracy for all practical purposes.

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*Jeffrey Mfg. Co., Columbus, Ohio.

Where a grade is to be negotiated in a given haul and the locomotive, with its train, is under headway before reaching the grade, larger train loads can be hauled than shown by the figures given in the tables. Where the grade is of any considerable length or where the train is to be started on a grade, the figures in the tables should be used as a basis in selecting the proper weight of locomotive.

In Regard to Motor Equipment

A locomotive should be equipped with motor capacity sufficient for developing the rated drawbar pull without reaching normal full load on the motors. By a normal full load is meant the one-hour rating, temperature rise not to exceed 75 degrees.

Calculated motor capacity for a given duty may indicate the capacity for that particular duty, but suppose the duty for that particular locomotive should be increased within the limits of drawbar pull for such a machine, what then? Is it not more practical for a manufacturer to determine from installations of various motor equipments which size to use on a given weight of locomotive? The reputation of the manufacturer is made or lost by the record of performance of his product.

The determining of the proper sized motor equipment for a given weight of locomotive is not a complex problem or one which the manufacturer is required to split hairs over unless he is inclined to give as little for the money received as possible and run the risk, sometimes, of giving too little.

There are thousands of locomotives in use in this country, and a study of these equipments will show that locomotives supplied with motors having a capacity of 10 hp. per ton and geared to drive the locomotives at six miles per hour are first-class equipments and amply large for any weight of machine. Such equipments will take care of practically any duty within the capacity of the given weight locomotive.

When the speed of the locomotive must be more than six miles per hour, the horsepower per ton rating of the motors should be increased not less than in direct proportion to the increase in speed.

All first-class manufacturers have motor equipments embodying high continuous capacity, and if sufficiently large motors are used for a given weight of locomotive, as outlined above, they will not overheat.

If the motors are too small, ventilation from the outside does little to increase their capacity because the motors are totally inclosed, the motor frames being the only surfaces exposed for radiation.

In any design of locomotive frame there is sufficient ventilation for carrying away the heat that is being dissipated by the outside of the motor frames, rheostats and other parts.

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High Coal Prices in Spain

The shortage of coal continues, says a cablegram from the American consul at Seville appearing in *Commerce Reports,* owing to prohibition of exportation from England. The Seville Chamber of Commerce, fearing paralyzation of industries, has requested the government to endeavor to arrange with the British government for lifting the embargo. Prices at Cadiz are $14.50 to $16 per ton for Welsh steaming coal. Certain Spanish steamship lines are increasing freights on account of shortage.

What Operators Think of Ball Bearings

By Arthur V. Farr*

In January of this year the SKF Ball Bearing Co. attempted to ascertain what was the opinion of the coal-mining industry in regard to the use of ball bearings on locomotives. The company conducted a *questionnaire,* mailing approximately 800 letters to the engineers of representative companies, asking six questions about ball-bearing motors.

Forty-three answers were received. The majority of the officials addressed were not able to answer the questions definitely, others made guesses, while some few were able to give the facts with a reasonable degree of accuracy. Practically all the operators who attempted to answer gave opinions which pointed in the same direction, as will be seen from the following.

There was evidence in the answers of a definite interest in these questions and the realization on the part of the mine operators that such definite knowledge would be useful to them in determining the value of ball bearings on their equipments.

The answers indicate that a considerable number of mines have recently put in ball-bearing mine equipment and have not used it long enough to be able to get definite facts and figures. The questions and some of the more definite answers are as follows:

Questions No. 1—(a) What percentage of time are locomotives with plain-bearing armatures out of service owing to armatures striking pole pieces? (b) What proportion of these motors give trouble? Answers—(a) "20 per cent."; "30 per cent." (b) "We have no plain-bearing locomotives; don't want any machinery with plain bearings." "Our data are in favor of ball bearings; 50 per cent."

Ques. No. 2—How much is your total motor-repair bill affected by using ball bearings on the motor armatures? Ans.—"60 per cent." "We are sure there is a large saving." "50 per cent."

Ques. No. 3—What has your experience shown to be the increased life of the gears of motors equipped with ball-bearing armatures? Ans.—"From our experience with plain-bearing mine cars we know there is a large increase." "100 per cent."

Ques. No. 4—How much have motor failures owing to grounds on brush holders, cables and other parts inside of the motors been reduced on account of ball-bearing armatures? Ans.—"80 per cent." "75 per cent."

Ques. No. 5—What difference do you find in the average condition of commutators of plain- and ball-bearing armatures? Ans.—"Condition of commutator 50 per cent. better than plain." "Very good difference."

Ques. No. 6—(a) How much does it cost for lubricant per motor per year for plain-bearing motors? (b) For ball-bearing motors? Ans.—(a) "$8." (b) "$1.80 for ball-bearing motors."

Many of the companies, instead of answering the questions as given, made general statements such as the following:

"Since we have used ball bearings (for over a year) on our locomotives, there have been no armatures on pole pieces yet. Two cases of armature on pole pieces in same period of time on plain bearings."

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*SKF Ball Bearing Co., New York City.

"We have no data from which to give exact information, but the four locomotives equipped with ball bearings give us practically no trouble, whereas the eight locomotives with plain bearings give us a lot of trouble and expense."

"In regard to ball bearings will say we find our commutators in better condition, and we have had no armature trouble with either of the two locomotives which we are operating and which are equipped with these bearings. We have three 8-ton locomotives so equipped."

"Our master electrician advises that he is a believer in ball bearings for motors, as he has experienced a great deal of trouble with the plain bearings. It requires a great amount of oil to keep them cool, and the oil soaks the winding and commutator and allows the armature to get down onto the pole pieces."

"So far, our experience with ball-bearing equipment has been satisfactory."

"We are operating practically all sizes and makes of mining locomotives. Our most recent purchases have been locomotives with ball-bearing motors. These have given excellent satisfaction."

It will be noted from these replies how general are the data of the mine operator in favor of ball bearings on locomotive motors. This feeling of the operators is well summarized in the terse reply of one man, who said, "All we can say is that we like the ball-bearing locomotives."

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An Appreciation of Successful Management

BY AN EMPLOYEE

Just as streams are traced to their sources, so it seems is success or failure in managing industrial concerns nearly always attributed to the management. It takes the full measure of ability, energy and money to operate coal mines and industrial concerns so that the constant returns on the investment will spell success for the stockholders.

Those concerns, both large and small, whose management is broad enough in knowledge of humanity to adopt policies which involve a possible decrease of returns on investment in order to improve the physical, moral and financial conditions of their employees certainly deserve especial credit where this is achieved not only without the criticism but with the full commendation of the stockholders. I think this is particularly true when success of this kind is achieved in a district where broad policies of welfare work have hitherto been virtually unknown.

I think it is a fine thing to work for a company which is continually demonstrating (in good times and bad) that the well-being and best interests of its employees are one of the cardinal principles of its management. It is better yet to see indisputable evidences of the fact that such policies have proven successful; the strongest of these evidences is that public opinion in the district now concedes that the company pursues these policies, not to make money, but because they are right in principle. When public opinion ceases to attribute ulterior motives to a company spending money to improve the conditions of workmen, that company's policies are successfully demonstrated.

BIG CONCERNS ARE NOT AGAINST THE INTERESTS OF LABOR

The company I work for is one of the largest industrial concerns in the South. It operates coal mines and coke ovens and manufactures iron and steel. I must grant it is a big concern—but that does not mean that big companies are the only ones that can do this kind of work, for many smaller ones in the district are following its example. It is unfortunate that our present administration at Washington seems to have the idea that because a business is big it is bad. We have done all we can to show them otherwise so far as our company is concerned. We know that the benefits we enjoy now are due to the present administrative policies of our officials, and we would much regret to go back to former conditions.

In the old days a change in management for our concern simply meant changes in high officials and certain lower ones. To the rank and file it meant nothing more than getting used to new bosses as the result of changes higher up. But when our present administration took hold several years ago, a different atmosphere soon made itself felt. In the few years intervening, the application of new and broader policies has brought to us many desirable things.

WHAT HAS BEEN ACHIEVED

First, safety in the performance of our work. Everywhere "safety first" is recognized and consistently taught. The company provides every safeguard possible, and the men learned long ago that it pays them far more than it does the company to observe safety rules. Accidents of all kinds, especially those which are fatal, have been materially decreased, and for men who are hurt there is a plan of relief.

Second, improved working conditions. Working conditions everywhere have not only been rendered as safe as possible, but everything for the convenience and physical well-being of workmen has been provided, such as pure drinking water (iced in summer), bathhouses, lavatories and toilet facilities. All this is absolutely free to us.

Third, improved living conditions. Most of us live in company houses in towns near the works. These are now screened and fenced. Nearly all of us have gardens, and there are prizes for the best. There are streets and sidewalks, and we have a complete sanitation system, including fly-proof closets. Our drinking water is analyzed frequently to determine its purity; pools and ponds are either drained or oiled; in fact, everything possible is done to take care of the health and well-being of the residents of company towns. As a result sickness has been materially minimized, especially such sickness as is usually caused by the presence of flies and mosquitoes.

Fourth, improved community life. Our state ranks somewhat low in school facilities, but our management has provided excellent school buildings wherever they have been needed, with full equipment and first-class teachers. Special kindergarten facilities are provided for the children. If our wives and daughters want to learn more about cooking and housekeeping, that information is furnished too. There are playgrounds for the children. Churches have been provided also, and the company assists in helping us to keep the church buildings in good condition. A complete health department is maintained, including hospitals and home treatment, cheaper than any of us could secure the same class of service outside.

Fifth, right treatment of employees. It is the fixed policy of our management that the men must be treated right. The "big stick" policy is not countenanced anywhere. We have learned to know that the company has our best interests at heart. Courteous and fair treatment is the invariable rule. As is natural in the South the negro forms the largest single nationality among our workmen. In the past the negro worker in the South has been too much abused because of a certain natural ignorance and shiftlessness inherent in the race. Our company not only refused to take advantage of its labor in this way, but has done all it can to teach this class in particular the value of a dollar and the advantage of saving it. The company stores are operated, not to make money, but to be of help to the workmen. The drawing of store checks on earnings is discouraged as much as possible and is becoming less frequent all the time. The discounting of checks for cash is prohibited, and our company refuses to be a party to the plan still followed by many coal-mining corporations of issuing store checks and then buying them for cash at a discount.

The Outcome of Liberal Policies

The result of such policies is that hundreds of us are buying and becoming owners of our own homes, and this is one of the best evidences of contented workmen. Wages are good—in fact, higher than ever before in our district. Strikes have become unknown to us. In the old days a strike was a contingency to be expected every year. Now with the spirit of full coöperation prevailing we do not think about such things. There is a profit-sharing system and a pension plan for aged employees.

Summing it up and speaking for myself, I know that I am working for the best concern in our district. Everybody, public and all, concedes that. There is an atmosphere of loyalty all along the line. The outside public feels the same way and recognizes in our company the greatest developer and benefactor of the district.

I know that I am truthfully voicing the sentiment of the great majority of all classes of workmen for our company when I say that this means successful management. It is the kind of management that many concerns in our own district are emulating to the best of their ability, and it is the kind that it will pay every coal-mining concern desiring ultimate success to consider well. In short it is a magnificent dividend producer, for what better dividends can be desired than the knowledge that both men and company understand each other and are working together for a common success.

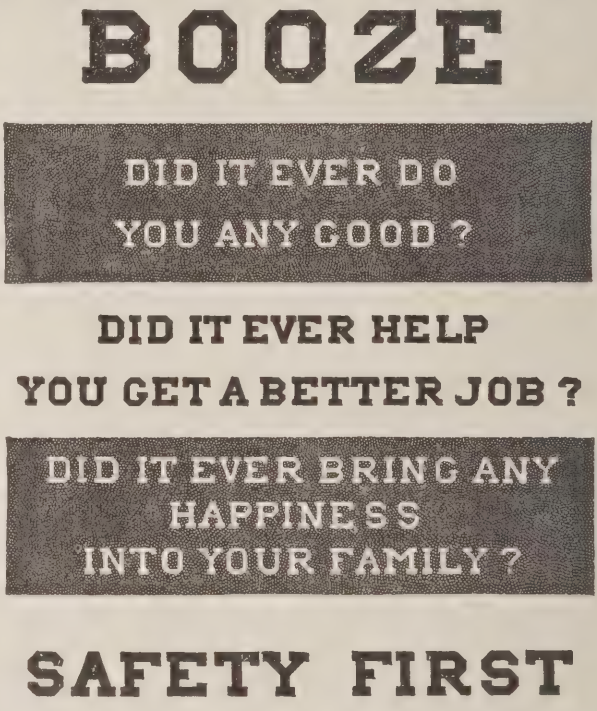
American Coal in Sweden

It was not profitable to import coal from the United States into Sweden during the past autumn and winter, says Consul Emil Sauer, of Goteborg, in *Commerce Reports,* on account of the high freight rates and the fact that exports from England to Sweden were resumed. At present, however, the freight rates from England to Goteborg are more than double what they were during the winter, and rates from the United States to Goteborg have decreased, so that they are little, if any, higher than the rates from England. On account of this fact and the partial export prohibition on English coal, it should be profitable now to ship American coal to Sweden on a large scale. Several Goteborg importers are already communicating with American coal exporters who applied to this consulate for assistance, and the city gas works of Goteborg has just ordered a cargo from the United States. Some German coal has come to Sweden during the last few months, and it appears now to be the German rather than the English competition that Americans have to meet.

(The facilities for and cost of discharging coal at Goteborg and a list of importers were given in Special Consular Reports No. 69, "Foreign Markets for Coal," which may be obtained, at 5 cents per copy, from the Superintendent of Documents, Washington. A supplementary report from Goteborg was published in *Commerce Reports* for Apr. 6, 1915.)

Coal Mining and Booze

The accompanying sign is displayed at the office of the Owl Creek Coal Co., Gebo, Wyo., right opposite the place where the miners receive their pay. It is about 18x30 in. and is made of a high-grade enamel with alternate stripes of dark blue and red.



BOOZE

DID IT EVER DO
YOU ANY GOOD?

DID IT EVER HELP
YOU GET A BETTER JOB?

DID IT EVER BRING ANY
HAPPINESS
INTO YOUR FAMILY?

SAFETY FIRST

An Opinion on the Export Outlook

Hugh L. Kirby, manager of the coal department of the Vernon Metal & Produce Co., is of the opinion that American fuels will soon displace a large tonnage of English coals now being exported to South America. Mr. Kirby has devoted considerable time during the past few years to a study of the export situation, paying attention particularly to New River coal. He has also under way a consolidation of several West Virginia mines.

In his opinion the soft-coal owners should avail themselves of the present conditions brought about by the European war and the embargo on Welsh coal, and inaugurate an aggressive policy. If the export business is developed he believes the problem of overproduction will be largely overcome. He states that American coal can be sold in Rio and Argentine at least $3 cheaper than English coal. The only obstacle in the way is the lack of bottoms and the fact that it costs 60 per cent. more to operate vessels flying the American flag.

A Coal-Traffic Readjustment

An important trackage agreement has been concluded between the Baltimore & Ohio R.R. and the Western Maryland Ry., whereby the latter will have access, with comparatively little construction, to two coal fields off its present lines and will participate in the traffic from a third. This agreement is a sequel to the purchase by John D. Rockefeller of a controlling interest in the Consolidation Coal Co. He already owned control of the Western Maryland Ry.

In the Somerset region of Pennsylvania, the Western Maryland Ry. will construct a short stretch of line extending from a point in Somerset County to a point in Westmoreland County, touching properties of the Consolidation Coal Co. on which new mines are to be opened. To reach this new track the Western Maryland, under the agreement referred to, will use about twenty miles of Baltimore & Ohio R.R. track.

In the Fairmont region of West Virginia, the Western Maryland Ry. will further construct a small mileage of track, in the nature of a mine branch, to serve intended new workings of the Consolidation Coal Co. To reach this the Western Maryland Ry. will use Baltimore & Ohio R.R. tracks for about seventy miles, from its own western terminus at Connellsville, Penn., to Fairmont, W. Va.

In the Cumberland region of Maryland, the Consolidation Coal Co. owns the Cumberland & Pennsylvania R.R., 57 miles long, which brings out approximately 1,500,000 tons of coal annually. This coal has heretofore been turned over to the Baltimore & Ohio R.R., but with the acquisition of an important interest in the coal company by the owner of the Western Maryland Ry., the latter found itself in a position to demand and obtain a division of this traffic.

Baltimore & Ohio Loses Traffic, But Gains Rental

These are the three sources of coal traffic affected by the agreement. In respect only to the last mentioned it is believed that the tonnage of the Baltimore & Ohio R.R. will be materially reduced. The extent to which its revenues will be affected has been authoritatively estimated at $700,000 or $800,000 annually.

The advantage to the Western Maryland, in addition to a share in the tonnage of the Cumberland & Pennsylvania R.R., will be found in its access to new coal fields and the opportunity to serve, exclusively, the new workings of the Consolidation Coal Co. It will be able to do this with a much smaller outlay of capital than would have been required if it had built its own lines through to the Somerset and Fairmont fields.

This agreement is regarded by railroad men as a striking illustration of the modern tendency to avoid duplication of railroad investment by making greater use of existing facilities wherever that is possible. While the Western Maryland Ry. will be saved an expenditure of possibly $8,000,000 to $10,000,000, the Baltimore & Ohio will benefit to the extent of the rental which under the terms of the agreement the Western Maryland Ry. will pay for the use of the tracks.

Of course, the Baltimore & Ohio R.R. will have to face new competition. By conceding the use of its tracks in this manner the railroad has opened the door to such competition, whereas 15 or 20 years ago it would doubtless have followed the custom of fighting the newcomer to the last ditch. The same competition as now would, in all probability, have resulted from such a course and a large expenditure on the part of the Western Maryland Ry. for about 100 miles of duplicate and largely unnecessary railroad would have been necessary. The Baltimore & Ohio R.R., also, would have missed the track rental it is to receive under the present arrangement.—*Boston News Bureau.*

Wilmington Meeting of the Penn. R. C. M. Assn.

By F. R. Wadleigh

The annual meeting of the Pennsylvania Retail Coal Merchants' Association held at Wilmington, Del., June 15 to 17, was an unqualified success, both in a business way and socially. The business sessions were ably presided over by President Howard White, of Philadelphia, to whose efforts and those of Secretary Wellington M. Bertolet was largely due the thorough, efficient and expeditious manner in which the various reports and discussions were handled.

The opinion seemed general that the association is doing the successful work for which it was formed, and at all the sessions there was a general feeling of fellowship.

The entertainment and social part of the meeting was most successfully provided for by the coal merchants of Wilmington aided by the Chamber of Commerce, while the lectures or talks of Chief Engineer Bevans, of the Philadelphia & Reading Coal & Iron Co., and Chief Mining Engineer Enzian of the U. S. Bureau of Mines were an excellent combination of entertainment and instruction that could not have been bettered. There were also a variety of interesting exhibits of the appliances and machinery used in the retail coal trade, which formed a valuable feature of the meeting.

The place of meeting, the "Play House" of the Du Pont Building, was ideal for the purpose, comfortable, well-ventilated and with ample room for everything and everybody. The association is to be congratulated on the convention as a whole, the large attendance, the spirit shown by the members, the efficient handling of all questions and the selection of Wilmington as a meeting place.

The convention was called to order by President White, and Mayor H. W. Howell, of Wilmington, welcomed the delegates in an unusually interesting speech, which was responded to by T. H. Tattersall, of Trenton, after which the delegates were again made welcome by President J. T. Satterthwait, of the Wilmington Chamber of Commerce.

Activities of the Association during the Past Year

President White, of the association, after taking the chair, delivered the annual address, which was followed by the reports of the various committees and officers. A *résumé* of the principal points covered in Secretary Wellington's reports follows:

The eleventh year of the association finds a membership of 1182—930 from Pennsylvania, 118 from New Jersey, 50 from Delaware and 84 from Maryland. During the year 272 new members were added. The total membership represents the sale of 3,000,000 tons of anthracite coal per year and includes 90 per cent. of the retail coal dealers of eastern Pennsylvania, New Jersey south of Trenton and Delaware and Maryland.

Consideration of the Clayton bill as affecting the coal trade showed that, as finally passed, the bill gives the coal operator the right to choose his own customers and that it may be used to prevent unfair competition. The proposed "war tax" on freight bills, finally dropped by Congress, was unjust and discriminatory and as such was formally objected to by the association. The Pennsylvania Anthracite Tax Act, now before the courts for determination as to its constitutionality, was touched upon, and dealers were advised to have a clear understanding with the operator or jobber from whom they bought coal as to the disposition of the tax in case the act was declared unconstitutional.

Attention was called to the percentage deductions on wet washed coal allowed by the carriers, as a result of complaint by the association. It was pointed out that this complaint has resulted in every member getting back a far greater return than the amount of his association dues. The order of the Public Service Commission of Pennsylvania reducing anthracite freight rates to Philadelphia territory about 40 per cent. is still before the courts, but it is not believed that the reduction will stand on the evidence as submitted. If the reduction is made, the rates to intermediate points will be reduced automatically by the terms of the long- and short-haul clause of the Public Service Act.

The past year has witnessed an unusual and widespread demoralization of prices. Retailers were able to purchase at unusually attractive figures, but many dealers did not take advantage of this fact and cut prices themselves, thus losing a profit they might have had.

The afternoon session consisted of short discussions on various retail trade topics, which were instructive, but brought out nothing particularly new. Reports of the several local associations were also read, giving information as to year's activities.

Concluding Sessions

The morning session on the second day was featured by the address on anthracite mining questions by Chief Engineer Bevans. Following this came reports of committees and the election of officers for the ensuing year. J. H. Tattersall, of Trenton, was elected president. The incumbents of the secretary and treasurer offices were reelected, together with five members of the board of directors.

The afternoon session was largely given over to a lecture on anthracite mining by Engineer Enzian, of the United States Bureau of Mines, the talk being illustrated by motion pictures taken especially for the bureau. These pictures showed every detail of getting out the coal—mining, preparation, loading and transporting, as well as first-aid work in case of accidents.

In the evening a smoker and vaudeville entertainment was given for the members by the City Club of Wilmington and was greatly enjoyed.

The following day was devoted by the members and their friends to a trip down the Delaware and back to Philadelphia, on the "Queen Anne," which was chartered for the occasion by Bush & Sons Co., the oldest firm of coal dealers in Wilmington.

The two lectures on mining should be of especial value; retail dealers, as a rule, are apt to take too little interest in and know too little about the mining end of the business. It would seem advisable to give them every opportunity to learn something about the way in which the product they handle is mined and prepared, and it is suggested that it would add to its value if the official organ of the association, *The Coal Dealers Message,* would include a mining department for the purpose of educating dealers on such an important and vital part of their business.

The exhibition of coal-handling machinery and supplies was quite elaborate and well worth attention. The facilities for exhibiting the various machines and their operation were ample, and the whole line of exhibits was the best yet seen at any of these meetings.

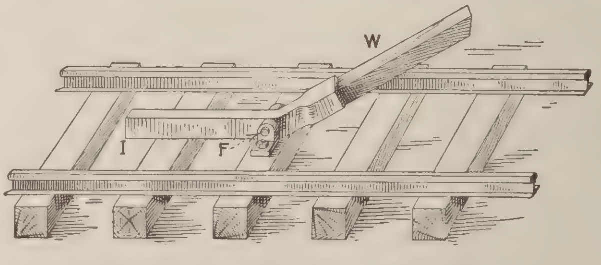
The list of exhibitors is as follows: Link-Belt Co., portable wagon loaders; Jeffrey Mfg. Co., portable wagon loaders; Autocar Co., motor trucks; Specialty Engineering Co., portable wagon loader, model of coal pocket; Gifford-Wood Co., portable wagon loaders, dealers' supplies; E. L. Koller, coal dealers' supplies; Standard Scale & Supply Co., oil engines, scales, supplies; Keystone Manufacturing Co., bags; F. S. Converse Co., screens, chutes and supplies; Howe Scale Co., scales; W. T. Lane & Co., bags; Fairbanks Scale Co., scales.

Safety Device in a Slope Mine

By Wilbur Greeley Burroughs

On the main slope of the Hisylvania Coal Co.'s mine, No. 22, at Glouster, Athens County, Ohio, the haulage is accomplished by means of an endless-rope system. The mine cars are gripped to the rope when coming out of and in going into the mine. If the rope should break, the loaded cars would run backward down the slope into the workings, with perhaps disastrous consequences. To insure against such an accident safety devices are installed at short intervals in the center of the track for the entire length of the slope.

One of these safety devices is shown in the accompanying illustration. Its operation is as follows: The arm *I* is made of iron, while the arm *W* is of wood. These arms are fulcrumed at *F,* this fulcrum being fastened securely to the track on the floor of the slope. The arm *W* is so attached that ordinarily it is high enough above the floor to be struck by the mine cars as they pass up the slope.



A Simple Car Stop for Mine Slope

As a loaded car moving up the slope strikes the arm *W,* it revolves on *F,* moving downward, allowing the car to pass over it, the iron arm *I* at the same time rising slightly into the air. When the car has passed over and the downward pressure on the arm *W* is thus relieved, the iron arm *I* on account of its weight falls to the floor of the slope, reëlevating *W* to its initial position.

If the rope to which the loaded cars are gripped should break, the rear of a loaded car going backward down the slope would come in contact with the arm *W* and be brought to a standstill. These devices are placed at short intervals so that a car cannot acquire much momentum before it is stopped by the arm *W*. Thus there is no danger of a car being thrown from the track by impact or of its gaining sufficient force to break the arm *W*.

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Large Decrease in Output of French Coal

No statistics have been published that would indicate the actual production of coal in France in 1914, says Consul General A. M. Thackara in the supplement to *Commerce Reports,* but from information obtained from the Comité Central des Houilleres de France, the French coal mines worked up to their normal capacity during the first 7 months of the year. At the outbreak of hostilities the extraction of coal on account of the mobilization of the miners and the invasion by the enemy fell off to 60 per cent. of the average output. During the last four months of the year all the mines still in operation gradually increased their production, so that at the end of 1914 they were working to almost their full capacity.

The mines in the North Basin and two-thirds of those in the Department of Pas de Calais were either in the hands of the enemy or were in the center of hostilities, so that the production in these regions was almost nil. Taking these facts into consideration and estimating on the basis of the production in 1913, the output of coal in France during 1914 was about as follows: First 7 months, 23,500,000 tons; during August, 2,000,000 tons; during the last four months, 4,500,000 tons, making a total for 1914 of 30,000,000 tons.

Coal mines are now producing at the rate of about 20,000,000 tons a year or one-half the normal output. The annual consumption of coal in France for industrial, domestic and for other purposes averages about 60,000,000 tons. To supply the deficit of the native production about 20,000,000 tons of foreign coal in normal times have to be imported. While the railroads, electric light and gas plants are consuming nearly the same quantity of coal as in peace times, the almost complete cessation of operation in the great metallurgical centers of the north and east of France and the decreased activity in other coal-consuming industries have resulted in reducing the coal consumption of France to about 35,000,000 tons. Therefore it is estimated that from 15 to 16 million tons of foreign coal will have to be purchased.

As imports from Germany and Belgium are not possible, coal from Great Britain is being received in large quantities. The principal ports from which the coal is sent are in South Wales, although direct shipments are made from the east coast of England, notably from Hull, Newcastle and Hartlepool. The price of coal at the mines has either remained the same or increased but slightly, but the cost to the consumer has risen considerably owing to increased freight rates both on land and on water.

The receipts of coal from other countries in 1914 amounted to 15,344,550 metric tons against 18,710,935 tons in 1913, a decrease of 3,366,385 tons. Of the imports in 1914 Great Britain shipped 10,759,085 tons, Germany 2,341,996 tons and Belgium 2,032,098 tons. In addition to the above France imported 1,446,423 tons of coke in 1914 against 3,070,038 tons in 1913 and 746,875 tons of briquettes as compared with 1,085,994 tons during 1913.

Of the imports of coal during last year, 5,078,346 tons were received during the last six months, mostly from Great Britain. The exports of French coal during last year were 701,556 tons, compared with 1,304,377 tons for 1913, the principal country of destination being Belgium.

⁂

Coal Scarcity in Holland

The situation regarding coal in the Netherlands, says Consul F. W. Mahin, of Amsterdam, in *Commerce Reports,* is becoming precarious. Before the war unlimited quantities could be had from both Germany and Great Britain. Now the imports from those countries are small, uncertain and insufficient for current demands.

The wholesale price of coal in this market has doubled, bituminous coal having advanced from about $4 a ton, the normal price, to about $8; anthracite has increased to about $10.

While this country produces peat in great abundance, it produces practically no wood for fuel and so little coal as to be negligible—only about 1,500,000 tons a year, from a few mines in the province of Limburg. Therefore, if outside fuel supplies were entirely cut off, the Netherlands would be practically limited to peat for fuel.

As respects the coal supply for the near future, the outlook is uncertain. Attention has been turned to the United States, but distance and freight rates cause importers and users to hesitate about placing orders there.

In this country close economy is now being observed by users of coal. As an instance, the municipal street lights of Amsterdam are now burning at only one-half their usual strength, which with other economies materially reduces the consumption of coal by the city.

⁂

New Mexico Breaks Record

The production of coal in New Mexico in 1914 was 3,877,689 short tons, valued at $6,230,871. This was the greatest coal output in the history of the state, according to C. E. Lesher, statistician of the U. S. Geological Survey.

New Mexico is the only one of the Rocky Mountain states in which more coal was mined in 1914 than in 1913. The increase of 168,823 tons in quantity and $829,611 in value is due to the greater output from Colfax and Santa Fé Counties, which, being on the east front of the Rocky Mountains and not far distant from the larger Colorado fields, were able to supply a part of the demand normally furnished with coal from Colorado, from which the 1914 production was restricted because of the continued strike.

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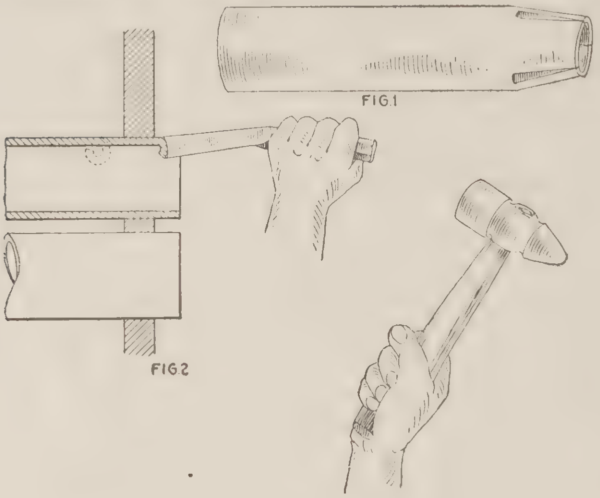
Regarding the limit of depth in mining, Joseph Dickinson said: "Some people are talking now of 5000 ft., and I should think that it may be obtained hereafter by means of shorter shifts, taking a man out from the face and allowing him a little respite and time to cool, and by the use of some of the modern cooling adjuncts. I do not know what effect ice machines will have in the working-face, and I do not know what effect liquid air will have; but compressed air when liberated produces a degree of coldness sufficient to freeze small valves of air machines, and that would have a cooling effect in a mine. We have by no means exhausted the cooling powers within reach of the miner at present."

Removing Boiler Tubes

In removing tubes from boilers, if the entire set is to be removed and replaced, they may often be cut from the inside and allowed to drop, to be taken out through the manhole.

Where only one or two flues are to be taken out, this method is impossible. In that case one or more flues may be removed by means of a ripper, which cuts the flue, allowing it to be slipped endwise through the tube hole. The accompanying illustration explains this method.

A curved ripper, Fig. 1, should be used, as it tends to force the flue inward as it is cut, thus preventing the bulges that are sometimes made when a straight ripper is used. By keeping bulges out of the flue, it is easily slipped through the tube sheet.



Method of Using Ripper

Discrepancies in Boiler Usage

By C. W. Crawford*

An error unchallenged and unnoticed for years becomes a habit as persistent in perpetuating itself as does an actual fact. The too-frequent wrecking of hoisting engines in coal mining indicates an error somewhere. When an engine goes to pieces all of a sudden, there is something wrong, and the cause is frequently regarded as a mystery and any attempt at explanation is accepted with suspicion.

It is no trifling cause that breaks bed-plates, cranks, pistons or whatever is weakest, but after all it is inexcusable and preventable. The presence of water in the cylinder is uncalled for, but how it came there is the real problem. There is no power derived from it, and therefore the less of it the better. It doesn't come through careless handling of the engine. It is an intrusion. Its source is the point to be sought after.

It comes from the boiler. The force that causes it to leave the boiler is the steam as it travels to the engine. Ordinarily it is in the form of fine spray. The force that starts the spray from the boiler has also the greater effect of starting solid slugs of water, when the conditions are favorable therefor, and when once a slug of water is started in the pipe it is compelled to go through, and disastrous results may follow.

It is pertinent to ask why the water is thus caused to leave the boiler. It will be difficult to get engineers who are trained to the present conditions to believe the real cause when it is pointed out. This problem was thrashed out years ago when the principal large boiler plants were located on steamboats. In those times similar accidents occurred frequently; cylinder heads were knocked out, connecting-rods and cranks were broken, etc. Steam drums (or header lines) and outlet pipes from the boilers were enlarged to more than double the capacity of those formerly used, and the trouble ceased. The steam drums were of large capacity, 30 in. or more in diameter, and the boilers small, with diameters from 38 in. to 42 in. Though the standard steam legs of our present 72-in. 150-hp. boilers are only 6 in. in diameter, the old-time boilers would have been furnished with steam legs with a diameter of 9 in.

For further comparison, a steamboat having 24-in. cylinders, 8-ft. stroke would have five boilers 25 ft. long of above diameter, while an uptodate hoisting engine with 24x36-in. cylinders and the same piston speed would require two boilers 72 in. diameter, 18 ft. long. The velocity of steam leaving the former (five outlets) would be 861 ft. per min. and in the latter nearly 5000 ft. per min. Header lines 16 in. in diameter are assumed to be sufficient on large modern boilers, so they are installed either without domes or with these accessories not nearly as large as they should be.

The boilers of the present time are excellently made and embody the best of material and are, as such, all that can be asked for, but it would seem that a mistake has been made in adopting a standard outlet steam opening, so small as to compel a steam velocity so rapid as to bring over the spray from the boiler without providing any means of separation.

An efficient separator will generally insure reasonably dry steam, if the right sort of separator is chosen; but the spray or solid water ought never to have cause for leaving the boiler.

There isn't much dignity in borrowing from the practice of 50 years ago, but the right must prevail in the end. Another good point from steamboat practice is making the end of the steam pipe project several inches into the drums or header line. This is an efficient aid in heading off the entrained water from passing on to the engines.

In any well-conducted boiler and engine plant 12 to 20 lb. of water (steam) per hp.-hr. is sufficient for reasonable economy. A consumption of 20 to 30 lb. per hp.-hr. represents roughly the average of hoisting engines, the difference being a useless quantity of water heated to the temperature of the steam, and which exerts no force and is a detriment to lubrication as well as to economy of coal.

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Operator's Duty to Furnish Headers—Where headers are customarily or necessarily used in mining, they constitute "caps," within the meaning of the Kentucky mining statute which requires an operator to provide miners with a sufficient number of caps and props. And where an operator is bound by this law or by contract to furnish headers, the miner does not assume the risk of being injured in consequence of the operator's neglect to supply them after repeated requests, unless he is chargeable with knowledge as to a loose condition afterwards causing him injury. (Kentucky Court of Appeals, Big Branch Coal Co. vs. Wrenchie, 170 Southwestern Reporter 14.)

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*President, Crawford & McCrimmon Co., Brazil, Ind.

The Labor Situation

On July 6, John P. White, president of the United Mine Workers of America, will commence a two months' membership campaign in the anthracite region. It is the hope of the union that every mine worker will become a member of that organization. Mr. White's first meeting will be at Carbondale in the northern district. He will attend the convention of District No. 1 at Scranton, beginning July 19, and will be present at the tri-district convention at Wilkes-Barre, at which the demands on the operators will be framed. The three anthracite districts are Scranton or No. 1, John T. Dempsey president, John Mack secretary; Hazelton or No. 7, Thomas Kennedy president, John Yourishin secretary; and Shamokin or No. 9, James Matthews president, James J. McAndrew secretary.

Possibility of a Lockout in Ohio

The arrangement between the eastern Ohio operators and the union conformed with the letter of the agreement which the latter made with the Hocking Valley operators. The miners said they would not settle the strike in eastern Ohio unless they received 47c. per ton for machine-mined run-of-mine coal. They kept that promise, but the Hocking Valley operators declare it was kept only to the ear and not in principle, seeing that it was offset with a number of valuable concessions. They consequently are making a thorough investigation to see whether they have a valid reason for attempting to overthrow their agreement with the miners. Their agreement with the union favored them, and they think they are in danger of losing the advantage gained.

The miners in the Ohio region have lost ground everywhere by the action of their union. They advocated a uniform scale based on the state average. This favored the Hocking operators, and accordingly they signed. On the other hand the uniform scale injured the eastern Ohio operators, so they refused to sign until concessions had been made which offset, and possibly more than offset, the demanded price concession. This was a bad situation; the Hocking men had reduced their wages to increase the wage of the Belmont men and then the latter made concessions so that in no real sense was the increase that they sought obtained

Now, the Hocking operators, denying that they have been delivered what they bargained for, are disposed to overthrow an agreement which they truly say was only conditional. The only dispute is whether the conditions have been really met. If the investigation proves or seems to prove that the deadwork and other concessions make important changes in the cost per ton, then the operators of the Hocking Valley, Jackson, Pomeroy Bend, Crooksville and Massillon districts will meet to discuss the issue and may cancel their contract.

Albasin Has Been a Good Leader

President C. J. Albasin, of the eastern Ohio district, denies the report that he will resign and says he is at a loss to explain the rumor. He is now serving his second elective term, which started Apr. 1 of this year. He appears to be a good executive in many ways. The fault in conducting the campaign, involving as it does all Ohio, can hardly be rightly ascribed to him. There was little or no violence during the strike, and this was largely due to Albasin and his lieutenants, who strove to keep down the unruly Industrial Workers of the World. There was a large amount of pilfering and some cases of robbery, but only because Albasin did not have at all times perfect control of the foreigners in the union.

The attempt to raise wages in one district and to lower them in others was a folly of follies, for it could only result in failure to raise wages and in success in lowering them, and now it seems that the operators whose rates were lowered are not satisfied. There is this gain, however—that Ohio may, as a result of the readjustment, gain a widened and steadier market as soon as times are better and the markets, lost during the strike, are recovered.

John McLennan, president of the United Mine Workers of America, is starting an agitation to have John D. Rockefeller, Jr., convicted of murder, arguing that as he was directly responsible for hiring the mine guards at Ludlow, he was to blame for their actions just as John R. Lawson was held to be chargeable for a murder committed by men under his direction.

The Carr mine of the Carr Coal Mining & Manufacturing Co., south of Leavenworth, Kan., is idle because of a dispute between the superintendent and the 200 miners. Two weeks ago a flood caused water to run down the air or escape shaft, and when the superintendent found that the fans were not able to force enough air through the mine he decided for safety's sake not to operate on that day. For this reason the pit committee called the men out, and they have not been at work since. A deputy state mine inspector examined the shaft and pronounced it in good condition.

Development of a Chinese Coal Mine

The Yingmaoyeh coal mine, says Consul General Horace Remillard, of Hankow, in *Commerce Reports*, is situated in the district of Puchi, in the Wuchang prefecture of Hupeh Province, in a large coal region on the Hunan border. Mining by native methods has been carried on there all along, but foreign machinery has recently been introduced, in connection with foreigners acquiring an interest in the development of the properties. Arrangements were made before the revolution for the exploitation of the Yingmaoyeh mine, but it is only two years since it was possible to make a start. Machinery was brought out from home and a foreign engineer engaged, and now two shafts have been sunk to the seam, which lies at a depth of 250 ft. and is 9 ft. thick. There is a steady daily output amounting to 2,000 tons per month.

The coal is a hard anthracite of great lasting power and burns clean away, leaving as its only residuum a little white ash. It consists of 78.81 per cent. of fixed carbon, 14.88 per cent. of volatile matter, 0.17 per cent. of sulphur, 5.29 per cent. of ash and 0.85 per cent. of moisture.

The chief trouble to be overcome in connection with the mines has been a superabundance of water, but a system of electric pumps has overcome that difficulty. A third shaft is now being sunk, which will be completed by August, and then the output of the mine will be doubled. At present 630 men are employed in various capacities.

The coal has to be carried by coolies to the waterway at Puchi City, a distance of 25 li (about 8 mi.), where it is put on board chartered junks, and has hitherto been sent to Shanghai, where it meets with a ready market. Arrangements are being made to have it put on sale in Hankow. A large consignment has arrived, and it is expected from the superior qualities of the coal that the output of this particular mine will become very popular. It is easily lighted and has great heating power and no smell or dust.

COMING MEETINGS

American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

American Mine Safety Association will hold the following meets: July 2-3, Big Stone Gap, Va.; July 23-24, Billings, Mont. Secretary, H. M. Wilson, 40th and Butler St., Pittsburgh, Penn.

Alabama Coal Operators' Association will hold its annual meeting at Edgewater, Ala., on July 10, 1915. James L. Davidson, secretary, Birmingham, Ala.

The Order Kokoal will hold its annual pow-wow at Chicago, Ill., July 13 and 14, 1915.

The Southern Appalachian Coal Operators' Association will hold its semiannual meeting July 23, 1915, at Knoxville, Tenn. J. T. McCoy, Knoxville, Tenn., is secretary.

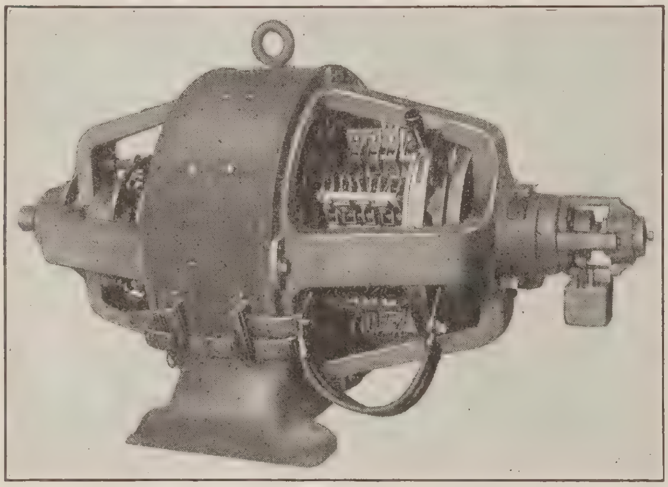
The United First-Aid Corps of the 4th district, Delaware, Lackawanna & Western R.R. Co.'s coal department, will hold its third annual first-aid contest at Harveys Lake, Penn., on Aug. 14, 1915. Secretary, Lewis Richards, 212 East Green St., Nanticoke, Penn.

The American Mining Congress will hold its 18th annual session at the Exposition Memorial Auditorium, San Francisco, Calif., Sept. 20-22, 1915. J. F. Callbreath, secretary, Majestic Bldg., Denver, Colo.

New Apparatus and Equipment

Rotary Converters in Mining

It is interesting to note the favorable impression being made by the rotary converter in coal mining, particularly since the manufacturer has developed the new commutating-pole machine in the smaller sizes. One of the chief troubles in mining work, particularly with small rotaries, has been commutation. The mining load varies anywhere from 10 per cent. of full load to 100 per cent. overload in a short space of time. With the noncommutating pole rotary, it was necessary to shift the brushes with the change in load, or sparking and damage to the commutator would result. This would end finally in short-circuited coils and burnouts.



The New Rotary Converter

Since the application of commutating poles, a machine normally designed for a 35-deg. rise in temperature at full load will carry a 50-per cent. overload for 2 hours with a rise not exceeding 55 deg. and a momentary overload of 100 per cent. without the least sign of sparking. In the commutating-pole design the brushes are set on the neutral point and fixed there, and the varying loads have no effect in so far as sparking is concerned.

The Westinghouse Electric & Manufacturing Co. recently received an order from the Stonega Coke & Coal Co. of Virginia for 24 commutating-pole 150-kw. rotary converters, wound for six-phase 60-cycle 275-volts direct-connected and operating at a speed of 1200 r.p.m. These will be placed in 12 underground substations which will be supplied with power purchased from the Kentucky Utilities Co. The power will be delivered to five points at a voltage of 33,000 and stepped down to 2300 volts, at which potential it will be transmitted to the mine, where there will be two banks of transformers, each consisting of three 50-kv.-a. single-phase machines wound for 2300 volts on the high-tension and rotary voltage on the low-tension side. Each substation will be controlled by a five-panel switchboard.

Another installation, similar except that it will be above ground, is that of the Conemaugh Smokeless Coal Co. in the Pittsburgh field. This installation consists of one 200-kw. rotary converter with the same characteristics as those for the Stonega company. This machine is of the bracket type, as will be seen from the accompanying illustration. The frame is of rolled steel, the feet being pressed out of a single sheet. This type of machine is built in three sizes which are popular in the mining field—100, 150 and 200 kw.

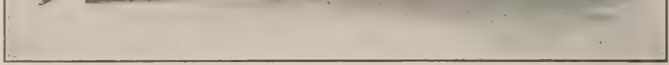
The Westinghouse company has also built a new type of this machine in the larger sizes, having furnished one 300-kw. 275-volt rotary converter of the commutating-pole type and a machine similar in design of 500-kw. capacity to the Lehigh Coal & Navigation Co., at Lansford, Penn.

⁂

The Halby Shoveling Machine

The efficiency of drilling machines has been increased many-fold in the last few years, but a great loss of time and money in driving drifts and tunnels at present is still incurred in mucking. After the material is broken, with but few exceptions mine operators are still using the methods of loading by hand which were in vogue over 2000 years ago. Recently the Halby shoveling machine, manufactured by the Lake Shore Engine Works, of Marquette, Mich., has been operated successfully for six months in one of the iron mines of northern Michigan, under the most varied conditions.

The most important factors which a shoveling machine should possess were carefully considered in this design. They are as follows: The first cost should be moderately low. The machine must be handled by miners and should be free from all complications. It must handle material consisting of the finest grains up to large pieces, material both wet and dry, and stand severe treatment as well as great wear and tear. The cost of upkeep must be low. The motion must be such that if any firm object is struck the mechanism will not be damaged. The machine must be small and compact.



The Machine Loading a Car

This shoveling machine was first demonstrated at the plant of the Lake Shore Engine Works last fall, at the meeting of the Lake Superior Mining Institute held on the Marquette Range. After the meeting it was shipped to the Judson mine at Alpha, where it is at present loading a 2-ton car in an 8x8 drift in 1½-min. when the loading conditions are average—that is, when there is a fair-sized bank of ore in front of the machine. At times the ore bank is small and scattered so that under these conditions it takes as much as 4 min. to load a 2-ton car; but an average loading time is a 2-ton car in about 3 minutes.

Formerly, with hand labor, it required two men shoveling 20 min. to load a 2-ton car under the same conditions as the machine is now working. The machine requires about 200 cu.ft. of air per min. The cost of operating for an 8-hr. shift is approximately as follows:

Power	$3.00
Runner	2.50
Interest on investment	.20
Repairs	.50
Oil, etc.	.17
Total cost per 8-hr. shift	$6.37

Figuring 200 tons loaded per 8-hr. shift this shows a net cost per ton of $0.031. The labor expense of two men loading for an 8-hr. shift would be $5 per day. Under similar conditions they would load approximately 40 tons in 8 hr., or a cost of $0.102 per ton. The Halby shoveling machine, therefore, loading for less than one-third the cost, at the same time loads five times the tonnage.

The overall length of the machine when ready for operation is approximately 15 ft., but the machine can in a few minutes be shortened to an overall length of 10 ft., if especially short curves or limited space should make this necessary. The overall height of the machine is 5 ft. 4 in., and the total width approximately 4 ft. The total weight is 7500 lb.

The machine is made up in three distinct sections, each forming a unit by itself. The top section contains all the working parts for the conveyor and shovel mechanism. The center or power section contains the motive power, all the clutches and the driving gears. The lower or truck section serves as a support for the entire machine. The top section can be lifted off the center section by removing two caps at the top of the side frames. The center section can simply be lifted from the truck, there being no bolted connections between them. This construction feature makes this loader especially adapted for mine and tunnel work where it often becomes necessary to move through openings too small to allow the entire machine to pass.—*Engineering and Mining Journal.*

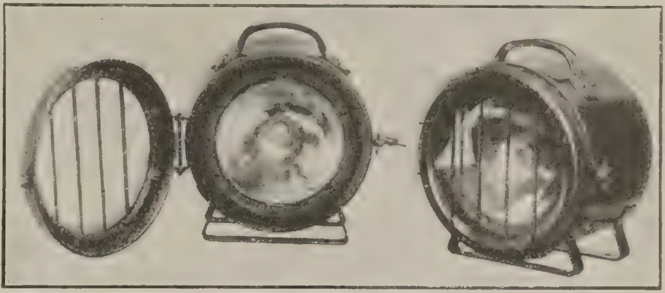
New Mine Locomotive Headlight

Many mine operators have long wanted an incandescent mine-locomotive headlight to replace costly arc lights or inefficient carbon bulbs. To meet the demand for such a headlight the Esterline Co., of Indianapolis, Ind., has recently perfected what is called the "Golden Glow."

This headlight is similar in design to the Golden Glow railway headlights which have been widely adopted in the past 18 months, because of their mirrored glass reflector and their fog-penetrating, nonblinding light. Exhaustive service tests have been made on the new headlight, and the result indicates that equipment may now be obtained which will give long bulb life, reduced current consumption and maintenance expense and give a nondazzling, keenly penetrating illumination.

The new headlight, as may be seen from the accompanying illustration, is really a lamp within a lamp, the interior lamp body carrying a 7-in. mirrored glass reflector and a Mazda bulb, so supported that the constant jarring and pounding incident to this service will not break the filament. The headlight is practically watertight.

Particular attention is called to the advantages which the Golden Glow light presents in a restricted space over the dazzling glare of an arc. Men ahead are not blinded or confused and may work in its light beam at close range or at considerable distance with equal ease. In fog it secures projection not possible with any white light.



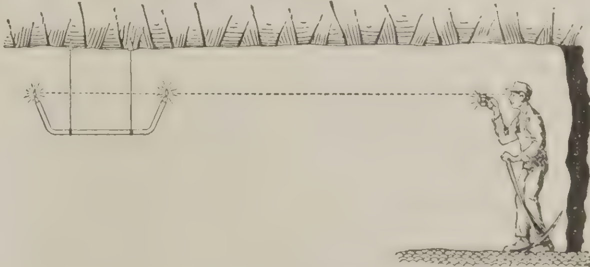
THE NEW HEADLIGHT

In electric railway and tunnel service over 6000 Golden Glow headlights are in use, and during four years not a single accident has been reported on account of lack of light or an inability to see an approaching car.

A reduction in cost of headlight operation has been long sought. The current consumption of the Golden Glow headlight is reduced from that of a 4-ampere arc light to ⅓ of an ampere with a 36-watt bulb, or ⅕ of an ampere with a 23-watt bulb. Furthermore, the expense of maintenance of arc lights, such as the cost of parts, replacement, cleaning and adjustment, has been reduced to the renewal of incandescent bulbs.

Novel "Sighting" Apparatus

The accompanying illustration shows an apparatus which will materially facilitate "sighting" places in the mines which are being driven on line. By means of this instrument the miner at the working face of a tunnel or drift can determine the true direction in which to advance.



METHOD OF USING SIGHTING APPARATUS

The target consists of a telescope bar having upturned ends in which candles are placed. The bar is provided with hooks to which cords are connected and fastened to the plugs in the roof of the tunnel. The bar thus extends in the true direction that the tunnel or drift is to take.

The candles in the target being lighted, the miner at the working face of the tunnel holds his candle so that it is in line with the two in the target, and in this way he is able to tell at any time the proper direction in which to advance. The inventor of this device is Frank Higgins, Box 218, Mulberry, Kan.

Editorials

Michigan's Low Death Rate

However high the State of Michigan may rank as a manufacturer of automobiles, house-heating appliances and furniture it can by no means be considered as a great coal producer. During the past year its output of coal amounted to 1,238,030 tons, or slightly over one-fifth of 1 per cent. of the production of the entire country. There is one circumstance, however, in connection with this coal output that practically places Michigan in a class by itself—only two deaths through accident occurred during the entire year. This corresponds to a production of 641,515 tons for each life lost.

While it will readily be conceded that many individual firms produced during 1914 tonnages per fatality vastly superior to the above, yet no other state considered as a whole has such an enviable record. The death rate per 1000 men employed in and about the mines in Pennsylvania was about 2.35, in West Virginia it was 7.43, in Illinois 2.43, in Missouri it was 1.82, while for the entire United States it was 3.3. Michigan's death rate per 1000 men employed in coal mining shows a marked contrast to the above, being 0.87.

As all mining men know, a low death rate either per thousand employees or per million tons of production may not be in anywise significant of care on the part of either miners or mine officials. Natural conditions may be such as to render operation either inherently safe or unavoidably dangerous, and the figures showing the death rate may be, and frequently are, merely a reflection of these conditions.

Whatever may be the reason for the low death rate in this state—and this death rate has not always been low—it must be conceded that in the year 1914 coal was mined there with a lesser cost in human life than in any other state in the country with an output at all comparable to that of Michigan.

*

The Enduring Conflict

Under this title one of our distinguished contemporaries has contrasted the continuance of industrial disputes with the impermanence of the present war and has argued that in England and elsewhere when the war is over class consciousness will take up the gage of battle after national consciousness has ended its warfare.

Before discussing this statement, however, it must be remembered that the word "consciousness," while often used of a correct sentiment, usually means something more in the mind of the socialists and labor leaders who invented it. In fact "consciousness" is frequently also a euphemism for "aggressiveness," and it will be used in this sense in the paragraphs which follow.

Where that quality is merely self-recognition it is fair and reasonable and no one can find fault with it. Surely no one would wish that in any class, sex, nation or creed the members should be so supine as not to seek their inherent rights to self-expression and equal opportunity.

In what follows, therefore, consciousness will be used not so much in its correct but in its popular usage as a recognition of one's power of aggression and a determination to use that power to its fullest extent.

The continuance of struggles derived from such consciousness, as endless as they are implacable, bodes no small degree of misery to the human race. But with judgment all forms of consciousness, whether of nation, class or sex, may be prevented from dividing mankind. At one time creed consciousness separated us, and we killed it or nearly killed it by forgetting it. Our national divisions are about to die also, not so much as a result of action as by reason of our knowledge that there is nothing national to be really conscious—that is, aggressive—about.

And class and sex consciousness, lately so loudly heralded, will pass with the rest into the limbo of forgotten separations. But this change will not come as the outcome of legislation; at least the laws we pass will have little influence in the result.

It is not well here to take up dogmatically the question of the value of laws in stemming any kind of intemperance, whether it be that of the body or of the mind. But it may be well to recall that it is asserted that the laws favoring prohibition have done more harm than good, and perhaps legislation restraining intemperance in labor agitation may not have any better result. It is not to laws but to character that we can best ascribe the decline of that creed consciousness of the past which had so many victims, and not to legislation but to self-restraint must we look for a gain in temperance. So also the contentment of labor is to be sought similarly in a correct attitude toward labor problems rather than in statute law.

Consequently all the clash about injunctions, the Clayton bill, incorporating unions and like legislative enactments are interesting and perhaps important, but must not be regarded too seriously. The prime necessity is to destroy class consciousness by a generous sense of the importance of class interdependence.

This work is the main duty of the next half century. The large corporation is separating operators and men. What is it doing to correct this evil; for having created the difficulty it should attempt to remove it? In most cases it is creating much trouble by continually changing officials between whom and the miners in the short period of their contact no sympathy or sentiment is likely to spring up. Foremen are shifted and discharged to satisfy expediency or efficiency without regard to the fact that, like gears, men run smoothest that for awhile have been running together.

It is not enough to say that small corporations are as much disposed as large to change their mine foremen frequently. That is quite true, but in these small concerns there is always the operator as a permanent representative of the company, and he is often far closer to the man at the face than the foreman at a large mine.

As a result of frequent changes at the mines of large corporations, there is often no one to whom to be loyal, no one to personify the company. The agricultural workmen from Europe who come to our mines hardly know what a "company" is. They are prepared to be loyal to someone in authority, but the man to whom they *could* give their allegiance stays so short a time in control that the loyalty is not won, and then also the man himself too often stays only a month or so and does not have time to develop any such an attachment.

It is not sufficient for a company that its directorate be composed of men who are fair and just. Its officials from top to bottom must be men who inspire loyalty and trust. There must be a degree of permanence in their tenure of office and in their methods of operation so as to create these qualities. A new official is a distinct shock to an organization. Everyone is prepared to resist the changes he makes, for fear they may not be for the benefit of the individual so resisting. Where changes are frequent, therefore, loyalty is impossible.

The most successful companies are those retaining men in office whose personality is so marked that the men work for the official and not for the company. If absentee management is to continue—and it will—and if it is to succeed—and it must—then we must find a way to make it not absentee at all in action, but must have the local boss a visual representative of the men at the home office.

We have been too careless of our duties in this respect. Many a man of character and friendliness has put a browbeater, a narrow, irresponsible man in charge and earned the ill-will of his men thereby. And many operating heads have changed their bosses needlessly and have lost the attachment of the men to the old official, which was worth as much as the greater efficiency of the new.

Many men have not scrupled to let old miners go and bring in new men in their place every day. The commonest sight at a mining village is a "flitting." The men go and come daily and there can be no basis for loyalty.

You know how it is in your own office. You know that you have men who seemed undesirable at first till you knew their ways and how to take them. They grew on you. The miners are just like you are—ruffled up at first with every unexpected characteristic of a new man, untrusting, uncertain and suspicious. Time removes those difficulties, so that even a man's faults are soon regarded as inevitable and natural.

Then just as everyone begins to move in his sphere without friction the man in charge is removed, and the shock is given and all the work has to be done over. Or the miners leave and are replaced and the loyal, or at least contented, force is replaced by strangers who have no friendliness with the boss, no attachment to their homes and a sort of grouch for everything and everybody.

The itinerant mine foreman is a menace to the industry, but it rarely is his fault that he stays so short a time in one place. The miner who moves from colliery to colliery is another source of discontent, and he also is not always to blame for so frequently placing his belongings on the moving wagon.

In a village where the people have known one another for years it is hard to introduce an atmosphere of doubt and suspicion, but where the continued shifting of men has made them all strangers to one another almost any story can be believed and any misfortune may be feared. If then peace is to replace class conflict, an attempt must be made to stabilize the population so that a community interest will be built up.

The Ebb and Flow of Alien Labor

The falling off of immigrants has been accompanied with a large increase in the number of returning foreigners. In the ten months ending May 1, 1915, the ratio of departing foreigners to those entering is 92.6 per cent. The net gain is only 28,364 men. The following table shows the record of arrivals and departures since 1910:

Year Ending June 30	Total Aliens			Ratio of
	Arriving	Departing	Net Gain	Departing
1915*	373,382	345,018	28,364	92.6%
1914	1,403,081	633,895	769,276	45.1%
1913	1,427,227	611,924	815,303	42.9%
1912	1,017,155	615,292	401,863	60.5%
1911	1,030,300	518,245	512,085	50.3%
1910	1,198,037	380,418	817,619	31.8%

*Ten months to May 1, 1915.

The unfortunate part of this loss of men to Europe is that it removes the most energetic workers. At other times we might congratulate ourselves that those returning are men too old to work or misfits or men too much bound by home ties to become nationalized and settled. We might congratulate ourselves on their loss, for we might well say they could no longer work or never were any good or were men hopelessly inassimilable.

But the men we lose to the war are young and active men with ideals, in many ways the pick of the workingmen in the countries they come from. The other countries gain by their return as we have gained by the coming of the more active men of Europe.

Moreover, we have broken them to our needs and industries and have given them a smattering of our ideals and our language. We have imparted to them all a degree of instruction which is now largely thrown away, for only a few will return when the war is over.

The shiftless, the unenterprising and the old will remain, and in a degree America will suffer from that deterioration of laboring personnel which has occurred in Europe as a result of the lure of America.

The public press has discussed the lack of interest in the employee due to absenteeism of the employer. It is true that the ends of democracy and the need for sympathy cannot be compassed under absenteeism. However, the evidences are that the operator is showing more interest than ever in the welfare of the employee despite his abstention from that employee's working place.

But if the operator has been growing away from the miner, still more has the miner been getting out of touch with the operator, whose language he no longer speaks and whose name even he probably too often does not know.

Some of the smaller companies have wretched living conditions; the mines are full of puddles; conditions of work are grievously unfavorable. But the miner in these smaller operations knows his boss. He feels that his employer is a man, not perhaps his ideal of a man, but still a man; and somehow there are no strikes and sometimes the men will work for him at much less than the union scale despite all the inconveniences with which their labor is encompassed.

The importance of this unity of feeling between worker and employer emphasizes the fact that the men who have learned English and know something of the company and the boss are an asset, and the occurrence of war that takes them away, that kills them, and sends us others whom we do not know, and who will be years learning to know us, is a distinct loss.

Discussion By Readers

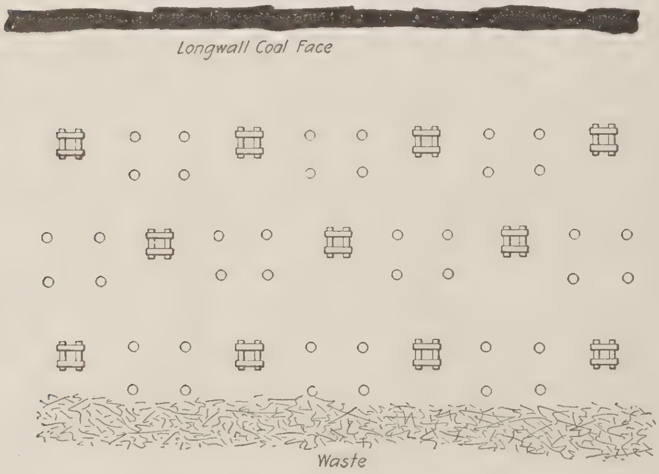
Longwall in Pittsburgh Seam

Letter No. 11—I noted with interest that Mr. Brown, in his Letter No. 8, Coal Age, May 29, p. 939, is of the same opinion that I expressed in Letter No. 7, May 15, p. 859; namely, that longwall advancing cannot be successfully employed in working the Pittsburgh seam, chiefly because of the impossibility of maintaining the haulage roads.

Mr. Brown presents an excellent block or panel system for mining this seam. I think, however, that if he will carefully study the retreating system presented in my previous letter, he will admit that it possesses certain advantages over his proposed block system.

I freely admit that the block system presents a decided advantage in the early stages of the development by permitting a larger output of coal earlier in the game. But to offset this advantage, the system requires the driving of a large amount of narrow work, which is expensive.

Comparing this method with the retreating plan I presented, it will be observed that my entries are driven directly to the boundary; but I believe that their expense is fully justified by the large amount of working face thus developed, which means much cheaper coal and a large output at once becomes available. It must be acknowledged, also, that the roads are more permanent and there is less shifting of tracks and changing of switches in the retreating plan, which means a great decrease both in cost of maintenance and in the operating expenses.



Showing Cribs and Posts at Working Face

One of the most important features of the longwall retreating plan is the protection it affords against the occurrence of creeps and squeezes. The same protection is not afforded by any plan of mining that provides for a large extraction of coal in the early stages of development. Another feature that can be urged in favor of the proposed retreating plan is the facility it affords for good drainage. The diagonal roads in this system invite natural drainage to a greater extent than where the butt- and face-headings are driven at right angles to each other as in the panel system. This feature tends to reduce the necessary expense for draining the mine.

In addition to the explanation given in my previous letter, the accompanying sketch shows the plan of cribbing at the working face. In order to support the enormous roof pressure, I would suggest carrying three rows of cribs. These should be built of hardwood blocks 4x4x18 in., and spaced 10 ft. center to center. Where the roof is quite frail, four posts should be stood between adjoining cribs, as shown in the figure; also, the cribs in the three rows should be staggered, as shown. When undermining the coal, sprags should be set 5 ft. apart. The coal may then be cut across the entire face of 100 ft., which is a great advantage in machine mining. The sprags are easily drawn, or knocked out after the cut is made and the miners are ready to leave the place.

Such a system removes all danger of roof falls where the miner keeps his place in good order and takes the necessary precautions for his own safety. No coal is lost, and there is less dead-work caused by the presence of clay veins, which are often troublesome and greatly increase the expense in the room-and-pillar system, while in longwall-work they can often be left to gob themselves.

John Oldroyd.

Farmington, W. Va.

Letter No. 12—Reading the numerous letters published in Coal Age in reference to the application of the longwall method of mining to the working of the Pittsburgh seam in eastern Ohio impresses one with the idea that the scheme is impracticable at the present time.

While there is no doubt in my mind that the Pittsburgh seam can be worked successfully on the retreating plan of longwall, to which reference has been made, I believe there is more need at present of discovering a system of room-and-pillar mining that will increase the recovery of coal in this seam without adding to the cost of production. It is no time now to experiment on the adoption of the longwall method in this seam when labor conditions are so disturbed and the profit on coal is at a minimum. Let a more favorable opportunity be chosen for investigating this question, but for the present let us strive to reduce the large percentage of coal left in the seam by adopting some simple modification of the present plan of mining.

All the conditions affecting the mining of coal in the No. 8 seam are well known, and having this knowledge, it should be possible to estimate with considerable accuracy the probable cost of mining by any proposed method. Moreover, the longwall method has been tried on several occasions in this district, and one can ascertain by making inquiry what results have been obtained in its use. Owing to the large outlay of capital necessary for the development of the longwall *retreating* system, it is plain that the *advancing* method presents the only feasible plan.

In considering the general question of longwall, regard must be had to the fact that the hard limestone above the

Pittsburgh seam is separated from it by a stratum of soft slate of varying thickness. This makes it practically impossible to secure a break in the limestone which is so important and essential for the success of any longwall method of mining. As the coal is taken out, the soft slate immediately above it falls. The broken slate occupies more space than it did in the solid formation, and as a result there is not sufficient room for the settlement of the limestone to cause a break. There would be more chance of getting a break if the limestone laid directly above the coal, as it would then have a drop of practically 6 ft., or the thickness of the coal seam. Instead of this, however, the limestone now settles gradually onto the broken slate beneath, and no break occurs.

Some time ago Mr. Waddell, Letter No. 6, Coal Age, Apr. 24, p. 732, stated that longwall was being used in various localities in Pennsylvania, West Virginia and at points on the Norfolk & Western Ry. He must remember, however, that those places have altogether different conditions of roof, coal and bottom and, moreover, that the labor conditions are frequently quite different from those in eastern Ohio, the latter being far from what might be desired. With unfavorable labor conditions and freight rates, the eastern Ohio operator must be quick to avail himself of the opportunity to profit by any suggestions that would enable him to recover a larger percentage of coal.

In my opinion, if such a thing had been possible, one of our district operators would have long ago devised a way for a larger recovery of coal in the working of this seam in eastern Ohio. At present they are anxiously awaiting some suggestion of a plan that bids fair to succeed. It is useless, however, to compare this district with work in the Fairmont field of West Virginia, where, under more favorable conditions, the operator is enabled to recover 95 per cent. of the coal in the seam. The eastern Ohio operator would be glad to recover 90 per cent. of his coal by any practicable method.

Mining Engineer.

Wheeling, W. Va.

Value of Coal Analyses

Referring to the inquiry on this subject by N. G. Near, Coal Age, June 19, p. 1072, I may say that opinion is naturally divided on the points presented therein. It is common to hear criticism of this nature, and in the hope of convincing at least some skeptics I offer the following remarks.

Before taking up the subject matter, however, and for the benefit of many whose ideas of coal testing are, to say the least, vague, permit me to digress for a moment and give a brief outline of the scope of such an analysis. For example, a complete commercial coal analysis includes the following determinations:

Moisture—In bituminous coal this should not exceed 1 per cent.

Volatile Matter—This is not all combustible matter. Hence, a coal whose volatile products are more largely combustible has more heat value than a coal whose products are partly incombustible. Such incombustible volatile matter dilutes the combustible portion and, by absorbing some of the heat, lowers the heat value of the coal. This constituent cannot therefore be considered a reliable factor in determining the heat value of a coal.

Fixed Carbon—This is the free carbon content of the coal and is the chief source of heat when the coal is burned.

Ash—The ash is composed of the mineral content or impurities of coal and is, to a greater or less extent, a necessary loss in the production of power by the combustion of coal. The ash not only affects the heat value of the coal, but its final disposal involves a necessary additional expense. The nature of the ash (high or low fusing point) makes a great difference in stoking, by causing the formation of clinkers and destroying the grate-bars, which in many cases must be replaced at frequent intervals.

Sulphur—This constituent when found in coal is generally combined as iron pyrites. It is of course injurious and troublesome and acts to rapidly destroy the grate-bars of the furnace by combining with the iron.

Heat Value (B.t.u.)—The heat value of coal is measured, in this country, by the British thermal unit (B.t.u.) and is of the greatest importance in determining the value of coal for fuel purposes. This unit expresses the amount of heat required to raise 1 lb. of water 1 deg. Fahrenheit.

Lack of space will not permit of the discussion of the relative value of different coals used for fuel purposes, and it will therefore be necessary to consider only bituminous coal as used for steam purposes. With this preliminary, I will proceed to answer, as far as I may be able, the points suggested in this inquiry.

The mining of coal, in general throughout the country, follows a fixed method of procedure. The coal is broken from its bed in the underground workings of the mine, brought to the surface in mine cars and dumped over screens at the tipple into the waiting railroad cars. The arrangements for screening and cleaning the coal vary at different mines, and the results obtained, in this respect, depend largely or wholly on the equipment at the mine, the honesty of the operator supplemented by the capability of the superintendent and the thoroughness of the men engaged in this work.

Inasmuch as no two seams of coal are exactly alike in quality, and since other conditions under which the coal is mined vary widely, not only in different mines, but from time to time in the same mine, one can readily see that the quality of the coal loaded for shipment will vary widely. Under conditions most favorable to the purchaser of fuel, the value of the coal loaded in each car can only be determined by analyzing a carefully prepared sample of its contents. The uptodate mine, therefore, will check its shipments of coal from day to day by making analyses to ascertain that the operations in the mine are being conducted properly and that the specifications required by contract are being fulfilled.

While it is absolutely correct, as has been said, that "We can add nothing in value to the coal by testing the shipment," it is manifestly unfair to claim that "Such work is a pure loss of time and energy," and that the coal tester is a "nonproducer," as is sometimes stated. The argument is so weak that it hardly seems worth refuting. The best way, however, to convince anyone who is in doubt in this respect is to let him make a canvass of the large manufacturing and industrial concerns. Thousands of these concerns employ a force of chemists themselves or are regular patrons of the commercial laboratory. Ask any of these interests, and their instant reply would be, "We employ no *nonproducers* in our laboratory, nor would we pay an outside commercial laboratory for testing what is of no *value* to us from a business standpoint."

In regard to the expense, I would say the cost of making such tests is not as great as many people seem to think. Many laboratories make a complete analysis for $6; or on a yearly contract the charge is about $4 per sample; while on a basis of one sample per week a yearly contract price of $200 is quoted. This certainly cannot be said to be an excessive cost when one considers that the loss on a few cars of coal of inferior quality will more than offset the bill of testing shipments for the entire year. Many plants are saving from $1000 to $10,000 or more per year by buying coal under proper specifications, while numerous other manufacturers who are not availing themselves of these privileges could save fully as much if they were alive to the importance of the work.

Inasmuch as fuel is one of the large and important expense items of every manufacturing and producing plant, the attention of all large purchasers of fuel should be directed to this matter. Other raw materials are given careful attention and the greatest care is exercised in guarding the quality by systematic analysis of the product, and the old assumption that "coal is coal" will not satisfy modern business methods. Today, the output of all other mines is sold on an analysis basis designed to determine the value of the mineral or its available contents. Coal is sold for its heat value and is therefore properly subject to the same conditions as other natural products.

Referring now to the final suggestion that "The solution of the problem is to be found in leaving the determination of the heat value of the coal to the mine operator," and the further statement that "Mine operators are not always the band of crooks so often claimed," it will be readily admitted that there is no "imputation of dishonesty" on the part of the seller because the purchaser desires to satisfy himself of the value of the product he buys. Such a method forms the underlying principle of all safe business. No honest dealer or operator will object to an analysis of the product he offers on the market.

In support of what I have said, permit me to cite a single incident of the large number of similar ones that have come under my personal observation. A 600-ton barge of coal recently shipped to a sugar refinery was instantly rejected on the report from their laboratory that the coal ran about 30 per cent. in ash. Out of curiosity to see where this shipment would finally land, it was followed, and the next day developed the fact that it was sold and unloaded at a plant across the river, which it is needless to say did not believe in testing fuel shipments. It would have astonished that manufacturer could he have discovered the amount of his loss.

Hundreds of other similar incidents could be quoted by anyone familiar with coal sampling and analyzing. When one reflects that millions of tons of coal of poor quality are mined and sold every year, the fact must be realized that much of this poor quality of fuel goes, of necessity, to the nontesting plants. It requires no argument to convince one that it would be an extremely poor business policy to leave this important matter, as suggested, entirely in the hands of the mine operator.

Not every plant could be benefited by testing their fuel purchases, because many are already getting the best coal possible for the price paid. But where the yearly consumption warrants, coal should either be purchased from a mine where the quality of its output is established, or purchased under fair specifications and each shipment tested to insure against loss.

Too much reliance is often placed in the practical knowledge and opinion of an engineer, who bases his opinion solely on the operation of the boilers. But under varying conditions of supply, coal cannot be judged correctly in this manner. Much more could be said; but I have offered these suggestions in the hope of throwing some light on a matter that is not appreciated as fully as its importance merits.

PERCY N. COUPLAND,
The Harris Laboratory.

New York City.

Education in Mining

Letter No. 1—I noted the suggestions of Karl F. Schoew, COAL AGE, June 12, p. 1034, urging the adoption of some practical plan for reaching miners in an educational way, and the account by John T. Bradley, Apr. 3, p. 611, of a successful mining class, I am led to offer the following remarks:

The value of vocational instruction as a means of increasing the efficiency and practical ability of men, as well as being a factor in the demonstration of the relative value and adaptability of technical ideas to the securing of practical results, has been shown through the industrial and educational departments of the Y. M. C. A. Under the supervision of this institution, a mining class was started in this place in November, 1913, and conducted for a period of six months, with sessions held twice a week. The prime object of the undertaking was to give such instruction in mining as would enable those who were ambitious to take the annual examination for mine foreman, assistant mine foreman and fireboss. Out of a class of twelve, five had the ambition and perseverance to continue to the close of the term.

The method of instruction used differed somewhat from that generally employed in this class of work. The instructor in charge of the class had learned from his own personal experience and that of others that the majority of those who studied the subject of coal mining with the object of securing a certificate of competency were men of comparatively small educational attainments and for this reason made the study of the subject a matter of *memory* and not a matter of *reason*. They committed *facts* to memory, but did not attempt to find out the reason for them. The instructor was but little better equipped in educational advantages than were his pupils, but he had discovered one important fact with respect to the study of mining; namely, that the employment of the faculty of reason was far more productive in the acquirement of technical and practical knowledge than was that of memory.

Believing that the best method of instruction to adopt was to present the subject matter in plain, simple language, and to explain each fact in a clear, concise way so as to show why it was true, he always tried to induce original investigation by asking questions to show the effects and to explain the simple, elementary laws they were being taught. The course of instruction was based on these principles and methods.

No reference books on mining were used in the class, not because books are not valuable, but for the simple reason that most textbooks did not explain the subject in a simple way, but made use of technical terms and expressions with which mine workers are unfamiliar.

That the method adopted was successful was shown by the fact that the five who presented themselves for examination in 1914 succeeded in securing certificates and that four of the class of five the following year were awarded certificates.

The Y. M. C. A. is to be congratulated on the success of its educational work in this place, not only in that of mining, but in other departments as well, and this success is to be largely attributed to the efficient management of its representative, Samuel Calverly. The only thing to be regretted is that the efforts put forth have not met with as hearty support as they deserve from those whom they were intended to benefit. It is to be sincerely hoped that coal miners may be brought to realize more fully the value and help of education in their daily work, enabling them to produce better results with less labor and in less time. The man who has trained himself to think and act in accordance with his reason has educated himself and will always excel one who performs mere physical labor. Labor is noble and dignified, but to be so it must be intelligent.

A. M. INER.

——, Penn.

Air Factor in Mine Explosions

Letter No. 1—I have read with great interest the article entitled "The Air Factor in Dust Explosions," by John Verner, COAL AGE, May 29, p. 922. I can say that I heartily agree with Mr. Verner in many of the statements made and conclusions reached by him in the study of this question. I desire, however, to take exception to one of these statements.

Mr. Verner gives as the three essential factors in the production of explosive-dust combustion the following: "1. Flame. 2. Combustible dust. 3. An air current or draft toward the source of heat, to bring the dust and air in contact with the flame."

One would infer from this statement that the air current or draft toward the source of heat is here understood to be a *factor* or the *cause* of the combustion; while, as a matter of fact, such air current or draft, as Mr. Verner explains later, is the direct *result* of the combustion.

I would suggest, therefore, that the three essential factors for explosive-dust combustion should be stated as follows: 1. Flame. 2. Combustible dust in suspension. 3. Sufficient air or oxygen to support combustion.

EDW. H. COXE.

Knoxville, Tenn.

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Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Specific Density—The term "specific density" expresses the ratio of the density of any elementary substance to that of the element **hydrogen,** which being the lightest of the known elements is taken as unity (H = 1). The **atomic weight** of an element referred to hydrogen is therefore the specific density of that element.

Density—The term "density" as applied to substances is used in two ways: 1. To express the **relative weight** of a substance with respect to hydrogen, volume for volume. 2. To express the **unit weight** (lb. per cu.ft.) of a substance. The density of an elementary substance is expressed by its atomic weight referred to hydrogen as unity. The density of a compound substance is equal to one-half of its molecular weight.

Specific or Atomic Volume—These terms have reference to an assumed unit volume for all gases, which **unit** is the assumed volume of a single gaseous atom.

Avogadro's Law of Gaseous Volume—This law may be stated briefly and clearly as follows:

At the same temperature and pressure all gaseous molecules are assumed to be of the same size.

With a few unimportant exceptions, this law applies to all gases, whether simple or compound. It holds true for all mine gases and is important in the calculation of the relative volumes of gases concerned in chemical reactions.

Molecular Volume—Chemical hypothesis assumes that the molecules of simple substances each contain two atoms only, while the molecules of a compound substance may contain any number of atoms, but never less than two. Notwithstanding this multiplicity of atoms, Avogadro's law makes all gases, with a few unimportant exceptions, to contain the same number of molecules, per unit volume, when measured at the same temperature and pressure.

Specific Heat—Investigation has shown that the same quantity of heat imparted to equal weights of different substances does not produce the same rise of temperature in each substance. Also, equal weights of different substances when cooling give out different quantities of heat for each degree the temperature falls. These facts show that different substances have different capacities for absorbing and holding heat as **sensible heat** causing a rise of temperature.

The "specific heat" of any substance is its **relative heat capacity,** or its heat capacity referred to that of an equal weight of pure water. The **unit of heat** is the amount of heat required to raise the temperature of a unit weight of water one degree. Therefore, the specific heat of a substance being referred to water expresses the heat units requird to raise the temperature of a unit weight of the substance one degree.

The **specific heat of a solid** or liquid always refers to the heat per unit weight. The **specific heat of a gas** may be referred to the unit weight or unit volume, as desired. The specific heat of air and gases is different according as the air or gas is confined (constant volume) or is allowed to expand (constant pressure). The specific heat of a gas for "equal volumes" is the heat capacity of the gas referred to that of an equal volume of air at the same temperature and pressure.

The Coal Age Pocket Book

The following table gives the specific heats of a few of the common solids and liquids of interest in mining:

SPECIFIC HEATS OF SOLIDS AND LIQUIDS

Substance	Temperature, Deg. Fahr.	Specific Heat
Aluminum	60-1150	0.2145-0.3077
Copper	32-1650	0.0933-0.1259
Iron	32-1100	0.1050-0.1989
Lead	60- 600	0.0299-0.0338
Lead (melting point 610° F.)	610- 680	0.0356-0.0410
Mercury	32- 500	0.0334-0.0320
Platinum	60- 210	0.0324
Silver	32-1200	0.0559-0.0750
Tin	32- 210	0.0545
Zinc	32- 700	0.0935-0.1220

The specific heat of all substances varies more or less with the temperature as appears in the above table. In the case of gases, the increase per degree (Fahr.) above zero is roughly estimated as follows: Air, nitrogen, carbon monoxide, 0.000012; oxygen, 0.00001; carbon dioxide, 0.00006; hydrogen, 0.0002; and water vapor, 0.0001; etc.

The following table gives the specific heats of the common mine gases, for equal weights at constant pressure and constant volume, and for equal volumes under constant pressure:

SPECIFIC HEATS OF AIR, MINE GASES AND VAPORS

Substance	Equal Weights Const. Pres.	Equal Weights Const. Vol.	Equal Volumes Const. Pres.
Air	0.2374	0.1689	0.2374
Methane	0.5929	0.4219	0.3314
Olefiant gas	0.4040	0.2875	0.3951
Carbon monoxide	0.2450	0.1743	0.2369
Carbon dioxide	0.2163	0.1539	0.3307
Hydrogen sulphide	0.2432	0.1731	0.2897
Oxygen	0.2175	0.1548	0.2405
Nitrogen	0.2438	0.1735	0.2368
Hydrogen	3.4090	2.4260	0.2361
Water vapor	0.4805	0.3419	0.2996
Ammonia	0.5080	0.3615	0.2992

When gas, air or vapor is free to expand (constant pressure) heat is absorbed and becomes latent. For this reason more heat is required to produce the same rise of temperature when expansion occurs than when the volume remains constant, and the specific heats in the first column are therefore higher than those in the second column of the table given above.

The values given in the first column of this table have been determined by experiment directly, while those in the second column have been derived from the first by dividing the latter by 1.405, the ratio of the specific heat of gases at constant pressure to that at constant volume. Likewise, the values given in the third column have been derived from those in the first by multiplying the latter by the specific gravity of the gas or vapor referred to air.

Inquiries of General Interest

Laws Regulating Explosives

I want to ask if there are any laws regulating the manufacture, sale and use of explosives, other than the state laws, in Pennsylvania. I am particularly interested in ascertaining if there is any law that defines the minimum distance at which a magazine for the storage of explosives may be located from inhabited dwellings, public roads, etc., similar to the provisions made in this respect in the laws of Massachusetts.

Sim. C. Reynolds, Safety Inspector,
Aetna Life Insurance Co.

Houston, Penn.

The following reply to this question has been sent by Arthur L. H. Street, Attorney and Counsellor at Law, St. Paul, Minn.

Aside from state laws, the only regulations on this subject will probably be found in the ordinances of cities and towns. For instance, on April 2, 1901, an ordinance was adopted in Philadelphia, Penn., regulating the manufacture, sale, storage and use of high explosives within the city, by requiring licenses to be obtained from the mayor, and prohibiting the keeping of such explosives within 300 feet of churches, schools, public buildings, etc. Similar ordinances have been enacted in most of the cities of the country. For information concerning these local regulations inquiry should be sent to the clerk of the city in or near which it is desired to store or use explosives.

Interchange of Certificates of Competency

We have had considerable discussion recently on the question as to whether a mine manager's (mine foreman's) certificate issued by the examining board in Illinois will be accepted for a similar position at any place in Canada or whether any of the certificates of competency issued by the examining boards in any of the states are good in any of the provinces of Canada? Kindly state which, if any, of the Canadian provinces will accept of such certificates and from what states they must come, and to whom application must be made.

John McMillan.

Gillespie, Ill.

The only province in Canada that, to our knowledge, recognizes a certificate of competency granted in another state or country is the Province of Alberta. The third paragraph of chap. 4, sec. 21, of the Alberta mining laws reads as follows:

> The chief inspector of mines may sign and deliver a certificate, without examination, to any person holding a certificate from any other country, providing the board of examiners reports that the standard of training and examination required for the granting of such certificate is equivalent to that required for the granting of a corresponding certificate under this act.

This law went into effect August, 1913. It applies alike to all the states where examinations are held and certificates issued by the state examining board. But the standard of such examination must be judged by the examining board of Alberta and its decision accepted as final. We believe that the standard of requirements for a mine-manager's (mine-foreman's) certificate in Illinois is fully equal to the requirements in Alberta and that the holder of such a certificate in Illinois would be indorsed as competent to hold a similar position in that province, upon making application to the chief mine inspector of Alberta.

Effect of Poor Ventilation on Safety-Lamp Flame

In a heading in a mine where the ventilation is very poor, but where there is no gas, either carbon dioxide (CO_2) or marsh gas (CH_4), being generated or that can be detected, what effect if any would be observable on the flame of a safety lamp owing to the slack ventilation? The gob in this place is somewhat heated.

Fireboss.

——, Penn.

In answering this question it is necessary to consider carefully the effect the slack ventilation, together with the heated condition of the gob, will have on the mine air in the place. The heating of the gob indicates the slow combustion of the fine coal in the waste. This combustion occurring in a slack air current in a confined space undoubtedly consumes considerable of the oxygen of the air, which is thus somewhat depleted of its oxygen content. In addition to this, it is possible that there is a slight amount of carbon monoxide present, produced by the combustion in a limited supply of air. The percentage of this gas, however, is probably inappreciable as long as some air is moving in the place.

The effect on the flame of a lamp burning in air partly depleted of its oxygen is to lengthen the flame of the lamp, which in its endeavor to obtain the necessary oxygen for its combustion reaches upward in a slim, taper-like blaze. The presence of carbon monoxide in the air, even though the amount is inappreciable, helps to lengthen the flame of the lamp. This effect would be much less if there was any carbon dioxide present. The latter gas being extinctive in its effect on flame would act to reduce the size of the flame and counteract the effect just described as due to the depletion of the oxygen and the possible presence of carbon monoxide.

It is a matter of common experience to observe this reaching upward of the flame of a common open light in a place void of proper ventilation, especially where there are evidences that slow combustion is taking place in the gob. This effect has been described, in earlier textbooks of mining, as due wholly to the presence of carbon monoxide, which is assumed to be present in the air owing to the combustion going on in a limited air supply.

Examination Questions

Montana Mine Foremen's and Firebosses' Examination Held at Red Lodge, June 8-10, 1915

(*Selected Questions*)

Ques.—Of what is atmospheric air composed?

Ans.—Normal atmospheric air is composed chiefly of a mechanical mixture of nitrogen and oxygen gases, together with smaller quantities of carbon dioxide, water vapor, argon and traces of ammonia. Its composition is practically as follows: By volume, oxygen, 20.9 per cent.; nitrogen, 79.1 per cent. By weight, oxygen, 23 per cent.; nitrogen, 77 per cent. The carbon dioxide (CO_2) in normal air, is generally stated as four parts in 10,000 or 0.04 per cent.

Ques.—Give the names, chemical symbols and composition of the different gases met with in coal mines.

Ans.—The common mine gases are the following:

Methane or marsh gas (CH_4); composition, carbon one atom; hydrogen, four atoms.

Ethene or olefiant gas (C_2H_4); composition, carbon, two atoms; hydrogen, four atoms.

Ethane (C_2H_6): composition, carbon, two atoms; hydrogen, six atoms.

Carbon monoxide (CO): composition, carbon one atom; oxygen, one atom.

Carbon dioxide (CO_2): composition, carbon, one atom; oxygen, two atoms.

Hydrogen sulphide (H_2S): composition, hydrogen, two atoms; sulphur, one atom.

Besides these may be mentioned the elementary gasses forming the atmosphere, oxygen (O) and nitrogen (N); and hydrogen (H), which enters into the composition of so many of the mine gases, although not ordinarily found as a free gas in mines.

Ques.—What noxious gases are produced by fires and explosions of firedamp in mines?

Ans.—The combustion incident to a fire or explosion of firedamp consumes much of the oxygen of the mine air, and as a result the products of such combustion may be stated as follows: Carbon dioxide (CO_2); carbon monoxide (CO); water vapor (H_2O); nitrogen (N_2). The relative amounts of carbon dioxide and carbon monoxide produced will depend on the available oxygen present to support the combustion. In a limited supply of air (oxygen) the combustion is more or less incomplete, and a less quantity of carbon dioxide and a greater quantity of carbon monoxide are produced, besides a larger relative proportion of nitrogen. Frequently, also, variable amounts of unburned methane (CH_4) and hydrogen (H_2) and at times small quantities of olefiant gas (C_2H_4) are found.

Ques.—Describe the dangers attending the presence of gases met with in coal mines.

Ans.—The presence of the gases in mine air dilutes the air and thus reduces the proportion of oxygen, which is necessary to support life and maintain healthful conditions in the mine. Some of these gases, as carbon monoxide (CO) and sulphureted hydrogen (H_2S) are extremely poisonous in their effect on the human system. Carbon dioxide also has a toxic effect on the system. Other gases when present in sufficient quantities produce suffocation, although not poisonous in their action on the system. This is the case with the hydrocarbon gases and nitrogen. Others of the mine gases are combustile and form inflammable or explosive mixtures with the mine air. The inflammable and explosive gases are: Methane (CH_4); carbon monoxide (CO); and hydrogen sulphide (H_2S).

Ques.—How are mine gases detected?

Ans.—Briefly, methane and carbon dioxide are detected in mines by the effect they produce on the lamp flame. In the detection of methane, a safety lamp must be used to avoid the ignition of the gas. Pure methane unmixed with air or containing but a small proportion of air may extinguish the flame of the lamp. When the proportion of air and gas is such that the mixture is inflammable, the volume of the flame is enlarged and it has an unsteady motion. With larger proportions of air or a smaller percentage of gas, a flame cap is observed surmounting the lamp flame. This is caused by the burning of the gas present in the air and in contact with the flame.

Carbon dioxide dims the flame of a lamp and when present in larger proportions extinguishes the flame completely.

Carbon monoxide being extremely poisonous and deadly in its effect, when present in air in too small a proportion to produce an appreciable effect on the flame must be detected by observing its effect on small animals, such as birds and mice, which are prostrated in a much shorter time than is required to produce a like effect on persons.

Hydrogen sulphide, though seldom present in sufficient quantity in mine workings, is best detected by its disagreeable odor, which resembles that of rotten eggs.

Ques.—How many cubic feet of air would be necessary to dilute and render harmless 500 cu.ft. of marsh gas (CH_4)?

Ans.—The answer to this question depends on the condition of the mine both with respect to dust and the inflammable nature of the coal. Where the mine is dusty and the coal inflammable the proportion of gas should not exceed 1 per cent. and may often be required to be much less than this to secure the safety of the mine and the men employed therein. Where the coal is harder, and there is less fine dust formed in the workings, the percentage of gas may safely reach 2 per cent.

But assuming a 1-per cent. limit for the gas, the total circulation (air and gas) would be, in this case, $500 \div 0.01 = 50{,}000$ cu.ft. per min. when the mine is generating 500 cu.ft. per min. The volume of air required to *dilute* 500 cu.ft. of marsh gas, under these conditions, would be $50{,}000 - 500 = 49{,}500$ cu.ft. of air.

Coal and Coke News

Washington, D. C.

Secretary Lane of the Interior Department after exhaustive hearings attended by the various disputants in the Oklahoma oil land lease matter, on June 17 announced his decision in the question of the socalled Foster lease covering 680,000 acres in the Osage Indian reservation which will expire on Mar. 16, 1916. The Foster lease is now owned by the Indian Territory Illuminating Oil Co. which has subleased the oil lands to a number of producers.

The Indian Territory Illuminating Oil Co. is to be eliminated as an intermediary and the sublessees are to lease direct. Oil and gas rights are to be leased separately and for terms of five years from date of approval by the Secretary of the Interior and as much longer thereafter as oil is found in paying quantities but the term shall not extend beyond the time the title to the minerals remains in the Osage Indian tribe.

Sublessees now holding land under the Foster lease will be given an opportunity to lease direct subject to the 4800 acre limitation of the law. Quarter section units, however, which are capable of producing 25 bbl. or more a day July 1, 1915, will be withheld and with the land not taken up by the sublessees will be offered for lease at public auction under rules to be prescribed by the Secretary of the Interior.

All oil leases will provide that the government may have an option to purchase all oil produced at the highest posted market price on the day of sale. Leases will be made on a royalty of one-sixth of the production, except where the wells in any quarter section shall produce 100 bbl. a day for a calendar month period, when the royalty will be one-fifth.

Unless lands are developed within one year after the approval of a lease by the Secretary of the Interior, the lessees shall pay $1 an acre a year. The plan provides for the making of gas leases to the present gas lessees for such periods as the Secretary of the Interior may determine, at a royalty of one-sixth, and provides that all contracts for the sale or use of gas shall be subject to the Secretary' approval.

The present oil sublessees must file their acceptance of the new terms before Aug. 1, 1915, and after that date all land open will be offered to the highest bidder.

Government Wins Favorable Decision

It was announced on June 21 that the Supreme Court of the United States had handed down a decision in the case of the United States against the Delaware, Lackawanna & Western Ry. Co., favorable to the contentions of the government. The suit was brought in connection with the socalled commodities clause of the interstate commerce act. This provision, it was claimed, was being violated by the plan of selling coal at the mine mouth to a coal company which disposed of the product and subsequently shipped it over the road.

It was originally contended that an exclusive contract of this kind was monopolistic and hence against the law. The district court for New Jersey had rendered a previous decision dismissing the suit. The question at issue necessarily turned chiefly about the legality of the plan for disposing of the coal. The text of the decision in the case will be made available within a few days, and will afford full information regarding the grounds upon which the verdict has been prepared and rendered.

PENNSYLVANIA

Anthracite

Pottsville—With the new Dawson coal tax act now effective rumors are already heard of suits on the part of municipalities and townships in this county which do not actually produce coal, but are desirous of sharing in the proceeds of the tax as they were entitled to do under the Roney act of two years ago. The question has arisen as to whether this city will receive a sufficient proportion of the tax to make it of consequence to the finances of the community. The whole trouble arises from the fact that the new law specifically states that the tax shall be apportioned to the districts in which the coal is mined and this will shut out a majority of the towns and townships in the county from a participation in the tax proceeds.

Pittston—No. 5 shaft team will represent the South Pittston district of the Pennsylvania Coal Co. in the annual intercompany first aid contests at Inkerman in September. The team made the average of 95 per cent. in the district elimination contests. Peter Hoolihan, of No. 5 team, is the district's entrant in the one-man contest.

Shamokin—The collieries of the Lehigh Valley Coal Co. will be idle on Aug. 21, since that is the date which has been selected for the annual outing of the Social Association of Lehigh Valley Employees. The outing this year will be held at Edgewood Park, Shamokin, instead of at Hazle Park, Hazleton. A special train will be run from Pittston and Wilkes-Barre to Shamokin. Salaried employees of the Lehigh Valley Coal Co. compose the Social Association.

Wilkes-Barre—A section in the central portion of Parsons about half an acre in extent recently settled about 20 ft. in a mine cave, occurring over an abandoned working of the Delaware & Hudson Co. A storehouse and a garage together with several other buildings dropped into the opening. Steps were immediately taken to prevent further caving.

Bituminous

Clearfield—Despite reports to the contrary, officials of the Sommerville Coal Co., which has large operations in this vicinity, have denied the story to the effect that it intended opening up large coal fields at Gazzam, and putting in an extension on the New York Central for the purpose. It was explained that the company had been prospecting in and around Gazzam but had found the field wanting.

Connellsville—The production of coke from the Connellsville region recently attained 334,000 tons per week with shipments of approximately 332,000 tons. This was an increase of 20,000 tons in production and 11,000 tons in shipments over the previous week. The steel interests are operating about 72 per cent. of their ovens in the Connellsville region.

One thousand additional coke ovens have been fired in this territory by the H. C. Frick Coke Co. The starting of these ovens means employment for many more men. With a total of 19,224 ovens the Frick company has now 12,895 in operation.

Uniontown—Orders have been issued to have the Isabella mines of the Isabella-Connellsville Coke Co. in Fayette County near Uniontown, placed in operation at full capacity for the remainder of the year or until further orders. This plant has been completely closed since last June and the houses have been empty for that period. At this plant there are 260 ovens, 136 being of the rectangular type and 124 beehive ovens. The Isabella plant is one of the Kuhn properties, being owned by the same interests which own the West Penn traction and electric system. Sometime ago it went into a receivership.

Johnstown—Stockholders of the Greenwich Coal & Coke Co. which has extensive operations in Cambria, Blair, and Indiana Counties (Penn) have sanctioned a movement to take over the stock, consolidate the interests and change the name of the Tunnel Coaling Co., which has mines in Cambria County, the officers to remain as before the change. The Greenwich Coal & Coke Co. operations are working about 60 per cent. of capacity. There are nine mines in the three counties and only one, a small one, is closed. Work will be started shortly on the installation of a ventilating plant to replace the one at Yellow Run shaft at Dunlo, Cambria County.

Dawson—Announcement has been published stating that the Washington Coal & Coke Co. is sharing in the war orders for fuel placed in this country by brokers. The contract so far as could be learned from officials of the company calls for a delivery of 1500 tons daily for a year. The coal is being shipped to Baltimore and from there it is believed to be consigned to Italy. The producers state positively that they do not know where the coal is being shipped and care less. This company is now operating 700 of its 1000 coke ovens and maintaining its 70 per cent. capacity.

WEST VIRGINIA

Logan—President Cary, of the Lorain Coal & Dock Co., announces satisfactory progress in developing the large tract of land recently acquired in the Island Creek district in West

Virginia. A tipple containing five tracks has been constructed, and equipped to make any kind of coal desired. The production of the mine in June will likely be 10,000 tons and it is planned to double that output during July. In August it is expected to mine from 1000 to 1200 tons daily. The mine as well as the mining town has been named Lorado. It is located 24 miles southwest of Logan, the county seat of Logan County.

Huntington—The West Virginia Coal Association composed of coal operators has established offices on the 8th floor of the Robson-Pritchard Bldg. The suite comprises four rooms on the northeast side of the building. W. H. Cunningham and G. C. McIntosh are in charge of these offices.

Charleston—During the month of May, 22 miners were killed in the mines of West Virginia. Although this record is lower by 6 than that of May for 1914, during which 28 miners met their death, Chief Mine Inspector Earl A. Henry declares that his department is exerting every effort to reduce the fatalities. He has requested that each and every operator in the state coöperate with the department in using every possible means to reduce the number of accidents.

Bluefield—The coal tonnage from the Norfolk & Western field in the month of May not only made a record for the year 1915, but a record which has only been surpassed three times in the entire history of the field or during the months of July, August and September of 1914. The output for all the mines in the field in May was 2,434,614 tons, exceeding the tonnage for April by 234,063 tons. The heaviest tonnage ever handled by the Norfolk & Western was moved in September 1914, when 2,509,916 tons were transported. Shipments thus far in June are reported as heavy, and it is generally predicted that this month will prove the banner month in the field's entire history. The Virginian R.R. also made a considerable increase in its coal tonnage during the month of May, its business amounting to 352,750 tons as compared with 309,427 tons in April, showing a gain of 43,323 tons.

ALABAMA

Birmingham—The annual outing of the Alabama Coal Mine Officials under the auspices of the Alabama Coal Operators' Association, will be held at the Edgewater mines of the Tennessee Coal, Iron & R.R. Co., July 10. This outing will be in the nature of an Institute for the education and instruction of those invited; consequently the number of invitations will be limited to the capacity of the auditorium at Edgewater, and only the executive and operating officials of the Alabama Coal Operators' Association will be asked to attend the meeting.

KENTUCKY

Lexington—Coal interests here have been much interested by the announcement of the discovery of a new bed of coal in Bell County, Ky., when Capts. Gunn and Rennebaum were opening up a new mine at Logmont. This vein is described as being 6 ft. 11 in., in thickness, with no partings of any kind in the seam, which is of fine quality. It is reported to be high in heat content and low in ash and to be one of the richest veins opened in Bell County, if not the whole eastern section of the state.

Jenkins—The Consolidation Coal Co. recently put 200 extra miners to work in its plants in Jenkins and McRoberts. Beginning July 1, it will make another increase in the output. On that date it is said all the mines in the Elkhorn field will be running.

Frankfort—Ownership of 25,400 acres of coal and timber land in Perry County was settled by a suit recently decided in the Court of Appeals at Frankfort, the decision going to Thomas C. Millard and others in their suit against the Kypadel Coal & Lumber Co., the highest state court affirming the Perry Circuit Court.

Praise—The Eastern Kentucky Block Coal & Fuel Co. announces that the first shipments will be made over the Carolina, Clinchfield & Ohio railroad July 1, destined for the markets of the South Atlantic seacoast. It will ship 1000 tons daily until the work advances. Extensions and increases will then be made.

Fleming—The Elk Horn Coal Corporation recently started 200 extra miners to work in the plants around Fleming. A good increase in coal shipments will follow. There is much industrial activity all over the eastern Kentucky coal fields.

OHIO

Floodwood—The power plant erected at Floodwood, Ohio by the Southern Electric Producing Co. has three large generators installed with a capacity of 6000 kw. Contracts have been made with 10 operating coal companies in this vicinity to furnish power for mining and other contracts mill be made later on. In addition to the plant at Floodwood, the same syndicate has plants in other places as follows; the Hocking Power Co. at Nelsonville; the Mutual Electric Co. at Middleport and the Athens Electric Co. at Athens. Later on it is planned to operate all of the power plants under a holding company to be styled the Ohio Electric Secureties Co.

Columbus—Since the settlement of the strike in the eastern Ohio district there has been some question about the interpretation of Rule 7 of the Miners' scale. The question of the duties of the pit committee has been the subject of dispute on innumerable occasions so the joint committee representing the miners and operators agreed on the following interpretation of the rule: Rule 7. The pit committee shall be limited to not more than three (3) members, one or more of whom shall be able to speak the English language. They shall remain at their working places the same as all other employees unless a miner and a mine boss fail to agree on prices to be paid for extra work, when they may be called in to confer with the mine boss or superintendent to decide the dispute. This, however, shall not prevent the committee from looking after the proper interests pertaining to the miners' organization. The interpretation of the Joint Scale Committee of the last clause in Rule (7) is that it does not extend the privelege of the mine committee beyond the limitation of the rule, and shall not be construed to give it any authority to interfere with the operation of the mine or proper discipline of the men. The term "proper interests pertaining to the miners' organization" is understood to mean, looking after membership in the local union, check members, union dues, or serving as interpreter if called upon, and is held to apply exclusively to the internal affairs of the United Mine Workers.

A movement has been started, fostered by John H. Winder, general manager of the Sunday Creek Coal Co., for a stronger association of operators in the Hocking Valley and eventually in the whole state. It is hoped to produce out of the chaotic condition of the coal trade in Ohio, some semblance of order and methods, which will be beneficial to the coal trade generally. This movement is modeled after the organization recently formed called the Splint and Gas Coal Operator's Association of West Virginia.

Steubenville—One of the developments in the projects of the two Columbus coal concerns to prosecute stripping operations in Jefferson County, Ohio, along the line of the Wabash R.R. is a movement to have an injunction issued by the courts to stop operations before they are started. Some of the farmers in the neighborhood of the lands owned by the New Method Coal Co. and the Piney Fork Coal Co. claim that the stripping operations will ruin their farms.

Martins Ferry—The Florence mine of the Youghiogheny & Ohio Coal Co. near here recently resumed operation for the first time since the eastern Ohio strike was settled. Minor difficulties between operators and men prevented an earlier start. This mine employs approximately 300 men when running at full capacity.

It is predicted that within 30 days every coal mine in eastern Ohio will be working full time, and will continue to so work. At present 46 mines are working and 38 are idle in this sub-district, while a number of the idle mines are preparing to resume work.

INDIANA

Petersburg—The S. W. Little coal mines at Little, which have been idle for several weeks have resumed operation, employing 150 men.

Boonville—The miners employed at the Caledonian coal mine have organized a coöperative association and have taken over the mine property.

ILLINOIS

Champaign—The Illinois Miners' and Mechanics' Institute is conducting a short course in coal mining at the the University of Illinois, which is to continue until July 17. The course is particularly useful to those who desire to apply to the State Mining Board for certification to the position of state mine inspector, mine manager, mine examiner and hoisting engineer.

Staunton—Plans have been made for wrecking the De Camp mine soon. A force is now engaged in taking out material from underground, after which the top works will be dismantled.

Percy—The mines at Willisville have been closed down for about 60 days, throwing approximately 300 men out of work. At a recent meeting of the miners' union at Percy, it was decided to share up with the men at Willisville. Accordingly about 125 were given places in the mine.

ARKANSAS

Fort Smith—Sixty-eight defendants in the Bache-Denman coal syndicate suit for $1,250,000 damages for the destruction of property during the prairie Creek riot of one year ago, have recently filed a motion in the United States District Court to vacate the order for the appointment of a receiver for the syndicate which filed voluntary receivership proceedings following the riot.

IDAHO

Lewiston—The Brew Coal Co. has taken over the old Spring coal mine at Lewiston and will commence operations shortly.

FOREIGN NEWS

Nanaimo, B. C.—Four more bodies of miners, victims of an explosion in the mine of the Western Fuel Co. property, have been recovered. There were 22 deaths in all, the explosion occurring on May 28.

Crows Nest Pass, Alta.—The Corbin Coal & Coke Co., owned by D. C. Corbin, of Spokane, has been shut down for the summer, and the entire crew, excepting the men on the steam shovels, has been discharged. These men were retained for surface development work.

Hillcrest, Alta.—The mines of the Hillcrest Collieries, Ltd., at Hillcrest, Alta., were closed down on the 15th inst., the British miners refusing to work until 100 Austrians and Germans employed were discharged. The movement against alien enemies is spreading throughout the West, and trouble is expected at Frank Blairmore and other mining centers.

PERSONALS

E. W. Mansfield was recently appointed by Chief Mine Inspector Shiflett, as district inspector for Middle, Tennessee.

Richard Coulter was recently elected to the presidency of the Keystone Coal & Coke Co., of Greensburg, Penn., to fill the vacancy caused by the death of the late Lloyd C. House.

P. F. Mitchell, mine foreman at the E. F. Stackhouse colliery, Shickshinny, Penn., has gone to Lake Kathlyn, British Columbia, where he will superintend the opening of an anthracite mine.

Cadwallader Evans recently resigned his position as general manager of the Arcadia Coal Co., Ltd., of Stellarton, N. S., and his present address is the Union Oil Bldg., Los Angeles, Calif. Mr. Evans is at present taking a needed rest.

Charles Fox, formerly secretary-treasurer of the United Mine Workers of America, district 11, and now president of the Indiana State Federation of Labor is to be one of the deputy mine inspectors under Michael Scollard, the new state mine inspector.

John Zelenka, secretary of the Pittsburgh Vein Operators of Ohio, with headquarters at Wheeling, W. Va., was recently reëlected at a meeting of the association. W. R. Woodford, president, S. H. Robbins, vice-president, and C. W. Troll, treasurer, were reëlected at the same meeting.

E. W. Stone, federal receiver for the Wyoming Coal Mining Co. since June 25, 1914, has been discharged by the federal court at Cheyenne and the property returned to the company. All outstanding indebtedness is to be paid in full. The company is one of the largest operators in the Sheridan field and owns property valued at about a million dollars.

E. C. Roberts, Jr., has formally resigned his position as resident manager of the Fairmount Coal Co.'s mines, since enlisting in the Canadian Contingent of the British Army. He goes as an officer and swears allegiance to the King only during service. This permits him to resign at any time without prejudice to him in any way. He is now at the camp in Niagara-on-the-Lake.

OBITUARY

Edwin E. Randall, aged 55 years, formerly superintendent of the Schooley mine of the Pennsylvania Coal Co. at Wyoming, Penn., died recently at Dayton, Tex., where he was employed by the New York Construction Co.

Captain George Ormrod died in Allentown, Penn., June 21, of heart disease at the age of 76 pears. He was born in Preston, England, coming to America when 20 years old. Captain Ormrod became a coal operator and was located at Raven Run during the "Molly Maguire" trouble in the '70s. For years past he has been head of the Donaldson Iron Works and vice-president of the Lehigh Portland Cement Co. Captain Ormrod was a member of the Franklin Institute and the American Institute of Mining Engineers. He is survived by five children.

Patrick Clark of Spokane, a well-known western mining man, died rather suddenly recently at the age of 65. He learned his trade as a coal miner in Scotland, emigrated to the States, worked in the Hoosac tunnel, on the Comstock lode, sank the first shaft on the Anaconda and discovered it was a copper and not a silver mine. He built the first plant for milling the galena ores of the Cour d'Alenes and discovered and at one time owned the famous War Eagle Mine at Rossland which has produced $30,000,000 in gold and is still producing $3,000,000 a year.

TRADE CATALOGS

The United Lead Co., 111 Broadway, New York. "Ulcoloy." Eleven pages, 3½x6 in., unillustrated.

Dodge Sales and Engineering Co., Mishawaka, Ind. Catalog. "Gearing." Illustrated, 126 pp., 6x9 in.

Scranton Pump Co., Scranton, Penn. Bulletin 102. "Duplex Plunger Pumps." Illustrated, 12 pp., 6x9 in.

The Borderland Coal Sales Co., Cincinnati, Ohio. "Borderland Coal." Thirty-two pages, 8x11 in., illustrated.

Arthur A. Zelnicker Supply Co., St. Louis, Mo. "Zelnicker's Bulletin, No. 174." Four pages, 3½x8 in., unillustrated.

International Mill & Timber Co., Bay City, Mich. Catalog. "Sterling System-Built Houses." Illustrated, 72 pp., 9x12 in.

The Cortwright Coal Co., Pennsylvania Bldg., Philadelphia, Penn. "Our Green Book." Four pages, 5x7 in., unillustrated.

The Sylvester Co., Parkersburg, W. Va. Bulletin No. 1. "The Sylat Timber Puller." Twelve pages, 10x8 in., illustrated.

The Waterbury Co., 80 South St., New York. "Waterbury Fiber-Clad Wire Rope." Twenty-three pages, 3½x6 in., illustrated.

The Esterline Co., Indianapolis, Ind. "Golden Glow Incandescent Headlights." Catalog No. 364, 32 pages, 6x9 in., illustrated.

Chicago Pneumatic Tool Co., Bulletin 34 X. "Class A. G. Giant Gas and Gasoline Engines." Eight pages, 6x9 in., illustrated.

Link-Belt Co., Philadelphia, Penn. Bulletin No. 221. "Circular Storage System for Storing Coal, Etc." Illustrated, 4 pp., 6x9 in.

Gifford-Wood Co., Hudson, N. Y. Bulletin No. 16. "Portable Wagon Loaders for Handling Coal, Etc." Illustrated, 12 pp., 6x9 in.

The Locomobile Co. of America, Bridgeport, Conn., U. S. A. "Locomobile Worm Drive Truck." Forty-two pages, 8¾x11½ in., illustrated.

The Waterbury Co., 80 South St., New York. "Waterbury Armored Rope for Long, Hard Service." Thirty-two pages, 3½x6 in., illustrated.

Link-Belt Co., Philadelphia, Penn. Book No. 210. "Wagon and Truck Loaders for Coal, Coke, Stone, Sand, Etc." Illustrated, 48 pp., 6x9 in.

S K F Ball Bearing Co., 50 Church St., New York. Bulletin No. 25. "S K F Ball Bearings in Machine Tools and Shop Equipments." Illustrated, 68 pp., 6x9 in.

The International Nickel Co., New York City. "Monel Metal." Twelve pages, 4x8½ in., unillustrated, accompanied by price schedule of 6 pages, 3½x6 in., unillustrated.

The Standard Underground Cable Co., Pittsburgh, Penn. "Standard Ignition, Lighting and Starting Cables for Motor Cycles, etc." Fourteen pages, 3½x6 in., illustrated.

Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Bulletin No. 34-U. "Instructions for Installing and Operating Class N-SO Fuel-Oil Driven Compressors." Illustrated, 24 pp., 6x9 in.

Sullivan Machinery Co., 122 S. Michigan Ave., Chicago, Ill. Bulletin No. 66G. "Air-Feed Stoping Drills." Illustrated, 12 pp., 6x9 in. Blue Booklet No. 115. Air Compressors." Illustrated, 32 pp., 3x5½ in.

The Jeffrey Mfg. Co., Columbus, Ohio. Bulletin No. 165. "Wagon and Truck Loaders for Crushed Stone, Sand, Etc." Illustrated, 16 pp., 6x9 in. Bulletin No. 166. "Wagon and Truck Loaders for Bituminous and Anthracite Coal." Illustrated, 24 pp., 6x9 in.

INDUSTRIAL NEWS

Louisville, Ky.—The St. Bernard Mining Co. and the Jellico-Laurel Coal Agency have been elected to membership in the Louisville Board of Trade.

Cleveland, Ohio—The M. K. Powers Advertising Co., recently changed its name to the Powers-House Co. The present address of this firm is 724-725 Illuminating Bldg., Cleveland, Ohio.

Marshfield, Ore.—Another coal field to compete in the outside market in the near future is in the Willamette Valley of Washington. The completion of a railroad from this point will make this new field accessable.

Hazard, Ky.—Work is being pushed on the First Creek Branch of the Lexington & Eastern R.R. into a rich coal territory below here. The road will be completed within 30 days when mining activities will be started.

Ebensburg, Penn.—Mine No. 20 of the Pennsylvania Coal & Coke Corporation at Hastings, one of the oldest operations in that region, has been taken over by the Rich Hill Coal Co., whose plant is nearby. A number of needed repairs are planned and the mine will be closed down for some time, that these repairs may be properly made.

Birmingham, Ala.—A $45,000 mortgage has been given by the Eldorado Coal Co. of Birmingham to the American Trust and Savings Bank. The mortgage is to secure the issue of 45 bonds of $1000 each, payable in 1920. The Indio Coal Co. has given mortgage to the American Trust and Savings Bank for $69,000 at 6% to secure the issue of bonds to that amount.

Portsmouth, Ohio—With the settlement in the Probate Court in Scioto County of the last two condemnation proceedings, the Chesapeake & Ohio Northern Ry. Co. has an unbroken right of way from the Ohio River to the Pike County line through Scioto County. The work of constructing the roadbed for the new line through the county is being rushed.

San Francisco, Calif.—The Ingersoll-Rand Co., recently opened a branch office at 139 Townsend St., San Francisco, with a view to giving closer attention to present and prospective customers than it was possible to secure through an agency. H. L. Terwilliger is district manager for the San Francisco and Los Angeles offices, with headquarters in San Francisco.

Mobile, Ala.—In order to put the port of Mobile on an equal footing with other ports on the Atlantic coast in handling bunker coal, the Mobile Bar Pilots Association has reduced rates for vessels coming into port only for coal, to a sum equal to those prevailing on the Atlantic coast although the service rendered is considerably greater. This is the result of the opening of the Warrior River.

Columbus, Ohio—Affirming the Franklin County appellate court and reversing the Common Pleas Court, the Supreme Court remanded for new trial the suit won by the New York Coal Co. in the common pleas court for $4600 claimed to be a balance due it from the Sunday Creek Coal Co. and the Buckeye Coal & Ry. Co. on minimum royalties for coal taken from mines leased to them in 1906 to 1908.

Duluth, Minn.—Coal shipments to Duluth and Superior from Lower Lake ports, from the opening of navigation up to June 1, amounted to 1,057,589 tons, being a decrease of 449,652 tons from the amount handled during the corresponding period of 1914. Duluth's soft coal receipts in May, amounted to 251,193 tons, or just about half the tonnage received at Superior. Of anthracite, Duluth received 41,756 tons, while Superior received 208,733 tons.

Montgomery, W. Va.—The May loadings of coal and coke on the Chesapeake & Ohio R.R. amounted to 2,025,620 tons. For the same month of 1913 these loadings were 1,812,500 tons. The loadings for January and February of the current year were in excess of the loadings for the same months in 1914. March, however, showed a decrease of something over 100,000 tons, and April a decrease of 99,000 tons. The first five months of the year, however, showed an increase over the same months of 1914, of 250,000 tons.

Huntington, W. V.—The Federal Mine Rescue Department has established a sub-station in the 3rd story of the Federal Building where H. D. Jones will be permanently in charge. The establishment of the station follows the announcement made early in May to the effect that Mine Rescue Car No. 8 would have headquarters in Huntington. In cases of accident at the mines, application for use of the car will come to the Huntington sub-station. D. J. Parker will be in charge of mine rescue car No. 8 stationed here.

Philadelphia, Penn.—The Pennsylvania R.R. has been adjudged not guilty in the suit brought against it by the government before the local Federal Court, on the charge that it granted rebates of 10c. per ton to the Glen White Coal & Lumber Co., of Kittanning Point, Penn., in the Clearfield bituminous coal district. The verdict was gained largely through the statement that the payments were made for services rendered by the coal company in hauling coal from its mine to the Pennsylvania tracks, a distance of 9000 ft.

Harrisburg, Penn.—Governor Brumbaugh recently announced his approval to the Vare resolution providing for the appointment of a commission of three to investigate the cause of the increase in the price of anthracite coal by operators or dealers, whether justified or made as a result of "any illegal combination or confederation upon the part of the operators of anthracite coal mines or dealers in anthracite." The commissioners are to serve without compensation and are given the right of subpoena. The commission has $5000 for expenses and may employ a secretary and call upon the Attorney-General for advice.

Toledo, Ohio—The Toledo Furnace Co. recently broke ground for a coke plant to be built on the company property adjoining the blast furnaces on the river front on the East Side. The general contract was let to the H. Koppers Co., of Pittsburgh, which already has its temporary construction office on the grounds. It is the present plan to build two batteries of coke ovens. The coke and gas manufactured will be used by the furnace company itself. West Virginia coal will be largely used according to published statements. Nearly 500 men will be employed in the construction work. This concern has in the past purchased its coke from Pennsylvania ovens.

Huntington, W. Va.—It is believed that the coal tonnage for the Grand Central Division of the Chesapeake & Ohio R.R. will, during the month of June, surpass all previous records for that month in the history of the company. Up until the 15th of the month, there had been moved 913,545 tons of coal or an increase over the same period of last year of 25,205 tons. It is estimated that over 2,000,000 tons of coal will be moved during June. During the month of May this division established a record in moving coal amounting to 2,044,675 tons. It is stated that the mining of coal has been heavy during the past month, and that the mines in this and neighboring states are operating to capacity.

Washington, D. C.—Modification of the anthracite coal rate to tidewater and the financial separation of carriers from coal companies controlled by railroads are two of the recommendations contained in the decision of the Interstate Commerce Commission, soon to be rendered. An investigation of the rates and regulations of the common carriers governing the transportation of anthracite coal from producing fields to tidewater and official territory, was instituted by the Commission on its own initiative in June 1912. The purpose of the inquiry was not only to determine the reasonableness of the rate, but whether the roads should be allowed to control mining companies. The rates on coal to tidewater are held to be too high, and a slight reduction will be enforced.

Cincinnati, Ohio—The United States District Court has heard and taken under advisement the bill of complaint brought by John S. Jones, of Chicago, seeking to compel the Hocking Valley Ry. Co. and others to turn over to him the capital stock of the Buckeye Coal & Ry. Co. and the Ohio Land & Ry. Co., which he alleges is withheld by the defendants in defiance of the decree of the court handed down in the Government's "soft coal trust" case. The point at issue is whether the stock of the two companies mentioned was to be disposed of under the decree of the court, the railway companies maintaining that it was not covered by the decree. The Government is watching the case, presumably with a view to instituting contempt proceedings if it developes that the decree of the court has been violated.

Spokane, Wash.—The third coal claim in the history of Alaska has just been allowed to go to patent, according to information received at Spokane. This claim is owned by the estate of Mary A. Rosene and was recommended for a patent by the office at Juneau. Familiarly known as the Blaine claim, it is located in the Bering River coal field and is accessable by water up the Bering River. It contains a bed of high-grade bituminous coal 17 ft. thick, running diagonally across the claim.

A striking feature of this allowance is that the Blaine claim is the only one out of 45 on the east shore of Bering Lake, a distance of 12 miles from Katalla over the mountains, to be allowed. Fourty-four claims, known as the Green-Young group and the Young-Ivey group were ruled on adversely. The Blaine claim lies adjoining the claim of M. A. Arnold of Seattle, which was allowed recently.

Coal Trade Reviews

General Review

Anthracite slow in responding to low prices and the usual summer dullness prevails. Reaction in bituminous though heavy exports stiffen up the sellers. Lake trade improves very slowly.

The anthracite trade is in the grip of the customary summer's dullness, somewhat accentuated and prematurely at hand. There are still some June orders to be shipped, but the trade failed utterly to show the usual month's end spurt, and there is little business in sight for July. Consumers are only making a feeble response to the heavy cuts offered by the individual operators, though this may be accounted for in a measure by a desire on the part of the buyers to strengthen their position with the large companies so they will be assured greater consideration in event of serious labor troubles on Apr. 1 next. The question of credits also continues a potent factor, many consumers being anxious to take supplies but only on such terms that the sellers do not feel able to meet.

There is more pressure to move bituminous coal; a reaction from the recent trend toward better conditions has developed and the price situation is not so encouraging. Quick buyers are able to pick up bargains, and low prices are the rule where any considerable block of coal is negotiated. Pressure is in evidence to move tonnage and the accumulation at Hampton Roads has reached a point where the railroads have been compelled to put temporary embargoes in effect.

The tremendous expansion in the export trade continues to exert a compelling influence on the market, and is undoubtedly stiffening the position of sellers. Additional inquiries are being received almost daily, but on the other hand a further advance in ocean freights is having a restraining influence on a further expansion in this direction. A curious development in the offshore trade is the arrival of a great many transatlantic liners on this side coaled up to their full capacity in spite of the extraordinarily high prices in Europe, and the correspondingly low prices here.

The inactivity among Ohio manufacturers, the disposition on the part of buyers to delay stocking because of the probability of continued low prices, and the fact that production can be enormously increased at any time, are depressing factors that are combining to keep the market in an extraordinarily depressed condition. Some boats are being loaded in the Lake trade, and shipments are increasing very slowly though the movement does not compare with previous seasons in any way. A congested condition is still reported at the Upper Lake docks.

Middle Western operators have apparently stiffened in their position as regards prices and are no longer anxious to contract at the prevailing low level. The coming threshing demand is a potent factor in the situation, and with generally record breaking crop reports in all sections there is a feeling of optimism in coal circles. Prices as a rule are at a fairly profitable level, though screenings are a trifle easier. The working schedules at the Southern Illinois mines are somewhat improved.

A Year Ago—Anthracite rounds out the month in better form than anticipated. Eastern bituminous markets at the lowest point for a long time. Situation at interior centers slightly improved under the influence of the large crops and the long suspension in Ohio.

BUSINESS OPINIONS

War Orders—The "Journal of Commerce" places the value of war orders, actual and expected, at $1,500,000,000 as follows: Great Britain, $500,000,000; Russia, $500,000,000; France $400,000,000, and Italy, $100,000,000. Of the total about one-third represents iron and steel products and base metals. The orders placed last week were largely for the Russian government. A feature of the contracts made recently is that they represent such items as locomotives, rails and structural material in rather larger degree than munitions of war.

Metal Markets—Shipbuilding work is active, most of the large yards on the Atlantic Coast having all the business they can take care of for the present. The activity of foreign buyers in the last fortnight has been displayed chiefly in inquiries and orders for railway equipment. Russia has ordered both locomotives and cars. France has placed an order for locomotives. Pig iron has an upward tendency and an advance was made in the price of bars and shapes to $1.25, when in reality this advance was only scheduled for July 1. The implement manufacturers have been exceedingly busy. An easing off in the price of spelter has helped the galvanizers somewhat, but many of them were practically out of the market for spelter, and they were refusing to make any quotations whatsoever for galvanized products.

Boston News Bureau—One of the peculiar features of the situation is the hesitation so noticeable in the many departments of business life. Outside of war orders there is a disposition to go slow on new commitments. The huge English and French war loans, if successful, means much. They will be a big factor not only abroad, but here. We should gain much by them in increased orders for breadstuffs and war munitions. From a money point of view this country is in a remarkably strong position. We can not only finance ourselves but can be a generous lender to Europe. Possibly conditions will change materially with the arrival of the German reply to President Wilson's second note. The outlook should be clearer after that.

Northwestern's Corp Report—Weather was cold and wet over the entire territory; crops generally are two weeks late, but the lateness may not be unfavorable. The making of the corn crop depends on the weather during July, August and September. Small grain is in excellent condition.

Bradstreet—A mixed budget of news is in evidence this week. Weather irregularities over a wide area have restricted current distribution of seasonable goods, while excessive moisture in the surplus grain producing states has retarded harvesting or crop growth, and pending the outcome of international political matters, some interests prefer to work along conservative lines. On the other hand, industrial operations continue to expand.

Marshall Field & Co.—Wholesale and retail distribution of dry goods shows unseasonable volume owing to the continued cool weather. Sales for future delivery by our traveling representatives are slightly ahead of those of the corresponding week a year ago. Fewer retailers have visited the market than during the same period last year. Collections are fair.

Duns—Nothing has occurred to check progress or to dim the bright future outlook. Prominence given to Europe's purchases of war materials overshadows the trend of affairs in strictly domestic channels, but there is still a gradual expansion in home consumption, and evidence of a less cautious policy in anticipating forward requirements. Recent official promise of abundant grain harvests has done much to stimulate confidence anew, and reports from the leading centers reflect an increasingly optimistic sentiment and more uniformity as regards actual business improvement.

ATLANTIC SEABOARD

BOSTON

Market quiet again and prices recede. Virtual embargo against some of the West Virginia output. Pennsylvania grades compete closely for business. Water freights quiet. Dull outlook for July anthracite.

Bituminous—The market on Pocahontas and New River is again extremely quiet. Although until recently the trend was encouraging it is now realized that the price situation is none too good. When any considerable block of coal is placed there are rumors of low prices and such sales as are reported undoubtedly reflect others that are on a like basis. The fact is the West Virginia operators are, as usual, showing their inability to work harmoniously and the output is too great for the market to absorb.

The demand for shipments inland is only spasmodic. Stocks are generally up to maximum and most buyers wait for price inducements. Cargoes for these points move very hard, and all-rail trade is also dull.

The railroads running to Hampton Roads appear to be taking a hand in the situation, to the extent of declaring what amounts to an embargo against shippers who fail to release cars in reasonably good time. This drastic remedy is made necessary by the big accumulations at the piers.

Georges Creek coals are not in any more plentiful supply. The slow movement of barges the past fortnight has simply helped out the detention at Baltimore; had they moved better they would have had longer waits at the loading piers.

Water Freights are again as quiet as the coal market. The demand falls off, and the slow movement of boats is not so much noticed. The Reading barge rate on bituminous from Philadelphia continues at 80c. to Boston points, notwithstanding a general expectation it would be reduced 5@10c. by the middle of June. Desirable transportation for the shoaler points is still in fair request.

Anthracite—The hard-coal market is almost featureless. There are still some unshipped orders for June, but for July there is little in sight. The July 4 suspension will be in effect soon, however, and with mining so close-hauled there is small likelihood of weak prices—at least not on the part of the principal companies. Meanwhile New England retailers are putting out very little coal.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	....	....	2.85@2.95	
Hampton Roads*	....	....	....	$2.65@2.80
Boston†	....	....	....	3.60@3.78
Providence†	....	....	....	3.50@3.73

* F.o.b. †On cars.

PHILADELPHIA

Anthracite continues dull, with collieries on half time and prices off circular. Bituminous very quiet, but some operators feel a change for the better is soon due, especially on Tide shipments.

Anthracite—Low prices and a dull market have been the ruling conditions the past week. Very few orders are coming in, as most of the dealers have filled all their winter storage orders. They state their customers offer plenty of orders but don't want to pay until fall. The summer dullness is evidently more apparent with the retail men than usual, as two quite prominent dealers have laid off men, a thing which they have not done in years past.

Cheap coal continues the rule. One dealer informed a representative of one of the large producing companies that he positively was not in the market for any first class coal; the only orders he had to fill were those for institutions and that he intended to go into the open market for bargains to take care of that trade. This seems to be the general practice among a number of dealers on orders of this nature, quality being only a secondary consideration on account of the low price at which they are taken.

Pea coal continues subject to the heaviest cutting. The circular is hardly thought of. One of the large companies is offering blocks of a thousand tons of this size at $1.85, without tax, freight prepaid. Most dealers claim they can buy good pea in any quantity at $1.60. Others yet say they have bought at $1.50, although it is not likely that any considerable quantity is moving at this latter price—yet.

Stove continues to hold closer to the circular than any of the other sizes; but there is not the least doubt that even this grade can be bought at the April circular, the usual conditions being, however, in this event that the other sizes must go with it to get the April price.

The retail price war in West Philadelphia and Kensington districts continues, although little coal is moving, as the class of trade in these sections usually buys only as needed.

The circular prices are as follows:

	City	Tide		City	Tide
Broken	$3.20	$4.45	Pea	$2.50	$3.25
Egg	3.45	4.70	Buckwheat	1.25	2.25
Stove	3.70	4.70	Rice	0.85	1.75
Chestnut	3.85	4.95	Barley	0.50	1.50

Bituminous—The situation is not materially different from last week, although among quite a number of interests the opinion is that a change for the better is due shortly, particularly as the iron and steel business continues to show increased activity. There are also fairly good inquiries for foreign deliveries, due to a stiffening by the British Government of the restrictions against coal exports, and this probably accounts for the fact that the exports the past week showed a slight increase over the preceding period.

Prices rule about as follows:

Georges Creek Big Vein	$1.65@1.75	Fairmont gas lump, mine run	$1.15@1.25
South Fork Miller Vein	1.50@1.60	Fairmont gas, slack	0.65@0.75
Clearfield (ordinary)	1.00@1.20	Fairmont lump, ordinary	0.85@0.95
Somerset (ordinary)	1.00@1.15	Fairmont run of mine	0.75@0.80
West Va. Freeport	0.85@0.95	Fairmont slack	0.45@0.75

Ocean charters from Philadelphia have been announced as follows:

Vessel	Nationality	To	Tons	Terms
Frankby	British	Barcelona	2618	
Hamborn	Dutch	Sagua	742	
Edwin R. Hunt		Porto Rico	1005	
Bertha L. Downes		Porto Rico	606	
Walter D. Noyes		New England		
Esrom	Danish	Havana	2040	
Hackness	British	Buenos Aires	2954	
Kariba	British	Buenos Aires	2350	
George Pyman	British	Barcelona	2350	
Rosebank	British	Valencia	2470	
Diana	Norwegian	Cartagena, Col.	691	
Jata Mendi	Spanish	Barcelona	2746	$9.60
Llanover	British	Argentine	6500	
Tavian	British	So. America	2878	
Island	Danish	Havana	2040	
Eagle Wings		Charleston	1900	1.10
William Booth		Portsmouth	825	0.90
E. A. Allen		Summerside, P.E.I.	775	2.10
Orkla	Danish	Havana	1622	

Note—Steamers are indicated by **bold face** type.

The "Philadelphia News Bureau" reports that the collieries of the Reading and the Susquehanna coal companies operated three days last week.

OCEAN FREIGHTS

Steamers anxious for charters to Spanish ports. Substantial advance in rates to the Plate.

During the last week a number of steamers were chartered from Atlantic Range to picked ports on the west coast of Italy at $10.08. lay days to commence on vessel's arrival at or off port with 24c. per net register ton per day demurrage, and it may be possible to shade this rate slightly. As previously advised, steamers are particularly anxious to secure coal to Spanish ports, and will accept reasonable rates.

Plate rates have advanced very materially and $8.40 is now offered for steamers to take coal to Lower Plate ports. Grain freights from the Plate have declined considerably and the general impression is that the movement of this year's Plate grain has been about provided for.

The freight market is quotable as follows:

To	Rate	To	Rate
Havana	$2.00@2.25	Bermuda	$3.50@3.75
Cardenas or Sagua	**2.75**	Vera Cruz	3.50@3.75
Cienfuegos	2.75@3.00	Tampico	3.50@3.75
Port au Spain, Trinidad	3.50@3.75	Rio	**8.64**
St. Lucia	**3.50**	Santos*	**8.88**
St. Thomas	3.00@3.25	Montevideo	8.40@8.52
Barbados	3.50@3.75	Buenos Aires or La Plata	8.40@8.64
Kingston	2.75@3.00	Rosario	**9.12**
Curacao	**3.50**	West Coast of Italy	9.80@10.08
Santiago	2.50@3.00	Barcelona**	**9.00**
Guantanamo	2.50@3.00	Valparaiso or Callao	6.75@7.00
Demerara	5.00@5.85	Marseilles	**9.24**

Note—Rates noted in **bold face** type are only approximate.
* Consignees paying dockage dues. **Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

NEW YORK

Bituminous stocks at Tide increasing and quick buyers can get cheap coal. Heavy export demand. Anthracite experiencing the full force of the midsummer dullness.

Bituminous—A slight improvement in demand, but not in prices, is noticeable. Large consumers are replenishing their bins and sales agents report better prospects. This together with a heavier call for export and bunker coal are the features of the soft-coal situation.

However, the general situation, as regards the New York market is quiet. Production in the Central Pennsylvania fields continues on about a half-time basis. Shipments to the Atlantic Seaboard are being continued as for the past several weeks while the accumulation at the local docks is increasing and quick buyers are able to pick up some good bargains in spot coals. Demurrage coal is not much in evidence and better reports are received from the line trade. Most shippers are depending largely on the Lake and Western business; increased demand is reported from these sources. Prices are weak. The call from New England has shown no signs of improvement.

Several big contracts were reported as being closed last week but the prices were not made public.

This month promises to be a record breaker in export demand. Additional inquiries are being received almost daily and there have been some inquiries with regard to gas coal for export. Companies with New York offices report an increased demand. Freight rates remain stiff. Some good sized cargoes have been sent to Spain and France and Italy is reported as having made several large purchases.

Current quotations continue as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein.	$3.30@3.40	$3.30@3.40	$3.30@3.40	$1.75@1.85
Georges Creek Tyson....	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Clearfield:				
Medium............	2.65@2.80	2.55@2.65	....	1.10@1.25
Ordinary............	2.55@2.60	2.55@2.60	....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks..........	2.90@3.05	....	....	1.35@1.50
Nanty Glo............	2.75@2.80	....	....	1.20@1.25
Barnesboro..........	2.65@2.70	....	....	1.10@1.15
Somerset County:				
Quemahoning........	....	2.70@2.85	2.70@2.85	1.20@1.30
Medium............	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe...............	2.45@2.55	....	....	0.90@1.00
Greensburg............	2.75@2.80	....	....	1.10@1.15
Westmoreland..........	2.95@3.20	....	....	1.15@1.40
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run................		2.50@2.60	2.50@2.60	0.70@0.80
Steam........................		2.45@2.50	2.45@2.50	0.90@0.95
Western Maryland................		2.35@2.45	2.35@2.45	0.80@0.90

Anthracite—The call for anthracite coal shows no improvement, although this is the last week when dealers will be able to take advantage of the June discount. The midsummer "drag" is on and with the vacation season at hand, coalmen are practically taking a rest. Only those dealers who secured large contracts are able to work their entire force.

Some companies are working on a four-day basis while others are doing better. Individuals who thought that by cutting prices they would be able to move their stocks easily are beginning, apparently to realize the opposite. One reason advanced for this is that the retailers expect trouble in the coal fields next spring and are holding closer to the companies expecting that with a suspension of mining or a shortage of coal this winter their wants will be better looked after by the companies than by the individuals.

All prepared sizes are in plentiful supply. Nut coal is the longest; there is very little call for it at Tidewater and some companies are storing it Egg and stove are easier to move.

Current quotations are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken................	$4.75		$4.80	
Egg..................	5.00	$4.80	5.05	$4.85
Stove.................	5.00	4.80	5.05	4.85
Chestnut	5.25	5.00	5.30	5.05
Pea..................	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat............	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice..................	2.00@2.25	1.90@2.10	2.05@2.30	1.95@2.25
Barley................	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Apolo	Spanish	Atlantic Range	River Plate	2800	
Blancae	Norwegian	Norfolk	Pernambuco	1477	$7.00
Edward J. Lawrence		Norfolk	Boston	2483	
Prosper III	Norwegian	Baltimore[2]	River Plate	2689	7.68
Westgate	British	Baltimore	Campana	1787	8.52 8.64
Francesco Ciampa	Italian	Atlantic Range	Italy[3]	2338	10.08
Laura C. Anderson		Norfolk	Morocco	766	7.40
Brina P. Pendleton		Norfolk	Lisbon	321	
A. & M. Carlisle		Philadelphia	St. John, N. B.	302	1.75
Mongibello	Italian	Atlantic Range	Italy[3]	2553	10.08
Sicania	Italian	Atlantic Range	Italy[3]	2750	
Tsirapinas	Greek	Atlantic Range	Italy[3]	1925	
Sowwell	British	Baltimore[2]	Italy[3]	2430	10.56
Orkild	Danish	Philadelphia	Havana	1622	
Samuel H. Hathaway		Newport News	Porto Rico	906	
Llanover	British	Philadelphia	River Plate	3040	
Antinous	British	Baltimore	River Plate	2362	
Liegeiose	Belgian	Baltimore	River Plate	2504	
Sabastino	Italian	Baltimore	Italy[3]	2567	
Rosalba	Italian	Baltimore	Italy[3]	1137	
Augustus H. Babcock		Virginia	Rio Janeiro	1299	
F. A. Allen		Philadelphia	Summerside	462	$2.10
William Booth		Philadelphia	Portsmouth	435	0.90
Highbury	British	Atlantic Range	Puget Sound	3026	6.00
	American	Atlantic Range	Tiburon	2000-3000	6.35
Chorley	British	Atlantic Range	Bahia Blanca	2468	8.88
Tavian	British	Virginia	Rio Janeiro	2878	8.64
Mersaro	British	Baltimore	Montevideo	2443	
Harflete	British	Baltimore	Sicily	3021	
Teviotdale	British	Baltimore	Italy[3]	2538	
Gowanburn	British	Virginia	Rio Janeiro	2723	8.34
Iperia	British	Baltimore	Montevideo	2061	
Ithaki	Italian	Baltimore	Italy[3]	2419	10.80
Antonios Stathatos	Greek	Baltimore	Italy[3]	1749	10.56
Luigi	Italian	Baltimore	Italy[3]	2260	
Scheria	Italian	Baltimore	Italy[3]	1724	
Hackness	British	Philadelphia	Buenos Ayres	2954	
Geo Pyman	British	Philadelphia	Barcelona	2508	
Rosebank	British	Philadelphia	Valencia	2470	
Silverstream[1]	Italian	Baltimore	Sicily	1151	
Antonia d'Ali[1]	Italian	Baltimore	Sicily	596	
Jacksonville		Hampton Roads	Jacksonville	547	1.10

Note—Steamers are indicated by **bold face type,** all others being schooners.
[1] Bark. [2] Or Virginia [3]. West Coast.

HAMPTON ROADS

Shipments only fair. Heavy exports to Italy continue. Large tonnage being taken for bunkering.

Shipments of coal from tidewater have been fair although hardly as large as anticipated. During the week there have been days when some of the piers did but little dumping while at those where the major portion of the export coal was loaded there was heavy vessel tonnage in dock the entire week. The coastwise movement has gone to practically all of the New England ports with two large cargoes to the Pacific Coast for the U. S. Government.

While Pocahontas and New River run-of-mine have been the principal coals moving there has been some small amount of prepared gas coal shipped and some coke to Peru.

Although there has been no large number of bunker steamers calling a fair quantity of coal for this purpose has been shipped as nearly all vessels are taking above their normal requirements to save taking coal aboard in Europe.

The following vessels have cleared from Hampton Roads during the past two weeks:

Norfolk

Vessel	Destination	Tons
Anna[5]	Barbadoes	2500
Washington	Messina	6900
Sjostad[2]	Santiago	1525
Tabor[1]	Curacao	5500
Catalone	Annunziata	5385
Genova[3]	Catania	5500
Georgios	Civita Vecchia	5172
Wm. E. Burnham	St. Georges	1125
Venetia[4]	Dakar	4852
Woodard Abrahams	Casa Blanca	963
Comino	Callao	*1176
Banda	Amsterdam	4500
Enrichetta	Elba	5100
Lejre	Palermo	3800
Adriatico	Naples	5502

Norfolk

Vessel	Destination	Tons
Geo. M. Embiricos	Piraeus	5618
Edith H. Symington	Seville	1359

Newport News

Vessel	Destination	Tons
Stephen	Para	3875
Lucy Neff	Guantanamo	1050
Comino	Callao via Norfolk	2593
Mayaro		1450
Tavian		6800

Shippers [1] Castner, Curran & Bullitt. [2] Baker-Whiteley Coal Co. [3] Pocahontas Fuel Co. [4] West Virginia Coal Co. [5] Smokeless Fuel Co. [6] Berwind-White Coal Mining Co. *Coke.

Shipments to other foreign ports have been reported as follows:

Ports	Tons	Ports	Tons
Havana........................	15,561	Rio de Janeiro..................	26,857
Marseilles.....................	15,142	Canal Zone......................	28,708
Genoa.........................	47,005	Buenos Aires....................	7,695
Pernambuco....................	2,680	Lisbon..........................	3,253
Montevideo....................	11,964	Elba............................	9,676
Cagliari.......................	15,700	Port au Spain...................	5,700
Tarragona.....................	9,085		

Railroad Tonnages—Dumpings over the local piers for the past several weeks compare as follows:

Railroad	Week Ending May 22	May 29	June 5	June 12	June 19
Norfolk & Western....	162,921	146,462	156,011	197,533	207,824
Chesapeake & Ohio....	84,286	83,678	44,702	89,447	71,511
Virginian............	39,431	61,688	38,372	34,975	51,644
	286,638	291,828	239,085	321,955	330,979

BALTIMORE

Export trade continues the leading feature. Domestic situation weak.

Interest centers on the export trade. In April it ran to 193,000 tons, the port record by more than 65,000 tons in any month; in May it reached 131,000 tons, while the first half of June saw such a heavy tonnage moved that the prospects for a total of from 250,000 to 300,000 tons do not seem exaggerated.

The domestic market, however, is very far from satisfactory. At the mines coal is still offering very cheap. Low-grade West Virginia coals are still offering at 75 to 85c. in many cases and ordinary Pennsylvania line fuels are to be had at 90 to 95 cents.

Charters for vessel loadings at Baltimore were announced as follows:

Vessel	Nationality	Tons	Destination	Rate
Mersario	British	2443	Montevideo	
Harflete	British	3021	Maddalena, Sicily	
Achlibster	British	2820	Barcelona	
Teviotdale	British	2528	West Coast Italy	
Luigi	Italian	2260	Civita Vecchia	
Scheria	Italian	1724	Palermo	
Silverstream[1]	Italian	1151	Sicily	
Antonio d'Ali[1]	Italian	596	Palermo	
North Pacific	British	2493	West Coast Italy	$10.80
Catalone	British	2410	West Coast Italy	10.80
Masarua	British	3189	Rio Janeiro	8.76
Christoforas	Creek	2345	West Coast Italy	10.80
Rosalba	Italian	1137	West Coast Italy	
Sebastino	Italian	2567	Genoa	9.60
Pacific	British	4612	River Plate	9.60
Antinous	British	2362	River Plate	9.60
Liegeirse	Belgian	2504	River Plate	9.60
Balgrav	British	2318	Piraeus	10.80
Antonios	Greek	1749	West Coast Italy	10.56
Ithaki	Greek	2419	West Coast Italy	10.80

[1] Bark.

During the week ending June 19 the export shipments from Baltimore totaled 89,929 tons.

LAKE MARKETS

PITTSBURGH

Slight signs of betterment, but operations remain at about 60% capacity and prices are low and unchanged. More export demand experienced by Connellsville operators.

Signs of betterment are beginning to appear in the Pittsburgh district. Demand from manufacturers has increased somewhat but as this is almost wholly against contracts, and the smaller operators that do not have large contracts are chiefly responsible for market prices, it does not help the market materially. The excellent crop prospects have revived hopes that the Lake movement will show considerable increases later. Export demand is becoming more a factor, particularly with Connellsville coke interests, who have a low mining scale and a very good grade of coal. The actual cost per net ton on cars is not over 40c. or 50c., and at going prices there is more money in shipping export coal than in turning it into coke. Mine operations in the Pittsburgh district proper remain at about 60% of capacity.

There is hardly any contract market, though $1.15 is the usual asking figure for mine-run to Apr. 1. Free coal ranges about as follows: Slack, 55@60c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Slight improvement in bituminous, warranted by prospects of a stir in iron. Anthracite not selling as it should though this may cause a bigger rush than ever next winter. All mines running slow.

Bituminous—The trade shows some disposition to improve. There are not so many members who complain of no change which means a better business. Some of the iron districts are more active and are taking off the miners. Indications now are that there will be both car shortage and shortage of men as soon as the demand for fuel is good again.

The Lake trade is doing a little better. One shipper, who diverts his coal this way when the Lakes demand drops off, has sold all he cares to here and is now concentrating on the Lake trade. Others look to the large and growing export coal trade and if the home demand increases the circle will be complete, even though the improvement is not large. There is not much business from Canada and sales to that trade show no improvement. If the war should suddenly stop there might be an early return to business.

Bituminous prices remain on the former basis of $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack, with Allegheny Valley sizes 25c. less.

Anthracite—There is no stir in the anthracite trade. The demand is very light. The mid-summer lull has come in mid-spring this year and it is not likely to change till there is cool weather to remind the consumers of winter. Some of the retailers are buying moderately, to get their supply at bottom prices, but they are not selling as fast as they are buying. Coal will slowly accumulate with them till the fall trade sets in.

The anthracite mines are running much slower than they commonly do at this time of the year. The amount shipped by Lake from this port for the week was 145,000 tons, a large showing for the time of the year and the state of the trade.

TORONTO

Demand continues light and supplies plentiful.

The demand in all lines continues light with no immediate prospects of any improvement. Dealers are stocked up for several months ahead and well provided against any scarcity which might result from labor troubles. Quotations for best grades are unchanged as follows: Retail anthracite, egg, stove and nut, $7.50; grate, $7.25; pea, $6. Bituminous, steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $6. Wholesale f.o.b. cars, $3.56; screenings, $2.90.

COLUMBUS

Steam business quiet though some better buying is reported in domestic circles. Lake trade increasing. Small sizes the only grades in demand.

The trade has been rather quiet during the past week. There is no increased buying of steam grades and that department remains dull. Some increase in the stocking movement is reported and a larger tonnage has been moving to the bins of the retailers. On the whole the tone of the market is not very good, although some operators profess to have a hopeful view of the future.

Buying for stocking purposes is increasing in every locality. This is especially true of the better grades such as Pocahontas and West Virginia splints. Some of the jobbers are selling quite a little Hocking lump for that purpose. The stocking movement is expected to be more marked after the coming convention of the Michigan-Ohio, Indiana Coal Association at Cedar Point, Ohio.

Lake business is increasing since the eastern Ohio field has resumed operations. Reports from the Northwest show that the docks are still very much congested and that interior buying is limited.

One of the best features of the trade is the strong market for the small sizes. Nut, pea and slack both from Ohio and West Virginia is in good demand as the production is rather limited. The same is true of coarse slack.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.35	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.70	0.75	0.65
Coarse slack	0.60	0.70	0.55

Mines have been working at about the following percentage of full capacity:

	Week Ended					Week Ended			
District	May 29	June 5	June 12	June 19	District	May 29	June 5	June 12	June 19
Hocking	30	30	25	25	Cambridge	35	35	35	30
Jackson	20	20	20	15	Masillon	35	35	40	35
Pomeroy	45	50	50	50	Eastern O.	15	25	30	45
Crooksville	35	35	30	30					
					Average	26	33	33	33

TOLEDO

Smokeless demand fairly good with small supplies at Toledo. Lake trade continues light. Indications that railroads may soon contract.

Some boats are being loaded in the Lake trade and quite a lot of coal is being shipped to the local docks but there is nothing that resembles a real market as compared with other seasons. It is probable that the movement will be heavier later on but this continues uncertain. This same condiiton prevails at Sandusky.

Smokeless coal is in fair demand and the prepared sizes are short. The production of the Hocking, Pomeroy and Cambridge districts is light and there will probably be very little improvement until the threshing season opens. West Virginia production is not specially heavy and will probably not be much improved until the Lake movement is larger. The Pittsburgh No. 8 district will have a better movement when the railroads begin placing orders; occasional inquiries are being received which would indicate that a number of the roads may soon place contracts. Prices are not being very closely maintained here save in a few lines.

CINCINNATI

General sluggishness prevails in all departments of the market. Industrial inactivity is apparently the principal cause.

The market still fails to show anything like the usual activity of the early summer. The several factors responsible for this remain unchanged, making it apparent that no relief can be looked for soon. The relative inactivity in manufacturing the tendency of the retailers to hold off stocking and the fact that production can be pushed to a high figure at any time, have combined to keep the market extraordinarily weak and dull. All varieties of rail and river coal are in plentiful supply on this market.

LOUISVILLE

Preparations for threshing is causing some activity but the market continues quiet.

Nothing has occurred in the Kentucky field during the past week or ten days to give the market any better tone, except that threshing will soon begin and there is some preparation for that. Some of the flouring mills of the state are making preparations to run when the new wheat comes on the market and are laying in coal.

Contracts are proving hard to make at this time, the industrial concerns preferring to take their chances on the open market. The Northern markets are not absorbing sufficient coal to relieve the pressure as usual. Cold weather has hurt the trade some due to its effect on the crops. Prices range in neighborhood of the following: Block, $1.50; round nut, $1.20; steam run-of-mines, $1. These are top prices, the regular June schedule, and there is not much shading or cutting, it is stated, because there is no market to buy even at low prices.

CLEVELAND

The local market is still lower and the downward tendency has not been checked. Pocahontas alone shows strength.

Slack prices are from 5 to 7c. lower than a week ago. Offerings of coal are made at almost any price to obtain an order. Pittsburgh fine coal sold Monday at $1.45 and Ohio No.

8 at the same price; these are nominal figures and 2c. less was accepted by some. The supply received here is not in excess of needs, but the offerings of operators were so heavy prices could not be maintained.

Coarse coals are barely holding their own at last week's quotations. The Lake trade is not taking enough coal to hold the market firm; Lake shipments are off 40% with no improvement in sight. May shipments from Duluth-Superior docks were smaller than in April and 2000 cars less than May of the last two years. Other ports report business on the same basis.

Pocahontas is up a little and egg and lump sizes are held fairly firm at quotation. Mine-run is about the same, but not as high proportionately.

Quotations for shipment to jobbers are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	Ohio No. 8
Lump..........	$3.45	......	......	....	......
Lump, ¾ in.....	.....	$2.15	$1.95	$1.85@1.90	$1.8 @1.90
Egg...........	3.45	......	......	....	......
Mine run.......	2.65	2.05@2.10	1.80	1.80	1.75@1.85
Slack..........	......	1.45	1.45	1.45	1. 5

COKE

CONNELLSVILLE

Coke market disappointing through not reflecting improvement in steel. Occasional sales at lower than current quotations.. Production and shipments make fresh high record for the year.

Coke operators are disappointed that the market does not show more life, when conditions in the steel trade are improving so steadily. The inquiry that recently appeared for second-half is largely hanging fire, partly perhaps because operators are trying to obtain $1.75 minimum with a sliding scale instead of $1.75 flat. A contract recently made, but which is just now heard of by the trade, involved about 7000 tons a month over the second-half, for Wheeling, at a price said to be under $1.70. A sale over the next two months has just been made at $1.50, and both these transactions are at lower figures than were supposed to represent the market.

Production and shipments of Connellsville coke have increased 65% since December without any real stiffening in prices and a labor shortage is threatened if much further increase in operations is required. The Frick Co. has blown in several hundred ovens in the past fortnight, when it could have increased its output by putting some of its operating plants on a six-day schedule, because it wished to get and hold the men against future requirements.

We quote furnace coke at $1.50@1.60 for spot and nearby shipment and $1.75 for second-half, and foundry coke at $2@2.40 for prompt and $2.20@2.50 for contract, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended June 12 at 334,514 tons, an increase of 19,617 tons, and shipments at 332,595 tons, an increase of 11,454 tons, both being new high records for the year.

Buffalo—There is report of improvement and even of better prices, but it is too early to say that it is a fact. Some stir in the iron trade is also regarded as a certainty, either now or to take place right away. One condition that is against an advance in either coke or iron is that there is no corresponding increase of activity in bituminous coal, which is waiting for a stir of that sort. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

Chicago—The coke market is stronger. The tendency of prices for gas house coke is higher, and sales have increased. Domestic sizes also show betterment, but no change has occurred in the demand for foundry grades. Prices are as follows: Byproduct, $4.65@4.85; Connellsville, $4.85@5; Wise County, $4.75; gas coke, $3.75@4.90; furnace, $4.75.

MIDDLE WESTERN

GENERAL REVIEW

Market generally stationary with more activity in domestic sizes. Screenings easier. Smokeless coal still gaining strength. Anthracite demand improved.

Surface conditions remain unchanged from a week ago, though the same feeling of optimism still prevails. Operators are not so eager to contract their output at low prices, and in several instances advances have been announced to take effect on July 1. It is true not a large volume of business is moving, but undoubtedly the sentiment has changed.

Storage buying, which is from two to three months late, has now begun, and although not of great consequence as yet is bound to have a healthy effect in July. Some buying is noted on the part of country dealers to replenish stocks. The Northwest seems to be taking heavier tonnages than any other section at the present time. It is expected that higher prices will prevail for Indiana and Illinois coals next month, owing to the small tonnage thus far stocked and increasing inquiries received for quotations covering deliveries in the immediate future.

CHICAGO

Improved running time at southern Illinois mines. Prices to advance on July 1. Situation in Indiana grades less favorable.

It is understood that the southern Illinois operators have had improved running time, some of the mines making six days last week; they are shipping more domestic sizes, particularly to the Northwest and very little is moving at less than $1.35, while it is announced that $1.50 will be the list price on July 1. It is also understood that No. 1 nut will be held for $1.50, and No. 2 at $1.35 on the first of next month. The demand for steam sizes is only fair and screenings are a trifle easier, but are holding at about 85c.

The movement of lump coal from Sullivan County is very slow, but in spite of this, screenings have declined on an average of 10c. per ton although it is thought that this is only temporary, and prices will shortly be on a higher level. Steam buying is slowing up and shippers are having difficulty in renewing contracts. The demand for coarse steam sizes has fallen off, and price cutting is noted. Some Indiana coal has been sacrificed in the Chicago market during the past week at a concession of 5c. to 10c. per ton, and the Indiana outlook seems to be generally less promising than in Illinois. Very little domestic sizes are moving from Sullivan County.

The market for Clinton and Knox County coals is dull, the demand for all sizes being quiet, but prices are well maintained.

Spot sales of Pennsylvania smokeless lump and egg have been made as low as 30c. per ton under list and plenty of mine-run has been sold at $1 per ton but operators expect higher priced orders next month.

A considerable tonnage of eastern Kentucky coal has been forwarded on consignment, and prices are still variable.

The demand for all-rail Hocking is light, but the operators continue to keep free coal off the market.

There is increased buying in anthracite, and further West it is reported that concessions have been made in order to market chestnut.

Quotations in the Chicago market are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump......	$1.35	$1.35	$1.35@1.40	$1.25@1.30	$1.40
Steam lump	....	1.25	1.10@1.15	1.15@1.20	1.30
2½-in. lump.	....	....	1.25@1.30	1.15@1.25	1.30
1¼-in. lump.	....	....	1.20@1.25	1.15@1.20	....
Egg........	1.25@1.35	1.25@1.35	1.15@1.25	1.15@1.25	1.15@1.25
Nut.......	....	1.15@1.25	1.00@1.05	1.00@1.05	1.00
No.1washed	1.25@1.35	....	1.50	....	....
No.2washed	1.25@1.35	....	1.40	....	....
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Mine-run...	1.10	1.05@1.10	.85@1.10	.90@1.00	.85@1.05
Screenings..	.85@ .95	.80@ .85	.75@ .80	.70@ .80	.75@ .80

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump......	$1.25@1.35	$1.30@1.70	$1.90	$1.35@1.50	$1.25@1.50
1¼-in. lump.	1.20@1.30	....	....	....	....
Egg.......	1.10@1.25	1.25@1.60	1.75@1.90	1.25@1.40	1.25@1.40
Nut.......	....	1.15@1.35	1.40	1.15@1.35	1.15@1.25
No. 1 nut..	1.25@1.35	....	....	....	....
No. 2 nut..	1.25@1.35	....	....	....	....
Mine-run...	1.05@1.10	....	1.10@1.25	1.05@1.10	....
Screenings..	.85@ .90	.65@ .80	....	....	....

ST. LOUIS

Beginning of the threshing season has a stimulating effect on the market. Prices a trifle stiffer.

The opening of the threshing season in the South and preparations for its opening in the West, North and Northwest is putting more life into the market than it has manifested this spring. The threshing outfits do not use a great quantity of coal but it is enough to stimulate the market to a perceptible extent.

The increased demand has stiffened prices a little. Threshing will not be on in the North for a couple of weeks but orders have already been placed. The result has been an advance of upwards of 10c. on the lump and egg sizes that the threshers use. Screenings are a little stronger than last week. Some natural improvement is expected around the first of July and there are indications that such improvement is about to set in.

	Wilm. & Frnk. Co.	Sparta	Mt. Olive	Standard
6-in. lump	$1.25@1.35	$1.25	$1.25	$0.90
2-in. lump	....	0.90	1.25	0.80
3-in. lump	....	....	1.15	....
3x6 egg	1.25@1.35	....	....	0.80
No. 1 nut	1.25@1.35	....	....	....
No. 2 nut	1.15@1.25	....	....	0.80
No. 1 washed	1.25@1.35	....	1.35	....
No. 2 washed	1.15@1.25	....	....	....
No. 3 washed	1.20	....	....	..
No. 4 washed	1.15	....	....	....
No. 5 washed	0.80	....	....	....
Screenings	0.80@0.85	0.90	....	0.80

INDIANAPOLIS

Screenings the only grade in demand. Not much improvement anticipated until the crop movement starts.

Mine operations continue at about the minimum, as usual in summer. There is plenty of coal on the open market, except screenings, which are in rather short supply and for which the demand is relatively good. However, contracts for screenings are difficult to make, owing to the experiences of last year, when buyers in the open market could get them almost at their own price; whether they will have this luck again is purely speculative.

The trade runs along at about the same level week by week and no change is expected until grain begins to move. Usually about that time cars become scarce, but operators do not anticipate much of a shortage the coming fall. The industrial demand does not seem to improve noticeably, nor does it fall back. Mine-run sells at $1 to $1.20 and screenings at 80c. to 90c. Indiana has promise of good crops of wheat and oats, particularly the latter, which will break the state record.

KANSAS CITY

The retail coal market in Kansas City has shown no signs of life for the week. The demand and the prices have both remained at the very lowest. The wholesale market seems to have settled into a routine of an even demand and supply. Prices remain unchanged and business confined almost entirely to the steam grades.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during April and the first four months of the last two years, in short tons:

	April		4 Months	
Anthracite	1914	1915	1914	1915
Baltimore & Ohio[1]	129,220	125,682	536,762	433,130
Chesapeake & Ohio[1]	1,903	1,451	4,954	3,623
Erie[3]	726,237	826,053	2,854,845	2,736,929
Pennsylvania[1] [3]	1,070,562	1,126,690	3,776,953	3,607,419
Virginian[2] [1]		112	52	197
Total 5 roads	1,927,922	2,079,988	7,173,566	6,781,298
Bituminous				
Baltimore & Ohio[1]	2,275,296	2,304,446	11,228,213	9,007,061
Buffalo, Roch. & P.[1] [2]	347,260	567,761	2,842,680	2,379,285
Buffalo & Susq.[1] [2]	14,721	84,823	447,647	356,667
Chesapeake & Ohio[1]	1,637,214	1,667,628	6,028,035	6,182,102
Erie[3]	218	4,730	28,421	34,896
Hunt. & Br'd T. Mt.[1] [2]	77,219	84,515	407,176	322,400
New York Central[3]	333,222	625,387	2,825,987	2,828,593
Norfolk & Western[1] [2]	2,117,280	2,200,551	7,861,693	7,615,262
Pennsylvania[1] [3]	3,699,928	3,358,062	16,114,420	13,203,746
Pitts. & Lake Erie[1] [2]	434,399	647,391	3,525,221	2,384,307
Pitts. Shaw. & North[1] [2]	72,747	154,995	864,002	747,093
Virginian[1] [2]	342,843	352,750	1,346,660	1,289,733
Western Maryland	271,332	230,273	1,114,564	1,077,261
Total 13 roads	11,623,685	12,283,312	54,634,719	47,426,406
Coke				
Baltimore & Ohio[1]	343,962	289,369	1,240,461	999,974
Buffalo, Roch. & P[1] [2]	17,523	32,717	97,222	133,141
Buffalo & Susq.[1] [2]	10,007	44,300	120,866	194,954
Chesapeake & Ohio[1]	36,215	21,421	147,323	65,540
Norfolk & Western[1] [2]	86,918	77,572	404,602	287,496
Pennsylvania[1] [3]	916,369	832,427	3,616,606	3,136,262
Pitts. & Lake Erie[1] [2]	529,535	404,152	1,870,674	1,363,697
Western Maryland	5,308	4,791	29,446	12,992
Total 8 roads	1,945,837	1,706,749	7,527,200	6,194,056

Total Coal and Coke 13 Roads	1914	1915
January	18,157,998	15,685,798
February	15,446,830	13,702,789
March	20,233,213	14,943,124
April	15,497,444	16,070,049
Total, 4 months	69,335,485	60,401,760

[1] Includes coal received from connecting lines.

[2] Includes company's coal.

[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 282,520 short tons of bituminous coal during March, 1914, and 819,682 short tons during the four months ending Apr. 40.

IMPORTS AND EXPORTS

The following is a comparative statement of coal imports and exports of the United States for April, 1914-15, and for the ten months ending March, 1913-14-15, in long tons:

	April		Ten Months		
Imports from:	1914	1915	1913	1914	1915
United Kingdom	442	3,012	8,550	10,133	32,962
Canada	136,486	116,632	1,181,216	882,772	959,072
Japan	233	4,729	66,497	83,441	72,980
Australia and Tasmania	29,020	13,027	129,985	226,945	154,907
Other countries	....	321	3,257	3,430	1,828
Total	166,181	137,721	1,389,505	1,206,721	1,221,749
Exports:					
Anthracite					
Canada	392,822	445,118	3,635,117	3,000,205	2,856,521
Argentina	....	....	....	....	212
Brazil	....	18	....	....	24
Uruguay	....	....	....	84	......
Other countries	3,438	8,391	66,324	50,077	50,101
Total	395,627	453,527	3,701,441	3,050,366	2,906,858
Bituminous					
Italy	....	253,273	....	....	960,233
Canada	395,627	381,223	9,092,740	9,972,979	6,962,352
Panama	33,073	42,946	393,449	314,467	261,343
Mexico	24,453	32,966	350,201	259,575	338,919
Cuba	63,091	101,013	1,035,110	965,528	882,572
West Indies	56,213	55,055	502,891	481,284	379,015
Argentina	18,966	79,531	....	118,354	297,328
Brazil	15,831	66,582	....	212,668	339,597
Uruguay	4,179	36,503	....	44,671	77,270
Other countries	160,604	63,576	911,299	1,066,061	576,679
Total	772,037	1,112,668	12,285,690	13,435,587	11,075,308
Bunker coal	695,192	655,465	5,976,266	6,449,722	5,686,855

FOREIGN MARKETS

GREAT BRITAIN

June 11—Owing to new restrictions imposed on the export of coal, and the consequent refusal of licences in many cases, the market has for the moment a downward tendency. The output of coal is, however, diminishing. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$7.20@7.44
Best seconds	Nominal	Seconds	6.96@7.20
Seconds	$7.20@7.80	Best Cardiff smalls	5.16@5.40
Best dry coals	7.20@7.80	Cargo smalls	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is very limited in extent owing to export difficulties and rates, while "patchy," are distinctly lower. Rates are approximately as follows:

Gibraltar	$3.84	Naples	$5.40	St. Vincent	$4.80
Marseilles	4.83	Alexandria	5.04	Rio de Janeiro	6.36
Algiers	3.86	Port Said	4.92	Monte Video	5.76
Genoa	5.28	Las Palmas	4.32	River Plate	6.00

Exports—British exports for May and the first five months of the past three years were as follows:

	May			Five Months		
To	1913	1914	1915	1913	1914	1915
Russia	650,197	533,074	10,735	1,442,564	1,304,074	16,139
Sweden	421,843	380,550	320,812	1,744,500	1,408,560	1,342,375
Norway	193,115	214,900	235,309	1,020,284	1,095,443	1,156,418
Denmark	208,569	255,938	264,761	1,262,015	1,169,560	1,255,985
Germany	830,610	811,720	....	3,512,982	3,378,673	....
Netherlands	167,613	156,244	108,854	879,344	708,952	649,038
Belgium	143,809	145,417	......	936,095	739,801	......
France	1,004,259	1,083,502	1,516,157	5,356,675	5,852,799	6,914,199
Portugal[1]	97,186	82,725	81,810	591,756	547,420	446,940
Spain[4]	298,066	252,185	187,173	1,620,152	1,503,304	893,783
Italy	708,149	849,177	446,608	3,930,725	3,900,684	2,669,021
Aus. Hung.	75,154	74,046	......	540,652	378,272	......
Greece	50,984	54,755	36,618	268,309	307,468	187,043
Roumania	25,705	55,533	......	49,637	131,206	......
Turkey	10,583	31,816	3,484	57,679	249,191	6,557
Algeria	95,859	125,467	93,963	578,849	535,389	455,014
Portuguese[5]	12,181	2,077	28,933	123,541	88,735	102,068
Chile	82,260	84,105	154	293,818	268,170	22,133
Brazil	120,602	103,761	51,175	851,210	591,307	309,230
Uruguay	44,422	86,014	25,277	298,768	324,274	184,227
Argentine	251,525	291,307	144,211	1,509,586	1,615,571	883,102
Channel Is.	13,071	15,932	8,778	61,919	66,817	53,527
Gibraltar	27,411	10,658	23,380	168,361	156,103	157,848
Malta	28,888	27,162	15,676	341,201	207,528	57,471
Egypt[2]	211,235	278,325	102,420	1,303,316	1,425,024	619,932
Aden[3]	18,121	16,449	13,561	60,196	79,861	60,402
India	13,200	31,043	939	90,987	98,002	12,110
Ceylon	26,155	23,375	14,390	98,535	146,599	31,521
Miscell'ous.	99,175	131,074	50,616	526,169	573,931	289,201
Coke	71,944	75,082	61,299	424,334	444,446	366,996
Briquettes	145,723	186,050	120,564	837,070	852,326	509,471
Total	6,147,614	6,469,463	3,967,657	30,781,229	30,149,490	19,651,751
Bunker	1,618,844	1,840,950	1,180,147	8,366,021	8,500,680	6,334,542

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.

Note—The figures in the above table do not include Admiralty and certain other shipments.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let Section on Page 12.

+Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
459	Am. Cocoa Butter Co.	Chicago	Ill.	200b[1]	627
545	Ballard & Ballard	Louisville	Ky.	15,000a	708
681	Upper Canada College	Toronto	Can.	1,000b	877
784	William Schuff & Co.	Louisville	Ky.	2 (cars)[1]	1005
785	The Water & Light Plant	Tupelo	Miss.	4,500b	1005
788	American Varnish Co.	Chicago	Ill.		1005
789	Louisville Hotel	Louisville	Ky.	3,500b	1005
790	Bryant Mfg. Co.	Chicago	Ill.	200c	1005
791	R. E. Wathen	Louisville	Ky.	600,000b	1005
792	Jos. Schwab Distil.	Louisville	Ky.		1005
793	Georgia Ry. & Power	Atlanta	Ga.	50,000b	1005
795	Light & Water Plant	Cullman	Ala.	2,400a	1005
799	Municipal Light Plant	London	Ohio	2,000b	1005
801	Mun. Electric Light Sta.	Henderson	Ky.	9,000b	1005
802	The Bay State Ry. Co.	Boston	Mass.	150,000b	1005
802	The Bay State Ry. Co.	Boston	Mass.	4,000a	1005
803	Board of Education	Jackson	Mich.	750a	1005
803	Board of Education	Jackson	Mich.	980b	1005
805	Light & Water Plant	Caldwell	Kan.	300b	1005
811	The City Government	Chicago	Ill.	123,000b	1006
855	U. S. Engineer	Wilmington	N. C.	13,000b	1085
856	Board of Education	Kansas City	Mo.	2,900a	1085
859	Bd. of Con. & Supply	Syracuse	N. Y.	7,000a	1085
861	Newberry State Hosp.	Newberry	Mich.	6,000b	1085
885	Lighthouse Inspector	Detroit	Mich.		1086
892	U. S. Engineers	Jacksonville	Fla.	7,000	1086
894	Bd. of Pub. Safety	Richmond	Ind.		1086
896	Board of Trustees	Indianapolis	Ind.	1,500	1086
903	Board of Education	Charleston	S. C.	145b	1086

a Indicates anthracite coal. b Indicates bituminous. c Indicates coke.

[1] Per month.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

+**No. 624—Providence, R. I.**—Only three bids were received on this contract (p. 795), which provides for furnishing the local Board of Education with about 8500 tons of anthracite coal, and all of these were rejected and the business readvertised. The new bids were opened at noon, June 16, but no advices as to the results have as yet been received. Address School Committee, 32 Summer St., Providence, R. I.

No. 726—New York—Bids on this contract (pp. 916, 955, 1004, 1084 and 1088), calling for 2700 tons of egg coal for the fireboats on the North River and in New York harbor, were reopened on Monday of this week. The bidders and prices were: John F. Schmadeke, $6.16 per ton, total bid, $16,632; William Farrell & Sons, $6.17 per ton, total bid, $16,659. Address Fire Comr. Robert Adamson, Municipal Building, New York City.

+**No. 801—Henderson, Ky.**—Bids are being advertised for on this contract (p. 1005), which provides for furnishing the local Municipal Electric Light Station with about 9000 tons of slack coal. The old contract was supplied by the People's mines at this place. Address Supt. L. P. Hite, Municipal Electric Light Station, Henderson, Ky.

+**No. 819—Austin, Tex.**—The requirements on this contract (p. 1048), which provides for furnishing the state charitable institutions with coal, are as follows: 1660 tons of domestic lump or shaker screen coal; 2400 tons nut coal or nut and slack coal mixed; 100 tons of McAlester lump; 420 tons of lignite. The bids may be accepted on any or all of these tonnages. Bids are to cover the cost of delivery to the institutions switch for freight yards, as designated. Deliveries are to be as required. Address State Pur. Agt., Geo. Leavy, Austin, Tex.

New Business

+**905—Logan, Ohio**—Sealed bids will be received by the local Board of Education until July 2, for furnishing approximately 400 tons of lump coal to be delivered at the various school houses during the ensuing school year. Bidders should specify what kind of fuel they propose furnishing. Address Clk. Herbert R. Harrington, Logan Village School District, Logan, Ohio.

+**No. 906—Eufaula, Ala.**—The Water and Light Department at this place will be in the market during July or August for approximately 2500 tons of Pratt, mine-run coal. The usual price is about $2.85 delivered in the bins. Address Supt. J. L. Kenny, City of Eufaula Water and Light Dept., Eufaula, Ala.

+**No. 907—Juniata, Penn.**—The local School Board received bids until 6 p.m. June 21, for furnishing the various schools with approximately 300 tons of coal, deliveries to be completed by July 20. Analysis are to accompany all bids. Address Secy. J. W. Fleck, Juniata School Board, Juniata, Penn.

+**No. 908—Chicago, Ill.**—The West Chicago Park Commissioners received bids until 4 p.m., June 22, for furnishing and delivering coal during the fiscal year beginning July 1, approximately as follows: 1835 tons of Pocahontas mine-run; 70 tons of Pocahontas lump; 34 tons of anthracite nut; 438 tons anthracite range; 5500 tons Indiana or Illinois screenings. A certified check must accompany all bids. Proposals are to be submitted on forms which may be obtained on application. Address West Chicago Park Commissioners, Union Park, Chicago, Ill.

+**No. 909—McConnelsville, Ohio**—Sealed proposals were received by the Board of Education, until 9 a.m., June 19, for furnishing the coal requirements of the various buildings of Malta Township. Quotations should be made f.o.b. cars, and bids will also be received for hauling coal to the schools. The successful bidder will be required to give a bond of $100. Address Clk. W. S. Conners, Bd. of Edu. Malta Township, McConnelsville, Ohio.

+**No. 910—Lincoln, Neb.**—The Local Light and Water Department will be in the market some time during the latter part of July for approximately 9600 tons of Pittsburgh (Kansas) mill and nut coal. The business is done on a competitive basis and the customary price is $3.70 per ton. Address James Tyler, City Water & Light Department, Lincoln, Neb.

+**No. 911—Cherokee, Iowa**—The Independent School District at this place will receive bids until 7:30 p.m., July 1, for furnishing approximately 300 tons of Illinois Standard lump coal. Deliveries are to be completed on or before Aug. 15. Address Secy. William Shardlow, Independent School District of Cherokee, Cherokee, Iowa.

No. 912—Freeport, Ill.—Bids will be received until noon, June 30, for furnishing approximately 160 tons of Pocahontas coal for the local Court House and Jail. Address H. C. Althoff, Board of Supervisors, Stephenson County, Freeport, Ill.

+**No. 913—Canonsburg, Penn.**—The local School Board received bids until June 21, for furnishing the fuel requirements for the ensuing year. Address Secy. George H. Challener, Canonsburg, Penn.

+**No. 914—Fort Dodge, Iowa**—Bids will be received until 7 p.m., July 6, for furnishing the several schools of the local district with coal for a period of one year. Bids should be submitted on lump, mine-run, and steam coal, and an analysis of the coal must accompany all bids. Address Acting Secy. H. M. Pratt, Bd. of Edu., Fort Dodge, Iowa.

+**No. 915—Oakville, Ont.**—Sealed bids were received until June 21 for furnishing a year's supply of coal for the county buildings of Halton. Address Chn. County Bldg. Com. A. S. Forster, Oakville, Ont.

+**No. 916—Salem, N. J.**—Sealed bids were received until 7 p.m., June 21, for furnishing the Salem City Water Works at Quinton, with coal during the ensuing year. Proposals should cover both the coal and cost of delivery at the station. Address Supt. Charles W. Dunn, City of Salem, Room 6, Dunn Bldg., Salem, N. J.

+No. 917—Springfield, Ohio—The Board of Education at this place will be in the market some time during July or August for approximately 2500 tons of Hocking lump coal which is usually bought at $3.07½ per ton. The call for bids is advertised and the business usually let to local dealers. Address Clk. Wm. H. Holmes, Bd. of Edu., Springfield, Ohio.

No. 918—Kansas City, Mo.—The Kansas City Municipal Water and Light Department will be in the market some time during July or August for approximately 500 tons of lump coal and 20,000 tons of mine-run. The business is usually closed on Cherokee coal for which $3.45 is paid for lump and $2.25 for mine-run. The contract is let on competitive bids. The lump coal is used at the City Hall and must be delivered in wagons while the mine-run is for use at the water and light plant and quotations should be made f.o.b. the plant. Address Pur. Agt. C. W. Lovelace, Kansas Municipal Water and Light Dept., Kansas City, Mo.

+No. 919—Pontiac, Mich.—The Board of Education received bids until 2 p.m., June 22, for supplying approximately 1000 tons of West Virginia threequarter lump coal and 100 tons of anthracite stove and egg sizes. Bids were to include cost of delivery at the schoolhouses during the year ending June 1. A certified check for $100 must accompany all bids. Address Secy. Elmer R. Webster, Bd. of Edu., Pontiac, Mich.

+No. 920—Lincoln, Neb.—Sealed proposals were received at the Board of Commissioners of the state institutions until 10 a.m., June 19, to furnish the fuel requirements of the various institutions for the fiscal year beginning July 1. About 4500 tons will be required at the Hospital for the Insane at Hastings, and 5450 tons at the State Penitentiary. Altogether about 32,000 tons of steam coal will be needed. All bids are required to be accompanied by a certified check for 5% of the amount bid. Address Secy. Leo Matthews, Bd. of Comrs. of State Institutions, Lincoln, Neb.

+No. 921—Rensselaer, Ind.—The county commissioners of Jasper County will receive bids until July 6 for furnishing 400 tons of coal. Address Audr. J. P. Hammond, County Comr. Rensselaer, Ind.

+No. 922—New Orleans, La.—The School Board of this place will receive bids about July 1 for furnishing approximately 2000 tons of both anthracite and bituminous coal for delivery to the 88 school buildings of New Orleans. The gross consideration is between $12,000 and $15,000. Specifications may be obtained on application. Address Purchasing Agent, New Orleans School Board, City Hall Bldg., New Orleans, La.

+No. 923—Lansing, Mich.—Bids will be received by the Michigan School for the Blind until noon, June 29, for furnishing approximately 1500 tons of three-quarter steam lump coal Bids should include cost of delivery in school bins. Address Supt. C. E. Holmes, Board of Control, Michigan School for the Blind, Lansing, Mich.

No. 924—Indianapolis, Ind.—Bids will be received until July 2 for furnishing the school buildings and the poor of Center Township with coal during the ensuing fiscal year. All bids should include cost of delivery. The bids are wanted on Sullivan No. 6 or Linton No. 4, and on Pocahontas third vein mine-run. Address Trustee, John W. Castor, 311 Saks Bldg., Indianapolis, Ind.

No. 925—Ionia, Mich.—The Board of Supervisors of Ionia County received bids until noon, June 21, for furnishing 200 tons of Pocahontas lump coal. One-half the deliveries are to be made immediately, and the balance during the winter or spring. Address Building Committee, Board of Supervisors, Ionia County, Ionia, Mich.

+No. 926—Detroit, Mich.—The Police Department of this place received bids until 11 a.m., June 22, for furnishing approximately 700 tons of anthracite, stove and egg coal, and 100 tons of chestnut, deliveries to be made during the year beginning July 1. Bids should include cost of delivery in the bins at the various police stations, and the successful bidder will be required to furnish a bond guaranteeing the faithful performance of the contract. Address Secy. of Police, Geo. A. Walters, Detroit, Mich.

+No. 927—Shelbyville, Ind.—The county commissioners of Shelby County will receive bids until July 6 for supplying the court house, jail, orphans home, and county farm with coal during the ensuing year. Address Audr. F. W. Flagel, County Comr., Shelbyville, Ind.

+No. 928—Quincy, Ill.—The Board of Education at this place usually contracts some time during July or August for their annual requirements of coal. The price on the current contract was $2.84 for 4-in. screened lump. The call for bids is not advertised in the papers. Address Business Mgr. Clyde L. Sears, Bd. of Edu., Quincy, Ill.

+No. 929—New Orleans, La. — Sealed proposals were received until June 21, for furnishing the Charity Hospital at this place with its annual requirements of bituminous and anthracite coal. Address Hon. Chas. A. Farwell, Charity Hospital, New Orleans, La.

+No. 930—East St. Louis, Ill.—The Board of Education here contracts either in July or August for their annual requirements of coal amounting to, approximately, 2800 tons. Bituminous lump is ordinarily used, and the current contract is being filled at $1.59¾ per ton. The call for bids is advertised. Address, Board of Education, East St. Louis, Ill.

+No. 931—Sharon, Penn.—The School Board at this place will receive bids until noon, July 6, for furnishing the local schools with coal for the school year beginning Sept. 8. Three-quarter inch coal is required. Address Secy. W. Whitehead, Sharon School Bd., Sharon, Penn.

+No. 932—Memphis, Tenn.—The Board of Education here contracts some time during the summer for their annual fuel requirements amounting to about 2500 tons of pea, slack, nut and mine-run coal. The usual price is about $2.50 per ton. The call for bids is advertised. Address E. S. Conser, Bd. of Edu., 876 Union Ave., Memphis, Tenn.

No. 933—New York—We are informed on reliable authority that the Board of Education will soon request bids for furnishing and delivering 18,000 tons of Buckwheat No. 3, and 6000 tons of semibituminous coal. Official announcement has not yet been made, or any specific dates set for opening the bids. Address Supt. of Supplies, Patrick E. Jones, Bd. of Edu., Park Ave. and 59th St., New York, N. Y.

+No. 934—Worcester, Mass.—Sealed bids will be received until noon, June 28, for furnishing and delivering 3879 tons of anthracite, and 7779 tons of bituminous to various public buildings. A satisfactory bond will be required guaranteeing the faithful performance of the contract. Address Supt. of Public Buildings, Geo. C. Halcott, Room 35, City Hall, Worcester, Mass.

+No. 935—New York, N. Y.—The Department of Docks and Ferries will receive bids until noon, July 2, for furnishing 2000 tons of Buckwheat No. 2. For previous purchases by this department see contract No. 49, p. 149, and No. 373, p. 567. Complete details may be had on application. Address Comr. of Docks, R. A. C. Smith, Pier A, Foot of Battery Place, North River, New York, N. Y.

+No. 936—Springfield, Mass.—Sealed bids will be received until 10 a.m., June 30, for furnishing the House of Correction, Court House, Hall of Records and Training School with coal as follows: Bituminous, 1200 tons; anthracite egg, 80 tons; nut, 10 tons; stove, 30 tons. Address Asst. Clk. Chas. M. Calhoun, Bd. of County Comrs., Springfield, Mass.

+No. 937—Amsterdam, N. Y.—Bids will be received until 1 p.m., June 28, for furnishing the local Public Schools with approximately 900 tons of anthracite grate, egg, stove, chestnut, and pea coal. Bids are to cover cost of delivery in the bins of the several school buildings. Address Clk. Leslie L. Bebb, Bd. of Edu., High School Bldg., Amsterdam, N. Y.

+No. 938—Owensboro, Ky.—Bids will be received until June 28 for furnishing the local public schools with 18,000 bu. of lump or mine-run coal. Deliveries are to be made at Bon Harbor or by rail. Address George H. Cox, Owensboro Public Schools, Owensboro, Ky.

No. 939—Richmond, Mo.—The Missouri Gas & Electric Service Co. at this place is requesting bids for furnishing their fuel requirements during the fiscal year beginning July 1. Clean coal for steaming purposes is required, and bids should include cost of delivery in the bin at the power house. The successful bidder will be required to furnish a bond guaranteeing the fulfillment of the contract. Address Missouri Gas & Electric Service Co., Richmond, Mo.

+No. 940—Rochester, Penn.—The school district of this place will receive proposals until July 1 for furnishing and delivering 4000 bu. of Pittsburgh lump coal to the various school buildings during the ensuing year. Address Secy. Geo. H. Karcher, Rochester School District, Rochester, Penn.

+No. 941—Helena, Mont.—The Board of Education at this place will receive bids until June 26 for furnishing their coal requirements during the ensuing year, which are approximately as follows: Mine-run, 600 tons; No. 2 nut, 600 tons; lump, 50 tons; also an alternative bid on 500 tons of forkings Deliveries are to be made at the various school buildings during the year beginning Sept. 1. Address Clk. Thos. E. Goodwin, Bd. of Trustees, Room 40, Bailey Block, Helena, Mont.

No. 942—Lafayette, La.—Bids will be received by the Southwestern Louisiana Industrial Institute, until July 1, for furnishing 300 tons of coal. Bidders should submit official B.t.u. tests of their coal. Address Southwestern Industrial Institute, Lafayette, La.

Contracts Awarded

+No. 208—St. Peter, Minn.—This contract (p. 400), which provides for furnishing the local City Government with between 1200 and 1400 tons of coal has been awarded to the **Purity Coal Co.** on range coal at $1.30 per ton f.o.b. cars at the mine. Address Supt. F. N. Wilson, St. Peter Electric Light & Water Works, St. Peter, Minn.

+No. 360—Chicago, Ill.—This contract (p. 566), which provides for furnishing the Acme Steel Goods Co. with its supply during the ensuing year, has been awarded to the **Paradise Coal Co.,** of Du Quoin, Ill., on its 2-in. screenings. Address Pur. Agt. H. H. Onstott, Acme Steel Goods Co., 2834 Archer Ave., Chicago, Ill.

No. 511—Dayton, Ohio—This contract (pp. 665, 748), which provides for furnishing the National Soldiers' Home with about 23,000 tons of coal during the ensuing year has been awarded to **E. A. Cole & Co.** at $2.49 per ton for West Virginia lump. Address Treas. W. H. Ortt, National Military Home, Dayton, Ohio.

+No. 585—Washington, D. C.—The anthracite awards on this contract (pp. 749, 875, 1084), which provides for furnishing coal for various of the Government buildings in the District of Columbia, were as follows:

Butler Building	J. Edward Chapman	Furnace	P. & R.	$5.69
Medical Museum	J. Maury Dove Co.	Furnace	P. & R.	5.73
Lemon Building	J. Maury Dove Co.	Egg	P. & R.	6.29
Ford's Theatre	Commercial Coal Co.	Stove	Mammoth	6.57
Department of Justice	J. Maury Dove Co.	Egg	P. & R.	6.30
Civil Service Commission	J. Maury Dove Co.	Egg	P. & R.	6.35
Geological Survey	L. Edward Chapman	Furnace	P. & R.	5.94
Weather Bureau	J. Edward Chapman	Furnace	P. & R.	5.68
Department of Commerce	J. Edward Chapman	Furnace	P. & R.	5.68
Coast & Geodetic Survey	J. Edward Chapman	Furnace	P. & R.	5.60
Bureau of Fisheries	J. Maury Dove Co.	Egg	P. & R.	6.15
Executive Mansions	W. H. Marlow	Furnace	P. & R.	5.95
Executive Office Building	W. W. Griffith	Furnace	P. & R.	5.95
Greenhouses	J. Maury Dove Co.	Furnace	P. & R.	5.68
Washington Monument	J. Maury Dove Co.	Egg	P. & R.	6.08
Navy Annex	J. Edward Chapman	Furnace	P. & R.	5.73
Soldier's Home	J. Edward Chapman	Stove	P. & R.	6.74
Soldier's Home	J. Edward Chapman	Furnace	P. & R.	5.84
Botanic Garden's	Commercial Coal Co.	Furnace	Mammoth	5.64

No awards have as yet been made for the Hospital for the Insane and for the Government Printing Office. Address Acting Secy. of the Treasury Byron R. Newton, General Supply Committee, Washington, D. C.

+No. 617—Kalamazoo, Mich.—This contract (p. 795), which provides for furnishing the local city government with its coal supply during the ensuing year, has been awarded to **Samuel Buurma,** on nut, pea and slack coal, at $2.44 per ton for deliveries made before Aug. 1, and $2.54 per ton thereafter. The cost includes shoveling in the bin. Address City Clk., C. L. Miller, Kalamazoo, Mich.

+No. 659 — Philadelphia, Penn. — This contract (pp. 836, 1050), which provides for furnishing the Lighthouse Department with coal has had further awards made in addition to those listed last week as follows: **Pennsylvania Coal & Coke Corp.,** bituminous, $2.60 per ton for delivery at Wilmington, Del.; **Charles Warner Co.,** for same delivery anthracite stove $5.90 and nut $6.05. Address Inspector T. J. Rout, 4th Lighthouse Dist., Philadelphia, Penn.

+No. 802—Boston, Mass.—This contract (pp. 1005, 1085), which provides for furnishing the Bay State Street Ry. with about 155,000 tons of steam coal has been awarded to the **Consolidation Coal Co.,** on 95,000 tons of Jenner coal for delivery at Quincy, Lynn, and Chelsea, Mass., and Newport and Portsmouth, R. I. and the balance, about 61,000 tons to the New England Coal & Coke Co. on New River coal to be delivered at Beverly, Mass., and Mystic Wharf, Boston. Address A. P. Emmons, Bay State Ry. Co., 84 State St., Boston, Mass.

+No. 803—Jackson, Mich.—This contract (p. 1005), which provides for furnishing the local Board of Education with about 1700 tons of coal has been awarded to **Collins, Hahn & Dalziel** on the following basis delivered in bin: Anthracite $7.75; Pocahontas lump $5; West Virginia splint 1½ in. lump $2.80; Hocking nut $2.80. This compares with last year's prices as follows: Anthracite $7.75; Pocahontas $5; West Virginia splint $3. Address Supt. Bldg., J. F. Forward, Bd. of Edu. 331 Ten Eyck St., Jackson, Mich.

+No. 808—Philadelphia, Penn.—This contract (p. 1006), which provides for furnishing the Bureau of Charities with coal during July, August and September, was awarded as follows: **Dexter & Carpenter,** 1730 tons of gas coal at $2.68; **Charles S. Sale,** 125 tons of pea coal at $3.95; **Rogers-Corr Coal Co.,** 300 tons of stove coal at $5.89. Address Dir. Herman Loeb, Bureau of Charities, Room 312, City Hall, Philadelphia, Penn.

Contract Notes

Winona, Minn.—The **Western Elevator Co.** was awarded the contract for supplying coal to all the schools next season.

Philadelphia, Penn.—Geo. B. Newton Coal Co., received the award for delivery of white ash buckwheat to the Eastern Penitentiary, at $2.76, and the Rogers-Corr Coal Co., have received from Girard College the award of 9100 tons of the same kind and size of coal at $2.30.

Stearns, Ky.—Thirty cars of block coal, consigned to Toledo, Ohio, for the Lake trade, have been shipped from here by the Stearns Co. This is the first consignment of a contract calling for ninety cars to be delivered in a short time. The mines are operating to capacity on this order.

Boston, Mass.—One of the curious features of the local bunkering situation is that most of the transatlantic steamers lately arriving have been coaled to capacity on the other side and their requirements here are little or nothing; and this in spite of the high prices that prevail over there.

Boston, Mass.—A power-house contract placed this week was divided between New River and a Somerset County (Penn.) coal, the larger tonnage to the latter. This is not exceptional on this particular contract but is shows that Pennsylvania coals are active competitors in this market.

+St. Paul, Minn.—The city purchasing committee last week opened bids on 17,000 tons of various grades of coal. The People's Coal & Ice Company was the lowest bidder on one grade of coal at $4.50 a ton. There were twelve bidders. The bids have been tabulated and referred to the various departments for advice.

Columbus, Ohio—The Hatton-Brown Coal Co., has secured a contract to furnish 100,000 tons of coal to the Atlantic Coast line. The supply of fuel for the company is secured from a number of operators, but the Hatton-Brown Co., was lucky in getting the largest tonnage of any operator on the Norfolk & Western.

Hudson, Mass.—The Mottoquottoc Worsted Co. at this place consumes about 1000 tons of bituminous coal per annum. It seldom contracts but makes its purchases in 300-ton lots which is the amount they have storage capacity for. Deliveries are made by rail. Address J. H. Hancock, Mottoquottoc Worsted Co., Cherry St., Hudson, Mass.

Philadelphia, Penn.—The condition of the anthracite market was clearly reflected at the recent convention of the Pennsylvania Retail Coal Men's Association, at Wilmington, Del., where, before over 900 retail men, President Tattersal, in his speech of acceptance of office, stated that no coal dealer could be considered a good business man who purchased coal at any figure in excess of the April circular.

Birmingham—Contracts totaling at least 1,000,000 tons of steam coal have been closed here recently. The Seaboard Airline contracted for 335,000 tons distributed as follows: Sloss Sheffield Steel & Iron Co., 200,000 tons for the Florida Division; The Alabama Co., 120,000 tons for the Birmingham Division and the Pratt Consolidated Coal Co., 15,000 tons for the Montgomery Division. Among other contracts was one for the Southern Ry. amounting to 500,000 tons. No announcement has yet been made as to the division of this order.

Foreign

Philadelphia, Penn.—Bituminous interests here have recently been in touch with Walter L. Webb who it is understood is representing various Italian interests in the purchase of coal and pig iron. It is stated on good authority that he expects to place orders for coal amounting to not less than 100,000 tons.

Insular Possessions—An American consular officer in one of the insular possessions reports that a business man in his district desires to purchase 500 tons of the best grade of American steaming coal. Shipments are to be by sailing vessel, the consignee to pay all expenses of the vessel while in the foreign port, as well as the costs of unloading. Prices should be made c.i.f. destination. The man states that he requires one shipment per annum of 500 tons of coal.

Amsterdam, Netherland—Press reports are to the effect that the American Consul at this place states that the Nederland Steamship Co., plying between Amsterdam and the Dutch East Indies proposes sending some of these vessels to American ports for coal. It is stated that the coal will be used both on its own steamers and those of the Holland-American line, which formerly coaled at Rotterdam. Holland imports from Germany and Great Britain have become too uncertain to be relied upon.

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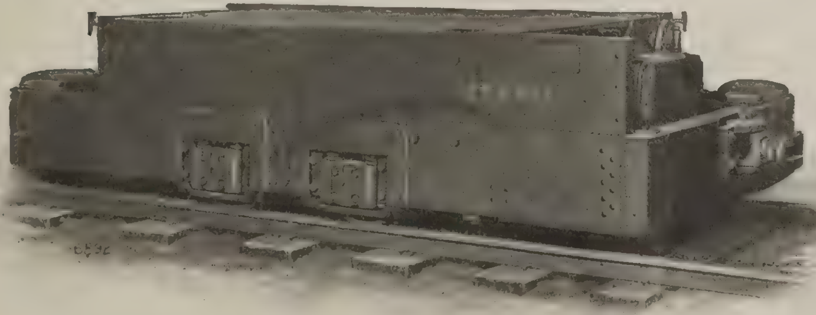

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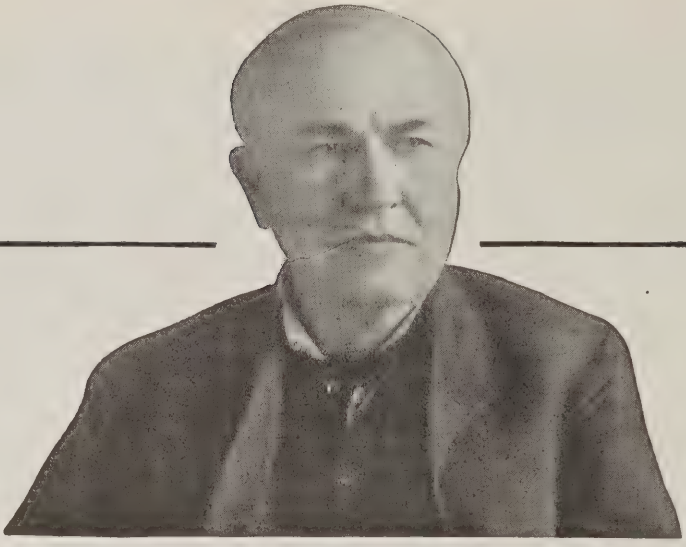

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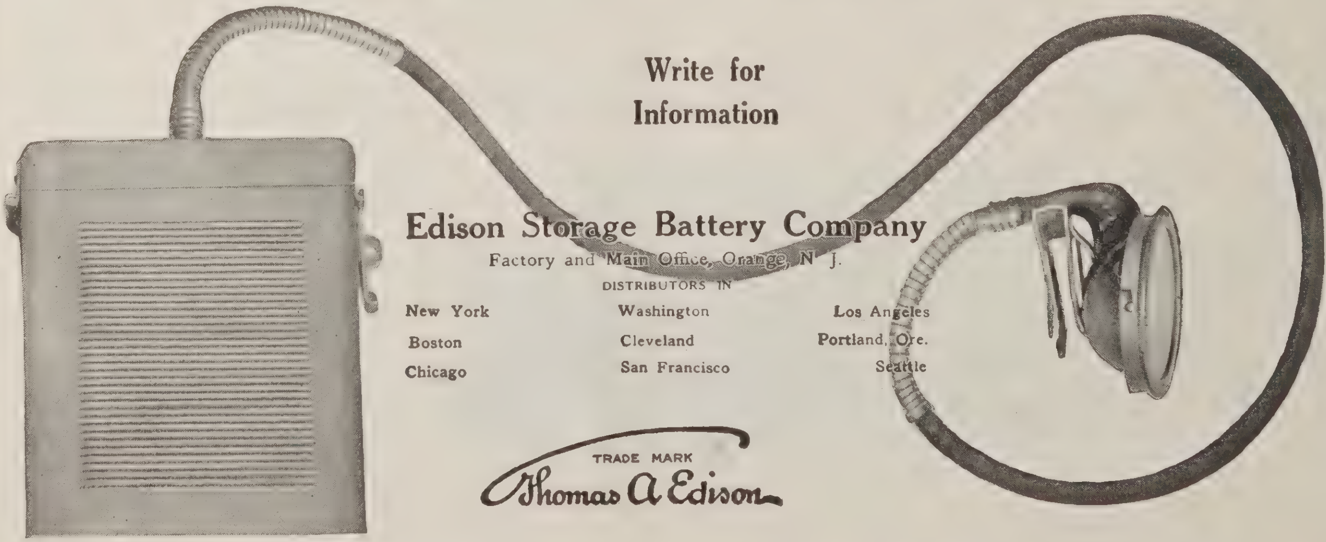

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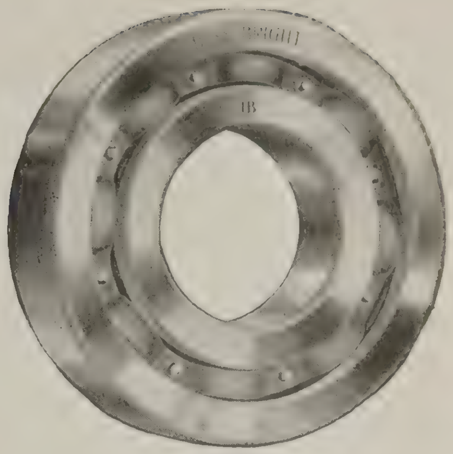

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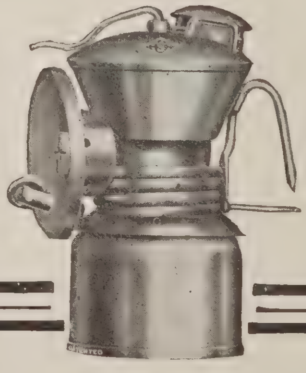

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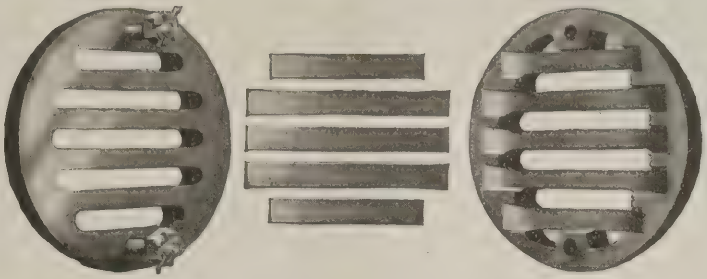

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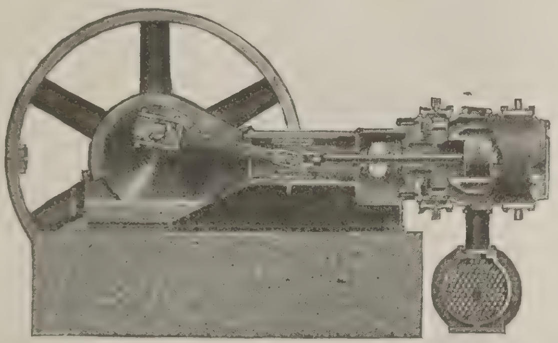

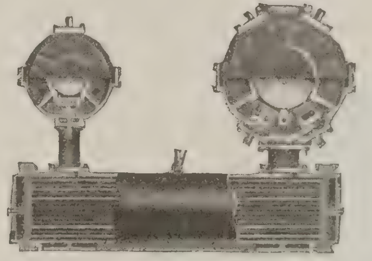

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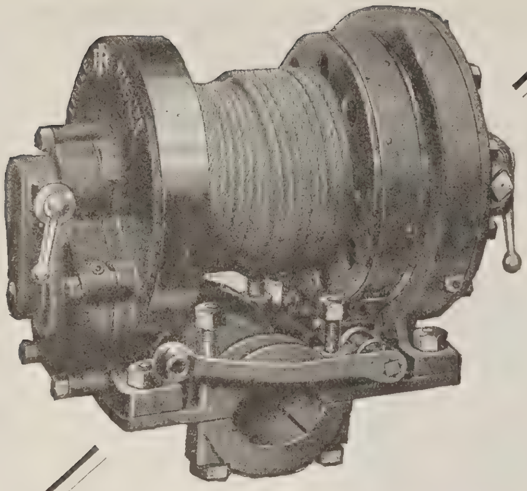


The "Little Tugger" Hoist can be furnished for operation by steam or air.

The "Little Tugger" Hoist Is Now Automatically Oiled

This hoist for hoisting and handling work in and about the mine already possessed many advantageous features not to be found in any similar tool.

In spite of this leadership the Company's engineers sought for still further inprovement. The result was the design of an automatic lubrication system, simple, economical and independent of attention, insuring long life to wearing parts and a decided elimination of friction.

The "Little Tugger" is compact, easily set up and operated and will soon pay for itself in the saving which it effects handling drills, mountings, timbers and material in the mine.

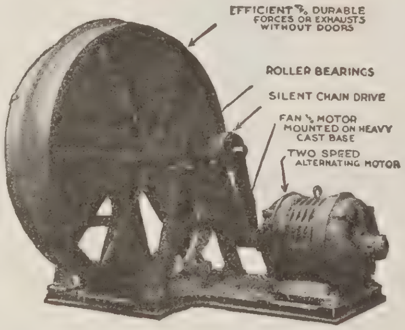
Shall we send Bulletin No. 4033?

INGERSOLL-RAND COMPANY

NEW YORK Offices the World Over LONDON

10-LH.

J. C. Stine Patented Disc Fans


EFFICIENT & DURABLE FORCES OR EXHAUSTS WITHOUT DOORS
ROLLER BEARINGS
SILENT CHAIN DRIVE
FAN & MOTOR MOUNTED ON HEAVY CAST BASE
TWO SPEED ALTERNATING MOTOR

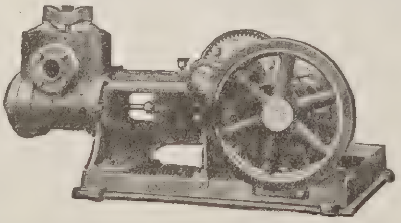
A new bulletin No. 21 is ready for distribution. It shows the wonderful saving in electric current by use of this new type.

Driven with two-speed induction motor. 9 sizes ready for delivery.

We also make these fans direct connected to self-starting direct current motors in 10 sizes. Bulletin 18 gives complete information.

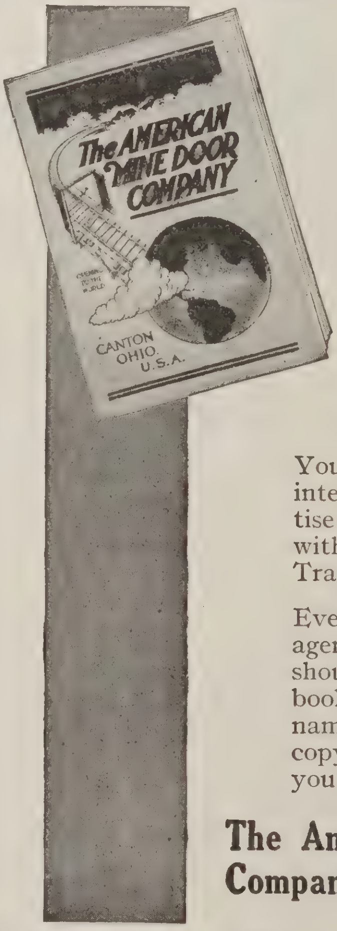
We make 17 sizes incline plane machinery. The most complete line in the country. Bulletin No. 20 tells about them. What do you think of this pump?

It is our 60-gallon size for dips, sumps and general mine work. Strong, economical and reliable. Bulletin 22.



J. C. Stine
Company

Tyrone, Penna.
U. S. A.



Your Copy Is Now Ready

You will need it. The interesting illustrated treatise on Mine Ventilation with Canton Automatic Trap Doors and Signals.

Every mine owner, manager and superintendent should have a copy of this book. Just send us your name and address. A free copy will be forwarded to you immediately.

The American Mine Door Company, Canton, Ohio

More Belting Service Less Expense

PRIOR to thirty-six years ago leather belting set the standards of price for proper belt service.

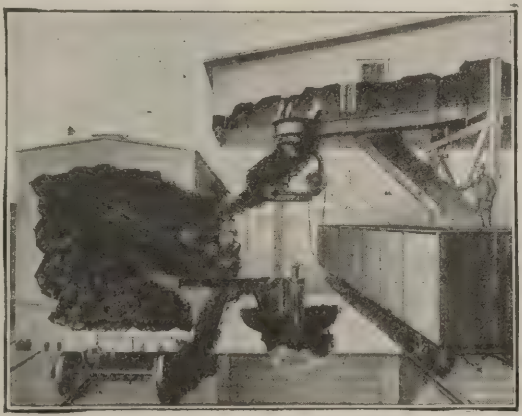
At that time Gandy Stitched Cotton Duck Belting was first made.

Today, after thirty-six years of experience with Gandy Belt, thousands of users testify that Gandy does the work equally as well at about 1/3 the cost of leather belting, and at much less than rubber belting.

"Gandy" has set a new standard for belt expense. Do you know what Gandy can do in **your** plant? If not 36 years of success warrants your investigating.

Samples and name of nearest distributor on request.

The Gandy Belting Company
734 Main St., Baltimore, Md.
New York Office, 36 Warren Street



Mr. Mine Operator

It will pay you to investigate the steel apron

Long Reach MANIERRE Loader

It loads large lump coal

Without Breakage

The above is a drawing of a typical mine installation. It is in successful operation, as is every Manierre. Bulletin 405 tells of other typical installations.

Manierre Engineering & Machinery Co.
"Six firms use thirty-one Manierres."
Milwaukee **Wisconsin**

THE selection and proper application of the right lubricant will almost entirely eliminate depreciation in any machinery. In mine car equipment, there is a tremendous opportunity for saving in this direction—the scrap heap of wheels and axles, most of them burned or worn out through poor lubrication, is a familiar sight.

The services of our experts are at the command of mining companies without charge.

"119" KEYSTONE GREASE

for mine car wheels

Number 119 *Keystone Grease* is not affected by heat or cold. It won't thin out in hot weather nor thicken in cold but remains the same the year around and affords perfect lubrication every day.

One filling of the wheels will last from *three* to *six* months,—often longer.

We'll make it easy for you to try it. Write us.

Applying No. 119 *Keystone Grease with a Keystone Grease Gun, which is supplied with the first order. The gun is made from heavy seamless steel tubing, with a tapered drawn brass nozzle, which can be cut to fit any opening.*

Keystone Lubricating Company

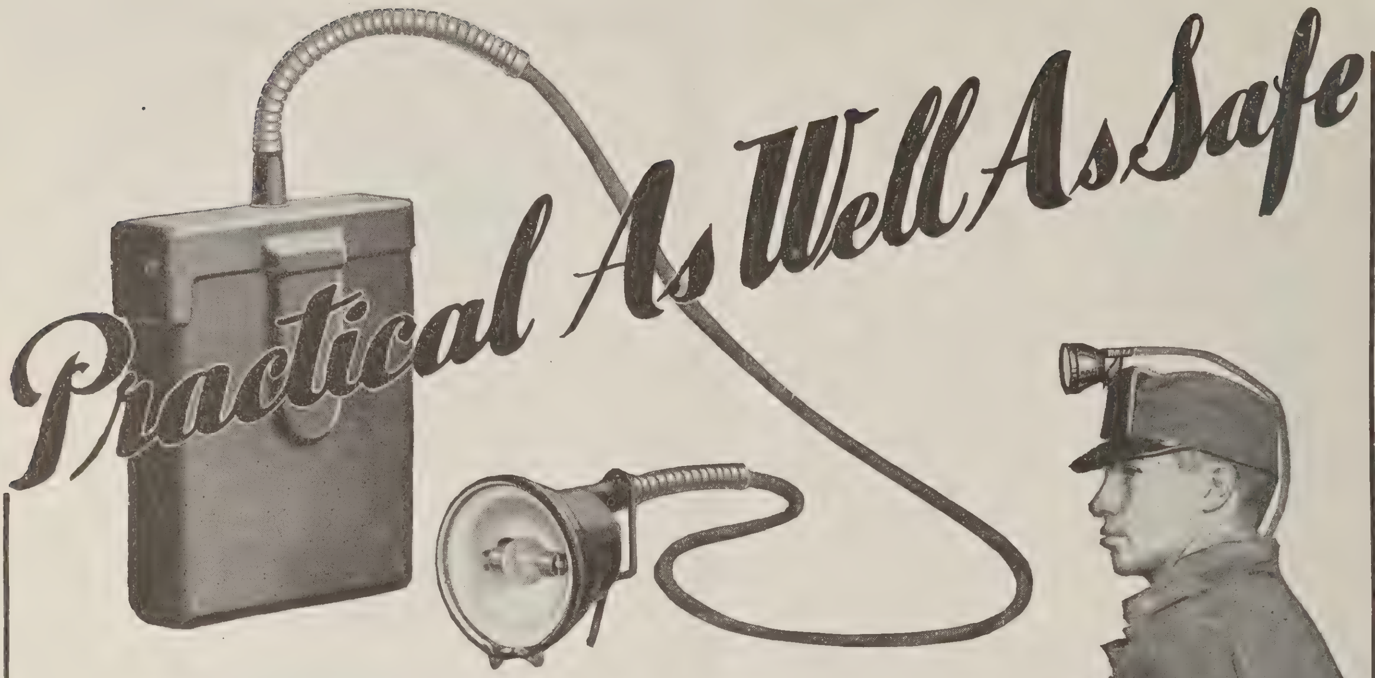
New York
Boston
Pittsburgh
Chicago
Savannah

Executive Offices and Works:
Philadelphia, Pa.
Established 1884

New Orleans
St. Louis
Denver
San Francisco
Minneapolis

General European Office and Warehouse, Manchester, Eng.

202



THE G-E MINERS' LAMP is practical as well as safe. It is light in weight, convenient in size and efficient.

The small, compact, sturdy cap lamp weighs less than four ounces and throws an evenly-diffused light through a solid angle of 130 degrees.

The strongly-constructed cable is amply long to avoid constricting the wearer's movements. It is protected against sharp bends at either end by flexible armor.

The battery is a non-spillable, lead plate storage type weighing about three pounds and of a size convenient for attaching to the miner's belt.

The construction of the outfit makes it absolutely safe for use in the presence of explosive gases. Even if the lamp is shattered as the result of an accident, to the wearer, there is no afterglow to ignite the most inflammable gas.

Ask our nearest office about this Lamp.

General Electric Company

General Office: Schenectady, N.Y.

ADDRESS NEAREST OFFICE

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dayton, Ohio
Denver, Colo.
Des Moines, Iowa
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
Fort Wayne, Ind.
Hartford, Conn.
Indianapolis, Ind.
Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
Salt Lake City, Utah
San Francisco, Cal.
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Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio

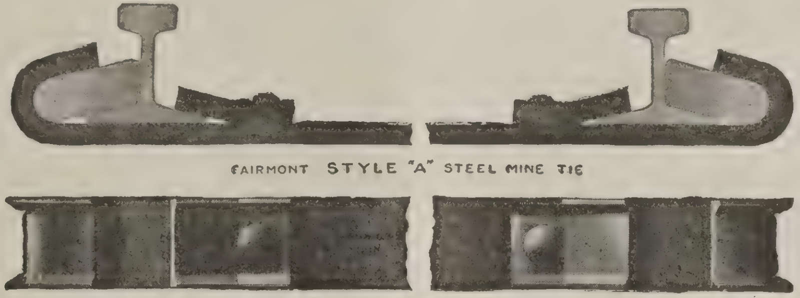
For Michigan business refer to General Electric Company of Michigan, Detroit, Mich.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.

5427

FAIRMONT
COAL MINE EQUIPMENTS

Fairmont Steel Mine Ties



FAIRMONT STYLE "A" STEEL MINE TIE

Mr. Jenkins, the Superintendent of the Marshall Coal Company, is an enthusiastic user of Fairmont Steel Mine Ties. We recently received the following statement from him:

"The ties were in sulphur water for more than two years and so far as I can see it has caused no material damage.

"I find in using these ties in room work that it saves considerable time and money for the reason that we have no trouble in keeping cars on the track."

Mr. Jenkins also speaks of the time saved in laying track and the greater facility in working low coal.

Why not ask us to put you in touch with some other users for direct inquiry, if you are interested in realizing large savings on your track equipment? Write.

FAIRMONT
Double Acting Electric Driven Force Pumps

Borderland, W. Va.,
March 7, 1914.

Fairmont Mining Machinery Company,
Fairmont, W. Va.
Gentlemen:

We have yours of the 5th and beg to advise that we have several of your mine pumps in operation, and so far we have been to no expense with these pumps with the exception of a few leather crimps and an extra set of valves.

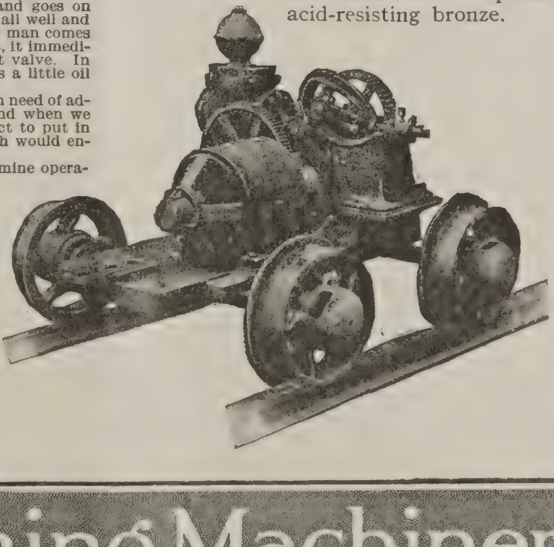
These pumps are started early in the morning, to pump out the various places, and as one man looks after all of the pumps in that mine he throws in his switch and goes on about his business. If the sump is pumped dry all well and good. The pump may continue to run until the man comes back, and, if, in the meantime any water appears, it immediately pumps it out as soon as it covers the foot valve. In other words, about all the attention they get is a little oil or grease every now and then on the gears.

I wish to state further that as soon as we are in need of additional pumps we expect to use this pattern, and when we have to renew some of our old pumps we expect to put in this style in case you make it belt driven, which would enable us to use the motors we have on hand.

We cheerfully recommend this pump to any mine operation needing this style or size.

Yours very truly,
BORDERLAND COAL COMPANY,
(signed) L. E. Armentrout,
Manager.

Read the letter opposite. It's typical of what every user has to say concerning these remarkable portable pumps that can be taken to any part of the mine and left to operate without an attendant. The cylinders and valves are made from a special acid-resisting bronze.



Write for interesting catalog giving full particulars of the complete line of Fairmont Coal Mine Equipments.

Fairmont Mining Machinery Co.
Fairmont West Virginia

Classified Ads

Positions Wanted, 3 cents a word, minimum charge 50c. an insertion in advanc

Positions Open, (Civil Service Examinations), **Employment Agencies** (Labor Bureaus), **Business Opportunities, Wanted** (Agents and Salesmen—Contract Work), **Miscellaneous** (Educational—Books), **For Sale,** 5 cents a word, minimum charge, $1.00 an insertion.

Count four words for keyed address care of New York; five for Chicago. Abbreviated words or symbols count as full words.

Copy should reach us not later than Saturday noon for ensuing week's issue. Answers addressed to our care Tenth Ave. at Thirty-sixth Street, New York or 1144 Monadnock Block, Chicago, will be forwarded (excepting circulars or similar literature).

No information given by us regarding keyed advertiser's name or address.

Original letters of recommendation or other papers of value should not be inclosed to unknown correspondents. Send copies.

Advertisements calling for bids, $3.60 an inch per insertion. C A

POSITIONS OPEN

WANTED IMMEDIATELY—First-class traveling salesman, thoroughly familiar with the safety lamp trade. Apply, stating age, experience, salary required and when could take up duties. P. 426, Coal Age.

POSITIONS WANTED

COAL STRIPPING SUPERINTENDENT; five years' experience revolving steam shovels, built and operated two stripping plants; thoroughly familiar with latest installations, plans and machinery for the most economical handling of this class of work; 15 years general contracting. P. W. 419, Coal Age, Chicago.

COAL COMPANIES needing general qualified electrician and mechanic, armature winding, construction and maintenances. P. W. 423, Coal Age.

OFFICE CLERK, eight years' experience in coal office in typewriting and general office work. P. W. 422, Coal Age.

CHIEF ELECTRICIAN AND MECHANIC, 15 years' experience all kinds mechanical and electrical mining equipment, desires responsible position. P. W. 421, Coal Age.

AS SUPERINTENDENT OR MINE MANAGER in coal mines; age 48 years; 12 years' experience as manager; can handle gas, soft roof or water; reference. P. W. 425, Coal Age, Chicago.

CONTRACTS TO BE LET

Bids received until June 29, 1915.

Coal Supply

Lansing, Mich.

The Michigan School for the Blind will receive bids until noon, June 29th, for supplying the School with 1500 tons more or less of ¾ Steam Lump Coal, weighed on the School scales and delivered in school bins, deliveries to be made so the school will not be hampered. Bidders must state whether the coal they propose to furnish is mined in Michigan and give the minimum B.t.u. value. Bids must be addressed to the Board of Control, Michigan School for the Blind, placed in sealed envelope and addressed to

SUPERINTENDENT C. E. HOLMES,
Michigan School for the Blind, Lansing, Mich.

⁂

Bids received until July 13, 1915.

To Coal Bidders

Ionia, Mich.

Bidders are invited to present sealed proposals to furnish supply of coal for one year ending June 30, 1916, to the Ionia State Hospital, Ionia, Michigan, and mark same "Proposals for Coal" and address to Dr. R. H. Haskell, Medical Superintendent, Ionia, Michigan, where they will be opened by the Board of Trustees, Tuesday, July 13, 1915. The coal is to be bituminous nut and slack (size of screen used must be specified), and furnished in such quantities as the Medical Superintendent may from time to time direct; two thousand five hundred tons in all, more or less. Bids must give name and place of mines from which coal is to be furnished and be accompanied by a chemical analysis and show the number of British Thermal Units guaranteed and the percentage of ash. The price is to be for the coal delivered f.o.b. cars on the Ionia State Hospital unloading tracks and shipments made in flat bottom cars. The right is reserved to reject any or all bids.

The bidder to whom award is made will be required to furnish surety company bond in the sum of One Thousand Dollars for the faithful performance of all the provisions of the contract.

For Sale

Second Hand Equipment

Rates: Less than 4 insertions 55 cents per line—4 to 11 insertions 50 cents per line—12 or more insertions 45 cents per line.

ADVERTISERS' NAMES are abbreviated in most of these items. Complete names and addresses are as follows:

NEW RIVER Co., The, Macdonald, W. Va.

AIR COMPRESSORS

Steam driven, 3 Laidlaw-Dunn-Gordon duplex 2 stage and 5 Norwalk tandem 2 stage.—NEW RIVER.

COAL CUTTERS

2—C. E. 6 and 2 C. E. 7 R. & P. Sullivan cutters, 250 volts, 6′ 3″ bars, 42″ gauge; condition A1; delivery July 1st.—DARBY COAL MINING CO., Darbyville, Virginia.

FANS

Ventilating from 18x7 down to 10x4, d.c. to steam engines Clifford, Capell, Robinson and Bullock.—NEW RIVER.

GENERATING UNITS

Generator sets direct current, 250 volt and 550 volt, direct connected and belted, capacities up to 250 kw.—NEW RIVER.

HAULAGE ENGINES

Tail rope and endless rope haulage engines.—NEW RIVER.

MINE HOISTS

12 hoists from 14x20 to 24x48 in excellent condition and practically as good as new; makers, Vulcan, Lane & Bodley and Robinson.—NEW RIVER.

MINING MACHINES

Sullivan longwall, equipped with two 7x7 air engines, gage 40″, feed chain $\frac{9}{16}$x65′. In first-class condition and as good as new. Immediate delivery.—NEW RIVER.

PUMPS

High head. General service and boiler feed.—NEW RIVER.

RAILS

About 100 ton 60 lb. relaying rail in good condition; price $18 per gross ton.—WICKES BROS., Jersey City, N. J.

Mine Contract Work
of all kinds, including Shaft Sinking, Steel, Wood and Concrete Construction and Machinery Erection. Reasonable terms. Full details on request.
Write me today.
F. D. Buffum Jenkins Arcade Pittsburgh, Pa.

HANS OLSON, Pres. JNO. A. FISHER, Sec'y.
Punxsutawney Drilling and Contracting Company
DIAMOND DRILL CONTRACTORS
Testing Bituminous Coal Lands a Specialty.
Weber Bldg. PUNXSUTAWNEY, PA.

COALS for BUNKER and EXPORT
New River Smokeless
South Fork Miller Vein
and
Somerset County Smokeless

Vernon Metal & Produce Co., Inc.
HUGH L. KIRBY, MGR.
Coal Department
90 West Street, New York City
Phone Rector 4567—Cable address FREELOU, NEW YORK

P&B INSULATING-TAPE

for wrapping your mine cables, insures thorough protection against abrasion, moisture and acids. Has no peer in insulating and adhesive properties. Does not dry out or deteriorate. Especially adapted for the coal mine. Sold in 1 lb., ½-lb. and ¼-lb. rolls, each wrapped individually and bearing the label shown in the illustration. Accept no other. Beware of imitations. There's no extra packing charge on ¼-lb. rolls.

Write for Booklet today.

THE STANDARD PAINT COMPANY, **Woolworth Building, New York City**

Manufacturers of Special Paints for Special Purposes. RU-BER-OID Roofing and Impervite Cement Waterproofing.

SHAFT SINKING

Slopes **Tunnels**

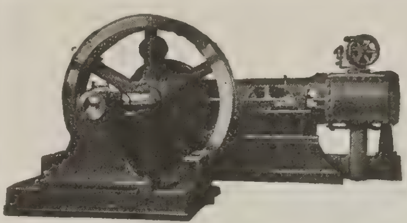
Concrete Construction

Bridge Piers **River Works**

Difficult Foundations

The Dravo Contracting Co.

Pittsburgh, - - - - - Penna.



CHUSE ENGINES

are unexcelled for driving Generators and Ventilating Fans.

Single Valve and Non-releasing Corliss.

CHUSE ENGINE & MFG. CO.

Mattoon, ***Illinois***

When It's

Diamond Core Drilling

you want, write or wire us.

Birdsboro Steel Foundry & Machine Co.
Birdsboro, Pa.

The Marion Steam Shovel Co.

Builders of Railroad and Revolving Type Steam and Electric Shovels, Dipper, Elevator and Hydraulic Dredges, Scraper-Bucket Excavators, Ballast Unloaders, Railroad Ditchers and Log Loaders.

Station K, Marion, Ohio, U. S. A.

Diamonds for Drilling must be both **Hard** and **Durable.** Otherwise you make **Losses** instead of **Profits.** We can offer at this time the following exceptional values.

Grade A. Highest quality obtainable. Choice, tested stones, **$60 to $85 per kt.** According to size and shape,

Grade B. Good, tough carbons, **$45 to $58 per kt.**

Grade C. Excellent serviceable carbons altho' not so hard as grades A and B.

Cheap but Good **$30 to $42 per kt.**

Gives good satisfaction in all but the very hardest formations.

→ *Goods sent for examination to any responsible concern.*

Byron & Hall
Importers
Centennial Bdg.,
116 Broad Street
New York, N. Y.

THEW SHOVELS

Are made in seven sizes, with from ½- to 2-yard dipper capacity and for operation with steam, electricity, gasoline or compressed air. Write for Circular C and other interesting data.

THE THEW AUTOMATIC SHOVEL CO. LORAIN, OHIO

We Look Into The Earth by using diamond core drills

We test Coal and Ore land in any part of North or South America.

The Pennsylvania Drilling Co.
formerly
The J. A. Brennan Drilling Co.

No. 30 Carson St.,
Pittsburgh, Pa.
Phone Hemlock 305

2623 Whitehall Bldg.
New York.
Phone Rector 993

WATERBURY WIRE ROPE

of Standard and Armored Construction. Manila and Sisal Cordage. Fibreclad Wire Rope. We make Ropes for every purpose. **Write for prices.**

WATERBURY COMPANY
80 South Street, New York
Chicago San Francisco Dallas
Boston New Orleans

Make Your Pick Bits at Less Cost

Make and sharpen your own pick bits on the

Little Giant Power Hammer

Gives position and accurate control of the blow and produces clean, sharp bits. An unskilled man can operate it with perfectly satisfactory results. Saves labor, time and material. No modern coal mine should be without the "Little Giant." Sold by all jobbers. **Write for Bulletin.**

MAYER BROS. CO. Mankato, Minn.

CHROMOLINE TEMPERING COMPOUND

—Keeps Your Bits In Perfect Trim

It eliminates the expense of improperly tempered bits because it tempers them perfectly every time.

For better bit service and cheaper coal use Chromoline—the big operators are doing it.

One pound tempers 2000 bits.

Crockwell Mine & Mill Supply Co.
707 New Bank of Commerce Bldg. St. Louis, Mo.

The "Repeat" Order
Its Meaning is Engineering

Directly the "repeat order" is no indication of the service that **you** can expect from any machine as **specific** in its work as a hoist.

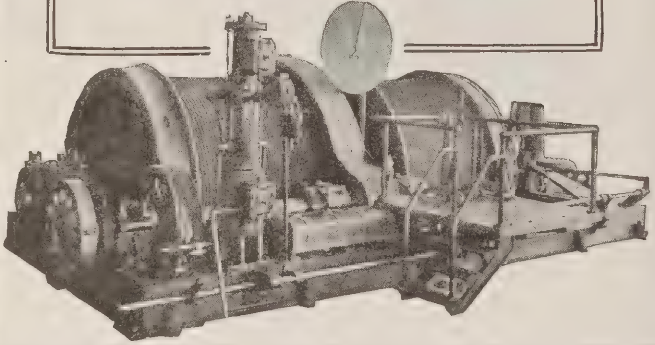
But the "repeat" order does show that some other purchaser, with conditions equally as specific as your own, got a machine in the **first place** that proved so good as to make him buy a second—and so on—from the same builder.

It shows you—when one VULCAN Hoist after another is bought by the same concern—that Vulcan engineers can **grasp** and **interpret** specific conditions exactly.

Isn't there significance for you in the fact that most VULCAN Hoists are "repeat" orders

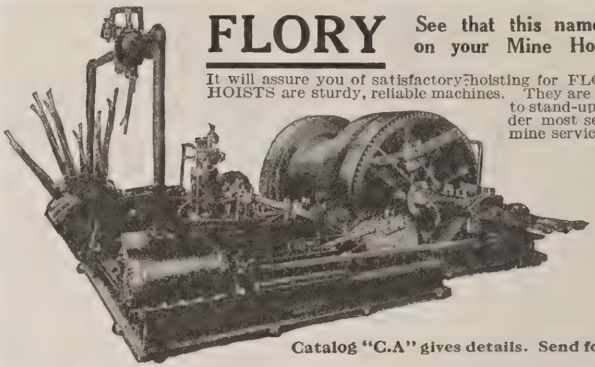
Vulcan Iron Works
1730 Main Street Wilkes-Barre, Pa.

VULCAN HOISTS



FLORY See that this name is on your Mine Hoists.

It will assure you of satisfactory hoisting for FLORY HOISTS are sturdy, reliable machines. They are built to stand-up under most severe mine service.



Catalog "C.A" gives details. Send for it.

S. Flory Mfg. Co., Bangor, Pa.
Also Manufacturers of Derricks, Cableways and Dredging Machinery.

RIDGWAY ENGINE GENERATOR UNITS

have no equals for haulage work. Their ability to take care of enormous overloads is the reason. 50% to 100% overload for 1 to 5 minutes is handled with ease.

Write for bulletin CA.

Ridgway Dynamo & Engine Co.
Ridgway, Pa.

PLATT
MAKERS OF
PLATT CENTRIFUGAL AND TURBINE PUMPS Single and Multi-Stage
SMITH-VAILE STEAM AND POWER PUMPING MACHINERY
STILWELL FEED WATER HEATERS AND PURIFIERS
SMITH-VAILE FILTER PRESSES AND OIL MILL EQUIPMENT
VICTOR-FRANCIS TURBINE WATER WHEELS
SMITH-VAILE AIR COMPRESSORS Steam and Power Driven

PLATT PRODUCTS

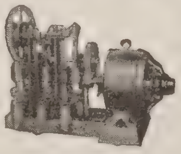
are known wherever economy and efficiency are matters of first importance. That's why you will find so many coal mines equipped with

Smith-Vaile "Triplex" Pumps

Built in a great variety of sizes—**and built right.** Any lining you need to protect your pump from acid-bearing waters.

Write for bulletins on Platt Products.

Platt Iron Works, Dayton, Ohio



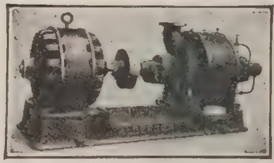
A Mile a Minute is Safe Speed for Wuest Herringbone Gears—

They made 20 to 1 reductions possible. They are almost noiseless. Have no back-lash. Write.

The Falk Co. Milwaukee, Wis.

ALBERGER MINE PUMPS

With Centrifugal Pumps, whether of the Turbine or Volute Type, the name of Alberger is a guarantee of maximum service and minimum operating expense. **Write for Bulletins.**



Alberger Pump & Condenser Company, 40 Cedar St., New York
Atlanta Boston Chicago St. Louis Pittsburgh San Francisco New Orleans

GOULDS PUMPS
FOR EVERY SERVICE
THE GOULDS MANUFACTURING CO. SENECA FALLS, N.Y.

Air Compressors

for all classes of mining service—one grade—the best!

Get Booklet 115C.

Sullivan Machinery Co., 122 S. Michigan Ave., Chicago

SOUTHWARK Foundry & Machine Co.
Philadelphia, Pa.

Designers and builders of Centrifugal Pumps covering their entire field of application.

Write for the Pump Book.

Three Coal Mine Superintendents

wrote us within a week that The Deming Pumps in their mines have been running for three years without costing a cent for repairs.

DEMING

Mine Pumps

are all made with the one thought,—low repair costs and highest efficiency.

An experience of more than thirty years has taught us how to successfully combine these two qualities. If you are in the market, tell us what your pump will have to do.

Fig. 70, Deming Portable Mine Pump.

Large Stocks of Deming Mine Pumps Are Carried in Pittsburgh, Chicago and Denver.

The Deming Company, Salem, Ohio

General Distributing Houses:
Chicago: Henion & Hubbell.
Pittsburgh: Harris Pump & Supply Co.
Denver: Hendrie & Bolthoff Mfg. & Supply Co.

McG

PUMPING MACHINERY

In All Types for All Uses

STEAM DRIVEN — POWER DRIVEN

SEE CATALOG LIST FOR TYPE PREFFERED

For the Discriminating Buyer

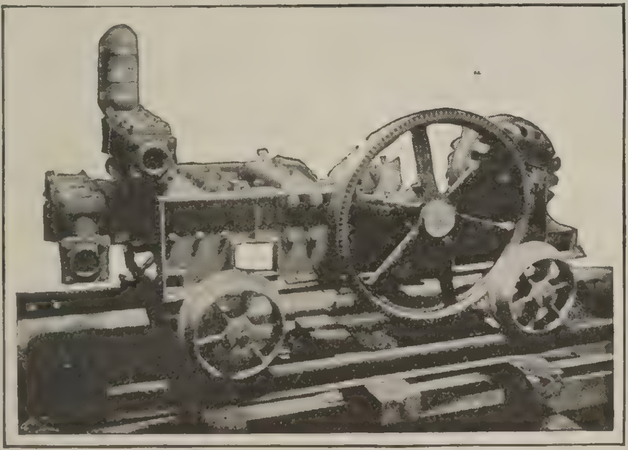
McGowan Pumping Equipment is designed with due consideration of every essential detail and will meet the most exacting requirements in any of the Types represented by the catalogs scheduled below. Satisfactory service is the natural result of judicious buying following an intelligent analysis of Plant conditions which should be understood before orders are placed or accepted, that a proper degree of efficiency may be expected or realized.

CATALOGS

395—Air Compressors
405—Single and Duplex Power Pumps
485—Deep Well Steam and Power Pumps
415—Triplex Power Pumps
425—Centrifugal Pumps
305—Single Steam Pumps
315—Duplex Steam Pumps

THE JOHN H. McGOWAN CO. CINCINNATI OHIO

Yough Pumps Are Backed by 35 Years Experience in Mine Pumping



You can't go wrong when you put a Yough at work in the mine. We've had time to learn how to build pumps. This one is built practically and is built right.

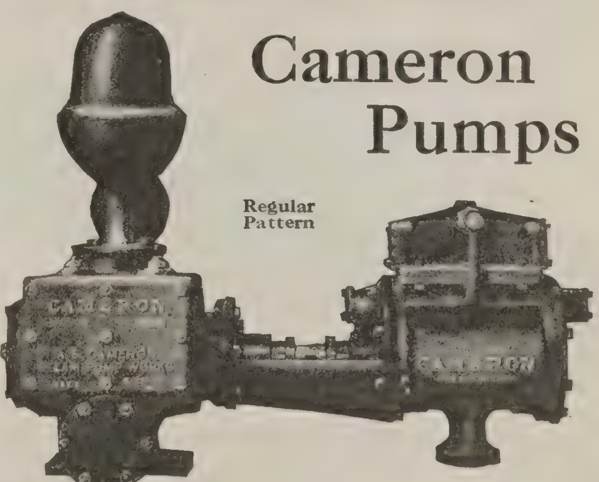
Strong, compact, takes up little head room, has sectional water end, on account of which the pump does not need to be thrown away when some little repair is to be made.

Full details on request.

BOYTS, PORTER & CO., CONNELLSVILLE, PA.

The Slogan of the Cameron—"Character: the Grandest Thing."

Cameron Pumps



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Maximum Service

Maximum service at the lowest cost. That's what you want in a pump. Initial cost is incidental. In the Cameron Pump you get maximum service at minimum cost because of the Cameron Design. Different from other pumps. Fewer parts. Less wear. Longer service. Over 70,000 in use today all over the world.

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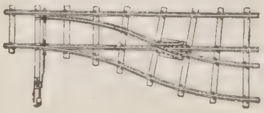
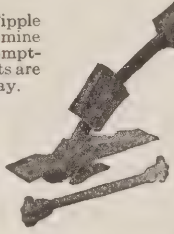
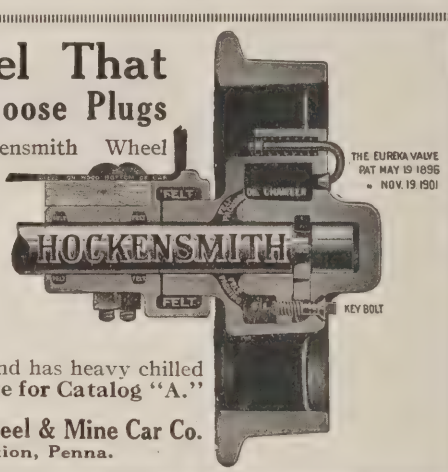
Frogs—Crossings—Switches—Tipple Tracks and every kind of coal mine track equipment furnished promptly. Large corps of track experts are at your service. Write us today.





3

A Wheel That Eliminates Loose Plugs



This new Hockensmith Wheel has solid closed Hub and Spring Valve Oiler. Note the straight spokes conforming to our usual high quality product. Wheel is thoroughly annealed and has heavy chilled tread. **Write for Catalog "A."**

Hockensmith Wheel & Mine Car Co.
Penn Station, Penna.

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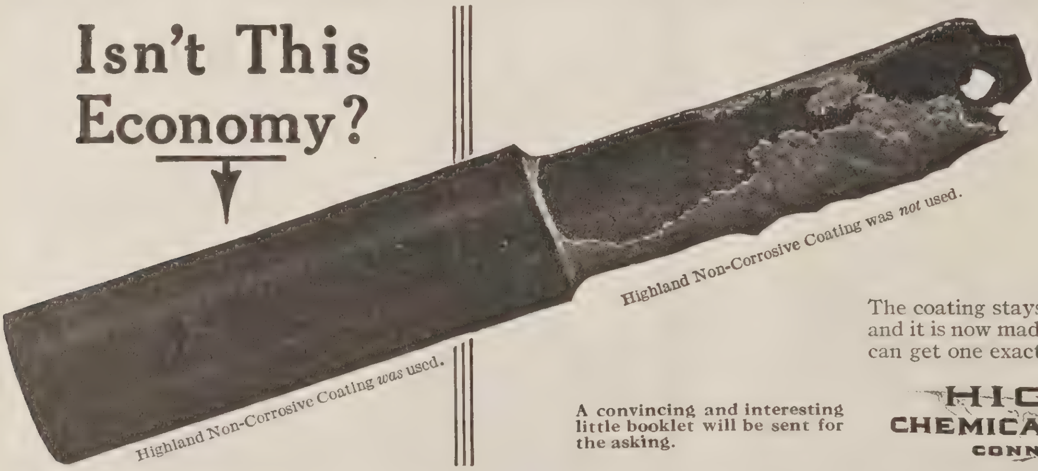

Highland Non-Corrosive Coating was *not* used.
Highland Non-Corrosive Coating *was* used.

Highland Non-Corrosive Coating

will not make a mine pipe everlasting, but it will extend its life three or four times what it is when left bare and pay for its own cost a dozen times.

The coating stays on, it does not crack or peel and it is now made in three grades, so that you can get one exactly suited to your purpose.

A convincing and interesting little booklet will be sent for the asking.

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CONNELLSVILLE, PA.

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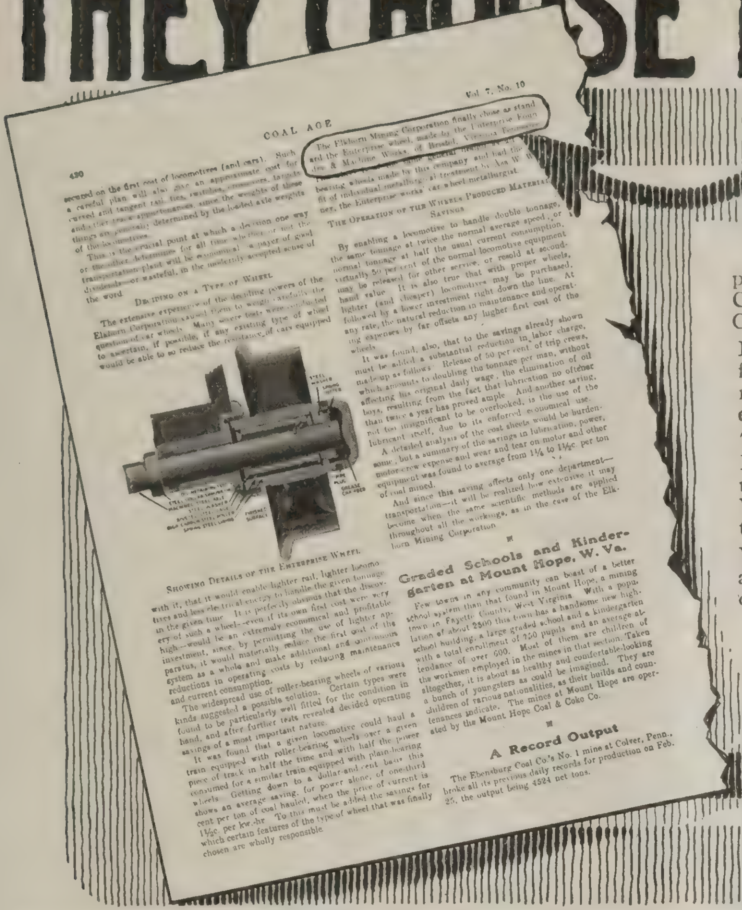
THE MAKE-IT-PAY DEPT. OF COAL AGE

THEY CHOOSE ENTERPRISE *Chilled Car Wheels*



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secured on the first cost of locomotives (and cars). Such a careful plan will also give an approximate cost for curved and tangent rail, ties, switches, crossovers, targets and other track appurtenances, since the weights of these things are generally determined by the loaded axle weights of the locomotives.

This is the crucial point at which a decision one way or the other determines for all time whether or not the transportation plant will be economical—a payer of good dividends—or wasteful, in the modernly accepted sense of the word.

DECIDING ON A TYPE OF WHEEL

The extensive experience of the deciding powers of the Elkhorn Corporation caused them to weigh carefully the question of car wheels. Many severe tests were conducted to ascertain, if possible, if any existing type of wheel would be able to so reduce the resistance of cars equipped with it, that it would enable lighter rail, lighter locomotives and less electrical energy to handle the given tonnage in the given time. It is perfectly obvious that the discovery of such a wheel—even if its own first cost were very high—would be an extremely economical and profitable investment, since, by permitting the use of lighter apparatus, it would materially reduce the first cost of the system as a whole and make additional and continuous reductions in operating costs by reducing maintenance and current consumption.

The widespread use of roller-bearing wheels of various kinds suggested a possible solution. Certain types were found to be particularly well fitted for the condition in hand, and after further tests revealed decided operating savings of a most important nature.

It was found that a given locomotive could haul a train equipped with roller-bearing wheels over a given piece of track in half the time and with half the power consumed for a similar train equipped with plain-bearing wheels. Getting down to a dollar-and-cent basis this shows an average saving, for power alone, of one-third cent per ton of coal hauled, when the price of current is 1½c. per kw.-hr. To this must be added the savings for which certain features of the type of wheel that was finally chosen are wholly responsible.

SHOWING DETAILS OF THE ENTERPRISE WHEEL

The Elkhorn Mining Corporation finally chose as standard the Enterprise wheel, made by the Enterprise Foundry & Machine Works, of Bristol, Virginia-Tennessee [illegible] general [illegible] bearing wheels made by this company and had the [illegible] fit of individual metallurgical treatment by Asa W. W [illegible] ney, the Enterprise works' car wheel metallurgist.

THE OPERATION OF THE WHEELS PRODUCED MATERIAL SAVINGS

By enabling a locomotive to handle double tonnage, the same tonnage at twice the normal average speed, or normal tonnage at half the usual current consumption, virtually 50 per cent. of the normal locomotive equipment may be released for other service, or resold at second-hand value. It is also true that with proper wheels, lighter (and cheaper) locomotives may be purchased, followed by a lower investment right down the line. At any rate, the natural reduction in maintenance and operating expenses by far offsets any higher first cost of the wheels.

It was found, also, that to the savings already shown must be added a substantial reduction in labor charge, made up as follows: Release of 50 per cent. of trip crews, which amounts to doubling the tonnage per man, without affecting his original daily wage; the elimination of oil boys, resulting from the fact that lubrication no oftener than twice a year has proved ample. And another saving, not too insignificant to be overlooked, is the use of the lubricant itself, due to its enforced economical use.

A detailed analysis of the cost sheets would be burdensome; but a summary of the savings in lubrication, power, motor-crew expense and wear and tear on motor and other equipment was found to average from 1¼ to 1½c. per ton of coal mined.

And since this saving affects only one department—transportation—it will be realized how extensive it may become when the same scientific methods are applied throughout all the workings, as in the case of the Elkhorn Mining Corporation.

Graded Schools and Kindergarten at Mount Hope, W. Va.

Few towns in any community can boast of a better school system than that found in Mount Hope, a mining town in Fayette County, West Virginia. With a population of about 2500 this town has a handsome new high-school building, a large graded school and a kindergarten with a total enrollment of 750 pupils and an average attendance of over 600. Most of them are children of the workmen employed in the mines in that section. Taken altogether, it is about as healthy and comfortable-looking a bunch of youngsters as could be imagined. They are children of various nationalities, as their builds and countenances indicate. The mines at Mount Hope are operated by the Mount Hope Coal & Coke Co.

A Record Output

The Ebensburg Coal Co.'s No. 1 mine at Colver, Penn., broke all its previous daily records for production on Feb. 25, the output being 4524 net tons.

THIS is a page from a story in "Coal Age" on the wonderful plant and equipment of the Elkhorn Mining Corporation of Fleming, Haymond, Hemphill, Garrett and Wayland, Kentucky.

Exhaustive tests were conducted with every form of equipment, before final choice was made in order to ascertain which was most efficient.

The exclusive choice of Enterprise Roller Bearing Wheels—every one of which is made under the personal supervision of Asa W. Whitney—is most significant, because it shows that ENTERPRISE **proved** their superiority.

We will gladly demonstrate their superiority at your mine, and send full information, without the slightest obligation.

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400-420 Shelby Street,
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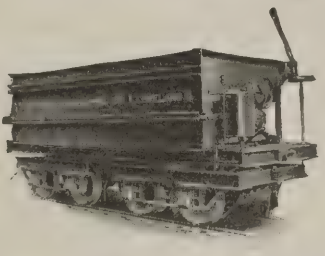

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Heavily built.

Large capacity.

Let our engineers fit your requirements.

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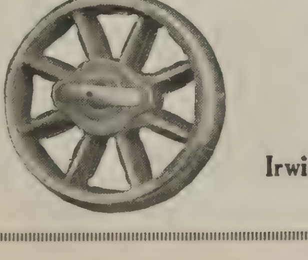
A Different Wheel

Here's a wheel that's easy to oil—that holds a large amount of oil—that is easily put on and taken off.

A wheel that gives real service.

Irwin Mine Car Wheel



In this wheel the oil hole is located on center, the oil chamber is large. Features that mean ease of oiling and long time running on one oiling. The linch pin is always accessible—No trouble to remove wheel.

This wheel means smaller maintenance costs—better service. GET DETAILS TODAY.

Irwin Foundry & Mine Car Co.
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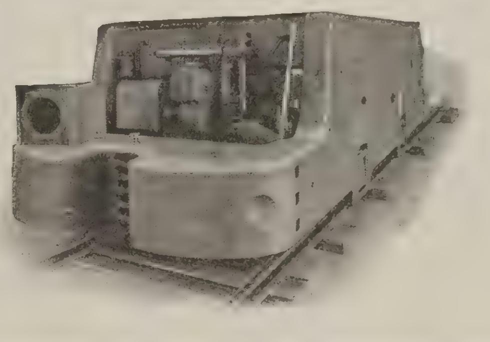
You Can't Figure Otherwise



when you get right down to comparative costs—actual users' data, than that **Whitcomb Gasoline Mine Motors** are the cheapest mine haulage—ranging from 10 to 50% lower in operating costs than any other systems. And this reduction is perfectly logical when you consider the low initial cost of this **unit** system requiring no outside power plants, bonded rails, wiring, charging stations, etc.

Whitcomb Gasoline Mine Motors

It only remains to demonstrate their dependability and their safe and entirely satisfactory operation. We can refer to any one of over 200 mines for the evidence that will be conclusive in this respect.

Let's get together and work out the **facts.** No obligation whatever no matter how large a saving we can positively show you.

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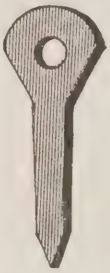

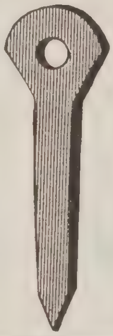

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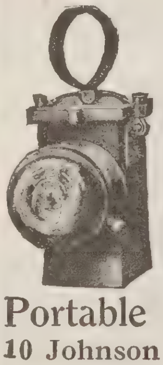

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The new type

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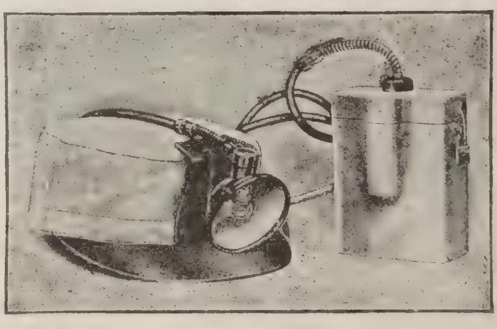

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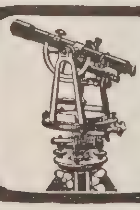

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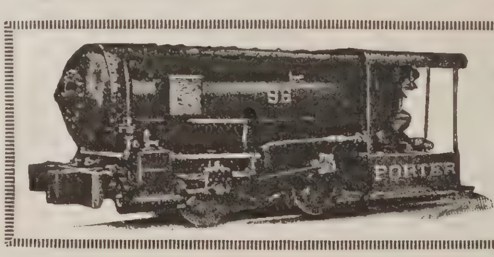

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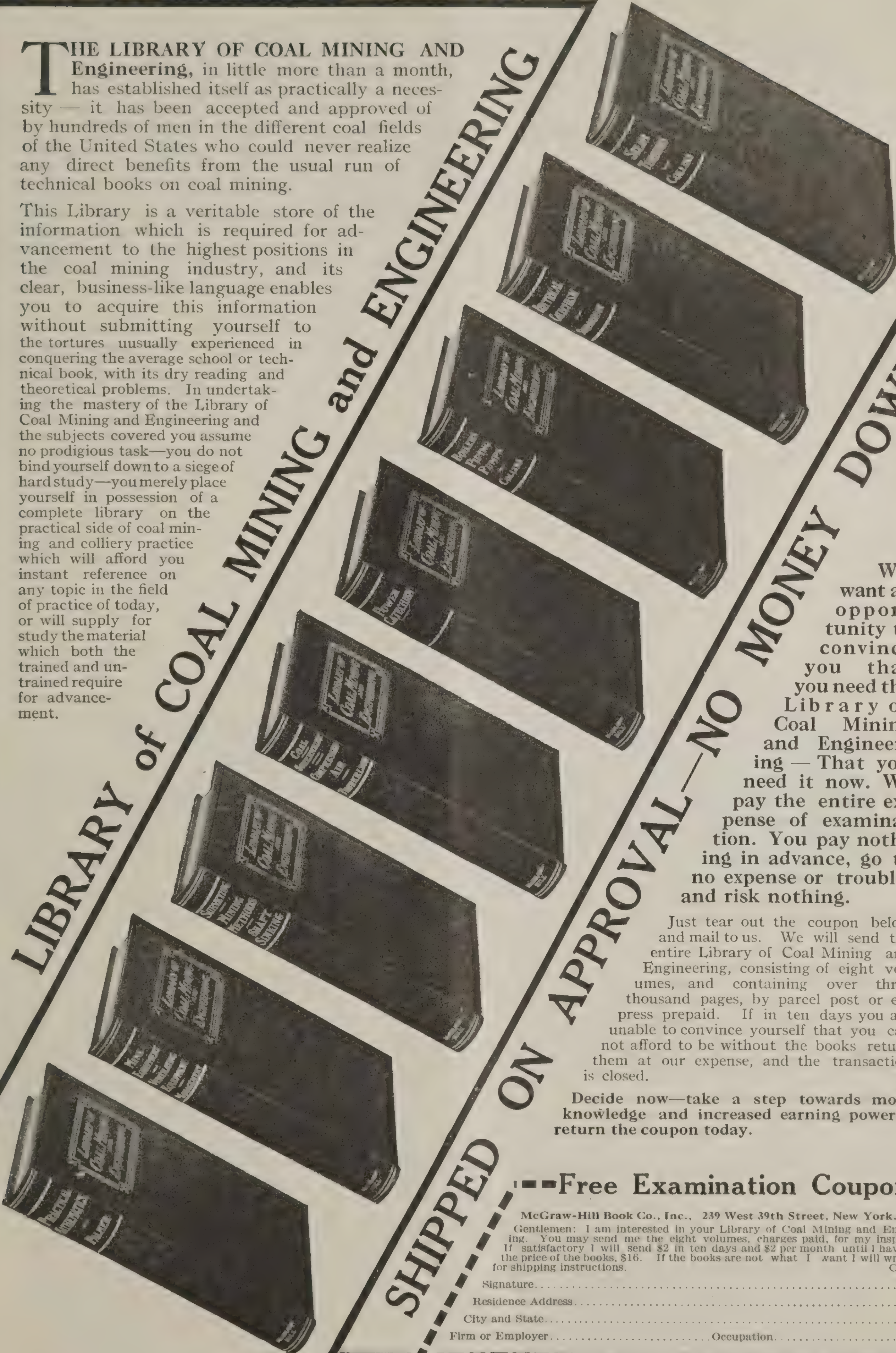

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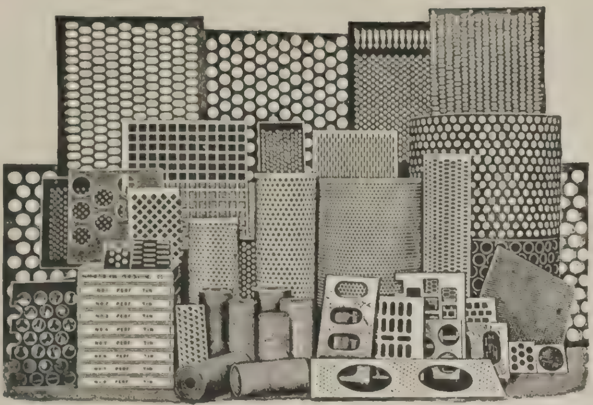

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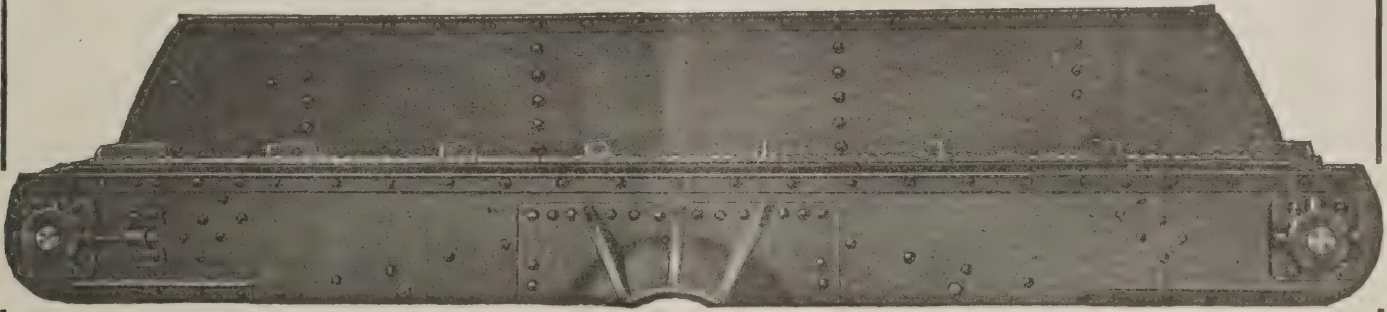

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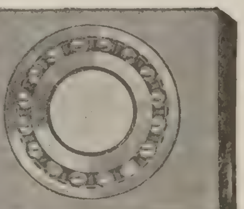

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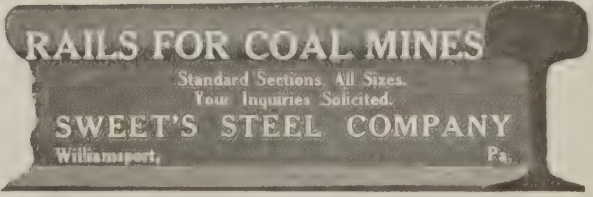

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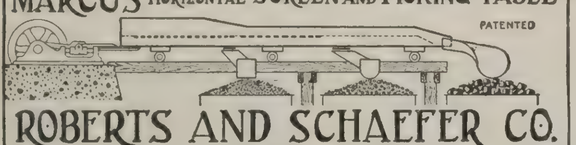

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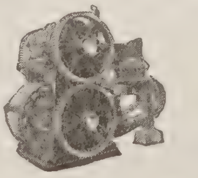

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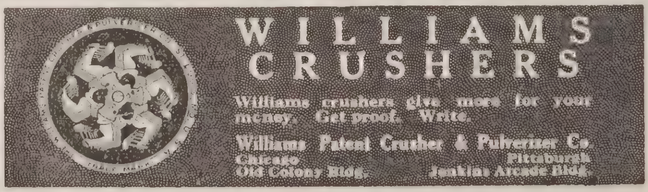

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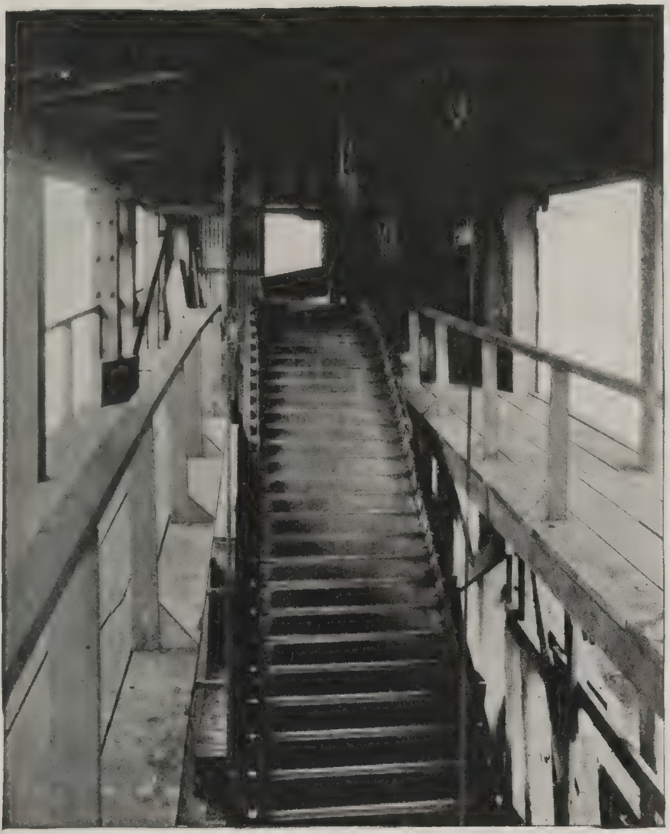

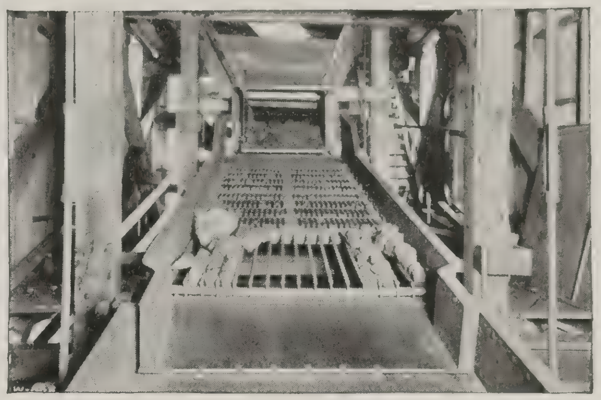

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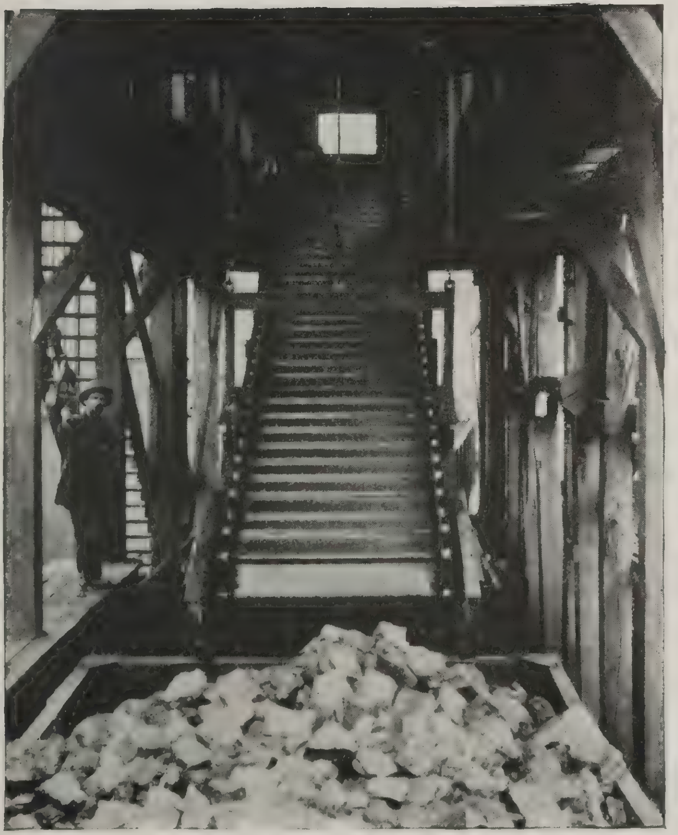

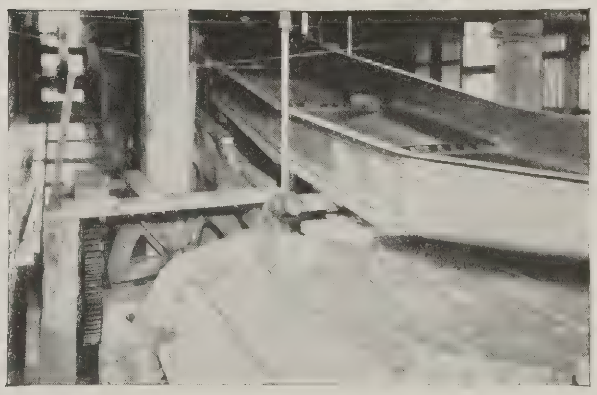

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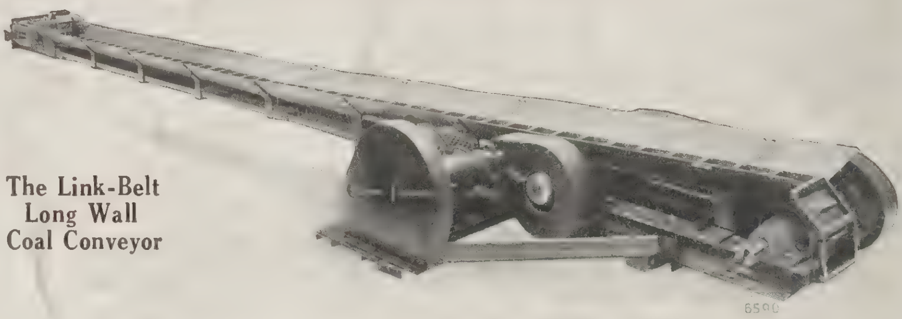
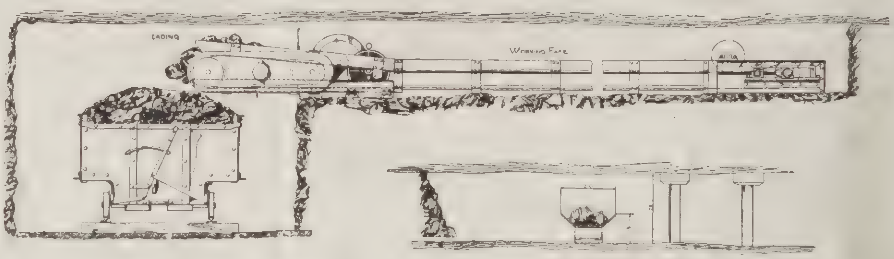
The Conveyor shown herewith was built for the Penna. Coal Co. It is 250 feet long and driven by a 7½ H.P. Back Geared Motor to give a speed of about 80 feet per minute. Driving mechanism can be placed on either side to suit conditions. The conveyor, which consists of a heavy H class chain, is mounted on a steel frame and trough—the trough being made into 16′ interchangeable sections and bolted together. This permits a section to be added whenever required as the coal is mined through the tunnel and makes it easy to transfer conveyor from one working face to another.

These machines are doing excellent work, and we recommend them wherever they can be used. They are strongly built for the work expected of them. Price and full particulars on request.

Let us work with you in planning your new Tipple, screening plant, picking table, or any other improvement you contemplate making. We make no charge for advice, layouts or estimates.



The Link-Belt Long Wall Coal Conveyor



Cross Section of the Conveyor

16′ Interchangeable Through Sections

LINK-BELT COMPANY

PHILADELPHIA **CHICAGO** **INDIANAPOLIS**

New York	299 Broadway
Pittsburgh	1501 Park Bldg.
Boston	49 Federal St.
St. Louis	Central Nat'l Bank Bldg.
Buffalo	698 Ellicott Square
Wilkes-Barre	2nd Nat'l Bank Bldg.
Detroit	911 Dime Bank Bldg.
Cleveland	1304 Rockefeller Bldg.
Seattle	580 First Ave., South
Portland, Ore	14th and Lovejoy Sts.
Los Angeles	204 N. Los Angeles St.
Denver	Lindrooth, Shubart & Co.
Minneapolis	Link-Belt Supply Co.
New Orleans	Whitney Supply Co.
San Francisco	N. D. Phelps, Sheldon Bldg.
Birmingham	General Machinery Co.
Brandford, Can	Waterous Eng. Works Co.
Montreal, Can	Williams & Wilson, Ltd.
Toronto, Can	Can. Link-Belt Co., Ltd.
Knoxville, Tenn	D. T. Blakey

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